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Canadian General
Standards Board

Office des normes
générales du Canada

Series 1
Série des 1

WITHDRAWAL

October 2011

Selected standards in the series Paints, pigments and related products

These CGSB standards and National Standards of Canada are hereby withdrawn due to limited use and support for their revision.

The Standards Council of Canada requires that accredited Standards Development Organizations, such as the CGSB, regularly review a consensus Standard to determine whether to re-approve, revise or withdraw. The review cycle is normally five years from the publication date of the latest edition of the Standard.

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RETRAIT

Octobre 2011

Sélection de normes de la série Peintures, pigments et produits connexes

Ces normes de l'ONGC et ces Normes nationales du Canada sont retirées par le présent avis en raison de leur utilisation limitée et du manque de support pour leur révision.

Le Conseil canadien des normes exige que les organismes accrédités d'élaboration de normes, tel que l'ONGC, effectue régulièrement un examen des normes consensuelles afin de déterminer s'il y a lieu d'en renouveler l'approbation, de les réviser ou de les retirer. Le cycle d'examen d'une norme est généralement de cinq ans à partir de la date de publication de la dernière édition de celle-ci.

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CAN/CGSB-1.5-M91

Low Flash Petroleum Spirits Thinner
(ICS 87.040)

CAN/CGSB-1.28-98

Exterior Alkyd House Paint (ICS 87.040)

CAN/CGSB-1.36-97

General Purpose Interior Alkyd Varnish
(ICS 87.040)

CAN/CGSB-1.38-2000

Interior Enamel Undercoater (ICS 87.040)

CAN/CGSB-1.40-97

Anticorrosive Structural Steel Alkyd Primer
(ICS 87.040)

CAN/CGSB-1.57-2003

Interior Alkyd Semigloss Enamel
(ICS 87.040)

CAN/CGSB-1.59-97

Alkyd Exterior Gloss Enamel (ICS 87.040)

CAN/CGSB-1.60-97

Interior Alkyd Gloss Enamel (ICS 87.040)

cette information. Ces normes doivent être consultées à des fins archivistiques seulement puisque leur contenu a été révoqué à la date du présent avis de retrait.

Des copies archivées des normes retirées peuvent être obtenues à des fins historiques ou archivistiques auprès du Centre des ventes de l'ONGC. Il suffit d'en faire la demande par téléphone au 819-956-0425 ou 1-800-665-2472, par télécopieur au 819-956-5740, par Internet à : www.tpsgc-pwgsc.gc.ca/ongc-cgsb/, par courriel à ncr.CGSB-ONGC@tpsgc-pwgsc.gc.ca, ou par courrier adressé au Centre des ventes, Office des normes générales du Canada, 11, rue Laurier, Gatineau, Canada K1A 1G6.

CAN/CGSB-1.5-M91

Diluant, essence minérale à faible point
d'éclair (ICS 87.040)

CAN/CGSB-1.28-98

Peinture aux résines alkydes d'extérieur
pour bâtiments (ICS 87.040)

CAN/CGSB-1.36-97

Vernis d'intérieur aux résines alkydes
d'usage général (ICS 87.040)

CAN/CGSB-1.38-2000

Peinture-émail d'intérieur, pour couche de
fond (ICS 87.040)

CAN/CGSB-1.40-97

Peinture pour couche primaire
anticorrosion, aux résines alkydes, pour
acier de construction (ICS 87.040)

CAN/CGSB-1.57-2003

Peinture-émail, d'intérieur, semi-brillante,
aux résines alkydes (ICS 87.040)

CAN/CGSB-1.59-97

Peinture-émail, d'extérieur, brillante, aux
résines alkydes (ICS 87.040)

CAN/CGSB-1.60-97

Peinture-émail brillante d'intérieur aux
résines alkydes (ICS 87.040)

CAN/CGSB-1.61-2004

Exterior and Interior Marine Alkyd Enamel
(ICS 87.040)

CAN/CGSB-1.69-98

Aluminum Paint (ICS 87.040)

1-GP-71 (Oct 1983)

Methods of Testing Paints and Pigments
(ICS 87.040)

1-GP-71

Methods of Testing Paints and Pigments

No. 5-96

Drying Times of Paints and Related
Coatings (ICS 87.040)

No. 38-96

Blushing Resistance of Lacquer
Finishes (ICS 87.040)

No. 73-96

Beilstein Test for Chlorinated Solvents
(ICS 87.040)

CAN/CGSB-1.73-97

Exterior and Interior Enamel for Floors
(ICS 87.040)

CAN/CGSB-1.74-2001

Alkyd Traffic Paint (ICS 87.040)

CAN/CGSB-1.76-2000

Interior and Exterior Heat-Resistant Enamel
(ICS 87.040)

CAN/CGSB-1.81-M90

Air Drying and Baking Alkyd Primer for
Vehicles and Equipment (ICS 87.040)

CAN/CGSB-1.84-M91

Alkyd Primer for Hardwood (ICS 87.040)

CAN/CGSB-1.61-2004

Peinture-émail aux résines alkydes,
d'extérieur et d'intérieur, marine
(ICS 87.040)

CAN/CGSB-1.69-98

Peinture à l'aluminium (ICS 87.040)

1-GP-71 (oct. 1983)

Méthodes d'essai des peintures et pigments
(ICS 87.040)

1-GP-71

Méthodes d'essai des peintures et pigments

N° 5-96

Durée de séchage des peintures et
revêtements apparentés (ICS 87.040)

N° 38-96

Résistance à l'opalescence des
produits-laque de finition (ICS 87.040)

N° 73-96

Détermination de la présence de
solvants chlorés par l'essai de Beilstein
(ICS 87.040)

CAN/CGSB-1.73-97

Peinture-émail d'extérieur et d'intérieur,
pour sols (ICS 87.040)

CAN/CGSB-1.74-2001

Peinture alkyde de démarcation routière
(ICS 87.040)

CAN/CGSB-1.76-2000

Peinture-émail résistant à la chaleur,
d'intérieur et d'extérieur (ICS 87.040)

CAN/CGSB-1.81-M90

Peinture pour couche primaire aux résines
alkydes, séchant à l'air ambiant et au four,
pour véhicules automobiles et équipement
(ICS 87.040)

CAN/CGSB-1.84-M91

Peinture d'impression aux résines alkydes,
pour bois dur (ICS 87.040)

CAN/CGSB-1.88-92

Gloss Alkyd Enamel, Air Drying and Baking
(ICS 87.040)

CAN/CGSB-1.100-99

Interior Flat Latex Paint (ICS 87.040)

CAN/CGSB-1.104-M91

Semigloss Alkyd Air Drying and Baking
Enamel (ICS 87.040)

CAN/CGSB-1.105-M91

Quick-Drying Primer (ICS 87.040)

CAN/CGSB-1.114-M91

Quick-Drying Flat Enamel (ICS 87.040)

CAN/CGSB-1.118-95

Interior Flat Alkyd Finish (ICS 87.040)

CAN/CGSB-1.119-2000

Interior Latex Primer-Sealer (ICS 87.040)

CAN/CGSB-1.122-99

Anticorrosive Vinyl Primer (ICS 87.040)

CAN/CGSB-1.132-M90

Zinc Chromate Primer, Low Moisture
Sensitivity (ICS 87.040)

CAN/CGSB-1.135-99

Flat Alkyd Enamel for Equipment
(ICS 87.040)

CAN/CGSB-1.138-97

Exterior Latex Flat Paint (ICS 87.040)

CAN/CGSB-1.143-98

Silicone Alkyd Heat-Resistant Aluminum
Enamel (ICS 87.040)

CAN/CGSB-1.88-92

Peinture-émail brillante aux résines alkydes,
séchant à l'air ambiant et au four
(ICS 87.040)

CAN/CGSB-1.100-99

Peinture-émulsion mate d'intérieur
(ICS 87.040)

CAN/CGSB-1.104-M91

Peinture-émail semi-brillante aux résines
alkydes séchant à l'air ambiant et au four
(ICS 87.040)

CAN/CGSB-1.105-M91

Peinture pour couche primaire à séchage
rapide (ICS 87.040)

CAN/CGSB-1.114-M91

Peinture-émail mate à séchage rapide
(ICS 87.040)

CAN/CGSB-1.118-95

Peinture de finition mate d'intérieur aux
résines alkydes (ICS 87.040)

CAN/CGSB-1.119-2000

Peinture-émulsion d'impression d'intérieur
(ICS 87.040)

CAN/CGSB-1.122-99

Peinture pour couche primaire, aux résines
vinyliques, anticorrosion (ICS 87.040)

CAN/CGSB-1.132-M90

Peinture pour couche primaire, au chromate
de zinc, à faible sensibilité à l'humidité
(ICS 87.040)

CAN/CGSB-1.135-99

Peinture-émail mate aux résines alkydes
pour équipement (ICS 87.040)

CAN/CGSB-1.138-97

Peinture-émulsion (latex) mate, d'extérieur
(ICS 87.040)

CAN/CGSB-1.143-98

Peinture-émail aux résines silicones-
alkydes résistante à la chaleur (ICS 87.040)

CAN/CGSB-1.145-97

Solvent-Based Pigmented Stain
(ICS 87.040)

CAN/CGSB-1.146-99

Cold Curing, Gloss Epoxy Coating
(ICS 87.040)

CAN/CGSB-1.150-M91

Clear Lacquer for Wood Furniture
(ICS 87.040)

CAN/CGSB-1.153-2000

High-Build, Gloss Epoxy Coating
(ICS 87.040)

CAN/CGSB-1.154-M89

Latex Type Paint for Concrete Floors
(ICS 87.040)

CAN/CGSB-1.158-M89

Cellulose Nitrate Primer, Modified Alkyd
Type (ICS 87.040)

CAN/CGSB-1.159-92

Acrylic Cellulose Nitrate Gloss Lacquer
(ICS 87.040)

CAN/CGSB-1.160-93

Low Gloss Acrylic Cellulose Nitrate
Lacquer (ICS 87.040)

CAN/CGSB-1.162-2004

Emulsion Coating for Stucco and Masonry
(ICS 87.040)

CAN/CGSB-1.165-2004

Cold-Curing Epoxy Primer (ICS 87.040)

CAN/CGSB-1.171-98

Inorganic Zinc Coating (ICS 87.040)

CAN/CGSB-1.175-97

Polyurethane Interior Coating (ICS 87.040)

CAN/CGSB-1.145-97

Teinture pigmentée à base de solvant
(ICS 87.040)

CAN/CGSB-1.146-99

Revêtement aux résines époxydiques,
durcissant à froid, brillant (ICS 87.040)

CAN/CGSB-1.150-M91

Vernis-laque pour meubles en bois
(ICS 87.040)

CAN/CGSB-1.153-2000

Revêtement par peinture aux résines
époxydiques, à pouvoir garnissant élevé,
brillant (ICS 87.040)

CAN/CGSB-1.154-M89

Peinture-émulsion (latex) pour sols en béton
(ICS 87.040)

CAN/CGSB-1.158-M89

Peinture-laque pour couche primaire, au
nitrate de cellulose et aux résines alkydes
modifiées (ICS 87.040)

CAN/CGSB-1.159-92

Produit-laque brillant à la résine acrylique et
au nitrate de cellulose (ICS 87.040)

CAN/CGSB-1.160-93

Peinture-laque aux résines acryliques et au
nitrate de cellulose, peu brillante
(ICS 87.040)

CAN/CGSB-1.162-2004

Revêtement de type émulsion pour stuc et
maçonnerie (ICS 87.040)

CAN/CGSB-1.165-2004

Peinture pour couche primaire aux résines
époxydiques, durcissant à froid
(ICS 87.040)

CAN/CGSB-1.171-98

Enduit au zinc minéral (ICS 87.040)

CAN/CGSB-1.175-97

Revêtement de polyuréthane d'intérieur
(ICS 87.040)

CAN/CGSB-1.176-2000

Interior Clear Moisture-Curing Polyurethane Coating (ICS 87.040)

CAN/CGSB-1.177-M91

Two-Component Polyurethane Coating, Resistant to Chalking and Yellowing (ICS 87.040)

1-GP-180Ma (Feb 1996)

Coating, Polyurethane, Two-Package, General Purpose (ICS 87.040)

CAN/CGSB-1.181-99

Ready-Mixed Organic Zinc-Rich Coating (ICS 87.040)

CAN/CGSB-1.183-99

Zinc-Rich Epoxy Coating (ICS 87.040)

CAN/CGSB-1.184-98

Coal Tar-Epoxy Coating (ICS 87.040)

CAN/CGSB-1.188-2004

Emulsion Filler for Masonry Block (ICS 87.040)

CAN/CGSB-1.189-2000

Exterior Alkyd Primer for Wood (ICS 87.040)

CAN/CGSB-1.190-M90

Sanding Type Primer Surfacer (ICS 87.040)

1-GP-191M (Apr 1980)

Enamel, Automotive Refinishing, Fast Drying, Gloss (ICS 87.040)

1-GP-192Ma (Feb 1985)

Deck Coating, Nonslip, Epoxy (ICS 87.040)

CAN/CGSB-1.176-2000

Revêtement de polyuréthane, d'intérieur, durci à l'humidité, non pigmenté (ICS 87.040)

CAN/CGSB-1.177-M91

Revêtement de polyuréthane, à deux constituants séparés, non jaunissant et non farinant (ICS 87.040)

1-GP-180Ma (févr. 1996)

Revêtement de polyuréthane, à deux constituants séparés, pour utilisation générale (ICS 87.040)

CAN/CGSB-1.181-99

Enduit riche en zinc, organique et préparé (ICS 87.040)

CAN/CGSB-1.183-99

Enduit aux résines époxydiques, riche en zinc (ICS 87.040)

CAN/CGSB-1.184-98

Revêtement à base de goudron de houille-résines époxydiques (ICS 87.040)

CAN/CGSB-1.188-2004

Apprêt-émulsion pour blocs de maçonnerie (ICS 87.040)

CAN/CGSB-1.189-2000

Peinture d'impression, d'extérieur, aux résines alkydes, pour le bois (ICS 87.040)

CAN/CGSB-1.190-M90

Peinture pour couche primaire surfaçante de type ponçable (ICS 87.040)

1-GP-191M (avr. 1980)

Peinture-émail brillante, à séchage rapide, pour le repeinturage des carrosseries de véhicules automobiles (ICS 87.040)

1-GP-192Ma (févr. 1985)

Revêtement de pont, antidérapant, aux résines époxydiques (ICS 87.040)

CAN/CGSB-1.193-99

High-Build Epoxy Marine Coating
(ICS 87.040)

CAN/CGSB-1.195-99

Interior Latex Semigloss Paint (ICS 87.040)

CAN/CGSB-1.198-2001

Cementitious Primer for Galvanized
Surfaces (ICS 87.040)

1-GP-200Ma (Jan 1985)

Deck Coating, Nonslip, Polyurethane
(ICS 87.040)

CAN/CGSB-1.202-2003

Interior Alkyd Low Gloss Enamel
(ICS 87.040)

CAN/CGSB-1.203-2003

Exterior Latex Wood Primer (ICS 87.040)

CAN/CGSB-1.204-98

Exterior Latex Pigmented Stain
(ICS 87.040)

CAN/CGSB-1.205-2003

Sealer for Application to Asbestos-Fibre
Releasing Materials (ICS 87.040)

CAN/CGSB-1.207-98

Low-Temperature Curing Epoxy Coating
(ICS 87.040)

CAN/CGSB-1.208-99

Marine Interior Water-Borne Gloss Enamel
(ICS 87.040)

CAN/CGSB-1.209-2003

Interior Latex Low Gloss Paint (ICS 87.040)

CAN/CGSB-1.210-2003

Quick-Drying Alkyd Primer for Structural
Steel (ICS 87.040)

CAN/CGSB-1.193-99

Revêtement aux résines époxydiques, à
pouvoir garnissant élevé, marin
(ICS 87.040)

CAN/CGSB-1.195-99

Peinture-émulsion semi-brillante d'intérieur
(ICS 87.040)

CAN/CGSB-1.198-2001

Peinture primaire additionnée de ciment,
pour surfaces galvanisées (ICS 87.040)

1-GP-200Ma (janv. 1985)

Revêtement de pont, antidérapant, aux
résines polyuréthanes (ICS 87.040)

CAN/CGSB-1.202-2003

Peinture-émail d'intérieur, aux résines
alkydes, peu brillante (ICS 87.040)

CAN/CGSB-1.203-2003

Peinture-émulsion (latex) d'impression
extérieure, pour bois (ICS 87.040)

CAN/CGSB-1.204-98

Teinture-émulsion pigmentée pour extérieur
(ICS 87.040)

CAN/CGSB-1.205-2003

Peinture d'obturation pour matériaux
renfermant des fibres d'amiante
(ICS 87.040)

CAN/CGSB-1.207-98

Revêtement aux résines époxydiques
durcissant à basse température
(ICS 87.040)

CAN/CGSB-1.208-99

Peinture-émail brillante en suspension
aqueuse, marine, d'intérieur (ICS 87.040)

CAN/CGSB-1.209-2003

Peinture-émulsion d'intérieur peu brillante
(ICS 87.040)

CAN/CGSB-1.210-2003

Peinture primaire aux résines alkydes à
séchage rapide pour acier de charpente
(ICS 87.040)

CAN/CGSB-1.211-95

Coating Systems for Marine Floating Navigational Aids (Buoys) (ICS 87.040)

CAN/CGSB-1.212-2004

Heavy-Metal-Free Marine Primer for Steel and Light-Alloy Surfaces (ICS 87.040)

CAN/CGSB-1.213-2004

Etch Primer (Pretreatment Coating or Tie Coat) for Steel and Aluminum (ICS 87.040)

CAN/CGSB-1.214-2004

Heavy-Metal-Free, Water-Borne, Marine Primer for Steel and Light-Alloy Surfaces (ICS 87.040)

CAN/CGSB-1.215-96

Two-Package Epoxy Blockfiller (ICS 87.040)

CAN/CGSB-1.216-97

Exterior Water-Borne Gloss Enamel (ICS 87.040)

CAN/CGSB-1.219-2001

Lead and Chromate-Free Waterborne Traffic Paint (ICS 87.040)

CAN/CGSB-1.220-2001

Lead and Chromate-Free Alkyd Traffic Paint (ICS 87.040)

CAN/CGSB-1.223-2004

Heavy-Metal-Free, Water-Borne Wash Primer-Tie Coat (ICS 87.040)

CAN/CGSB-1.300-2000

Applied Coating System of Semigloss Baked Finish for Metal Office Furniture (ICS 87.040)

CAN/CGSB-1.500-75

Methods for Test for Toxic Trace Elements in Protective Coatings (ICS 87.040)

CAN/CGSB-1.211-95

Systèmes de revêtement pour aides à la navigation flottantes (bouées) (ICS 87.040)

CAN/CGSB-1.212-2004

Peinture primaire sans métal lourd, marine, pour surfaces en acier et en alliage léger (ICS 87.040)

CAN/CGSB-1.213-2004

Peinture primaire réactive (enduit de traitement préliminaire ou couche de liaison) pour l'acier et l'aluminium (ICS 87.040)

CAN/CGSB-1.214-2004

Peinture primaire, sans métal lourd, en suspension aqueuse, marine, pour surfaces en acier et en alliage léger (ICS 87.040)

CAN/CGSB-1.215-96

Apprêt pour blocs aux résines époxydiques en deux constituants (ICS 87.040)

CAN/CGSB-1.216-97

Peinture-émail brillante d'extérieur en suspension aqueuse (ICS 87.040)

CAN/CGSB-1.219-2001

Peinture à l'eau de démarcation routière sans plomb ni chromate (ICS 87.040)

CAN/CGSB-1.220-2001

Peinture alkyde de démarcation routière sans plomb ni chromate (ICS 87.040)

CAN/CGSB-1.223-2004

Peinture primaire réactive – Couche de liaison, sans métal lourd, en suspension aqueuse (ICS 87.040)

CAN/CGSB-1.300-2000

Système de revêtement de finition semi-brillant, cuit au four, pour meubles métalliques de bureau (ICS 87.040)

CAN/CGSB-1.500-75

Méthodes d'essai des éléments toxiques à l'état de trace dans les revêtements protecteurs (ICS 87.040)

CAN/CGSB-1.501-M89

Method for Permeance of Coated
Wallboard (ICS 87.040)

CAN/CGSB-1.501-M89

Méthode de détermination de la perméance
des panneaux muraux revêtus (ICS 87.040)

Canadian General Standards Board

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Office des normes générales du Canada

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Methods of Testing Paints and Pigments

1-GP-71

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Canada

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Une liste à jour des normes de l'ONGC comprenant des renseignements sur les normes récentes et les derniers modificatifs parus et sur la façon de se les procurer figure au Catalogue des normes publié chaque année avec un supplément. Cette publication est gratuite et tout intéressé peut en faire la demande.

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METHODS OF TESTING PAINTS AND PIGMENTS

This October 1983 reprint incorporates amendments 1 to 12 and supplement No. 1 into the August 1974 edition. All test methods have been printed on new identifying headers. No changes have been made to any test method.

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FOREWORD

CGSB 1-GP-71 contains physical and chemical methods of testing paints, pigments and related commodities for conformance with the standards of the Canadian General Standards Board and with legislation of the Government of Canada. These methods provide a uniform basis for testing, and thus they eliminate divergence in results arising from variations in the methods used.

New and revised test methods are provided by the CGSB Committee on Paint Test Methods. The committee has representatives from government, defence establishments, the coatings industry and industrial laboratories.

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Holders of 1-GP-71 may automatically receive the standard's amendments (but not the supplements) without charge as they are issued. Send your request, including name, mailing address, and number of copies required to the:

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 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
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Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	SAMPLING OF FILLED CONTAINERS AND BULK SAMPLING OF LIQUIDS	METHOD 1.1 August 1974

Supersedes Issue of
October 1957

FILLED CONTAINERS

Select at random a single unopened container from each batch*. When containers are of less than 1 gal (4.5 l) capacity, take a sufficient number to provide not less than 2 qt (2.2 l) (unless otherwise specified) from each batch. When the capacity of the containers exceeds 1 gal (4.5 l) (or 10 lb (4.5 kg) for powders), procure the sample by opening a container, removing any surface skin, thoroughly mixing the contents and withdrawing 2 qt (2.2 l) of material or other specified amount. Place immediately in air-tight containers, completely filling them. Pay particular attention to the thorough mixing of the material in the container before withdrawing the sample. When powdered material cannot be conveniently mixed, take a cored sample. Samples must be representative of the contents of containers.

BULK SAMPLING OF LIQUIDS

Mix the material in the tank thoroughly before completely filling two 1 qt (1.1 l) containers. If the containers are to be filled from a valve on the bottom or side of the tank, mix the material, draw off at least 5 gal (23 l) through the valve and return to the tank before taking the sample.

* A batch is defined as the end product of all the raw materials processed in a single grinding or mixing operation.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	SAMPLING OF PUTTY	METHOD 1.4 August 1974

Supersedes Issue of
October 1957

Select at random, a single unopened container from each batch* of 1000 lb (454 kg) or less. When the capacity of the container exceeds 1 gal (4.5 l) (or 10 lb (4.5 kg) for powders), procure the sample by opening a container, removing any surface skin, thoroughly mixing the remaining material and withdrawing sufficient to fill a pint (0.6 l) can. Prior to any test, remove surface skin from the sample and mix thoroughly if there is evidence of exudation.

* A batch is defined as the end product of all the raw materials processed in a single grinding or mixing operation.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	DENSITY (WEIGHT PER GALLON)	Method 2.1 May 1978

Supersedes issue of
August 1974

SCOPE

This method is for determining the density (weight per gallon) of paints, enamels and related materials at 20-25°C.

APPARATUS

- (a) Density cup of 80-105 mL capacity, weighing not more than 160 g
- (b) Analytical balance accurate to 1 mg
- (c) Laboratory balance accurate to 0.1 g

CALIBRATION OF THE DENSITY CUP

Clean the density cup thoroughly, and in the subsequent standardization avoid handling, which will leave fingerprints. Weigh the cup on the analytical balance to 1 mg. In an environment of 20-25°C fill the cup with distilled water at a temperature slightly below 20°C. Immediately cap the cup and dry the outside with clean lintless tissue. Allow the cup and contents to stand in a location free from draughts for 30 min to attain room temperature (20-25°C) and measure that temperature in the vicinity of the cup. When constant volume is attained, wipe off the cap to remove water expelled by expansion, being careful to avoid wicking-out of the water. Determine the volume of the cup from the mass of water and the density of water at the temperature of calibration (see Table). Repeat the standardization until three volumes are obtained that do not have a range greater than 0.03 mL. Calculate the mean volume of the cup to 0.01 mL. If in frequent use, the cup should be recalibrated occasionally since the volume will increase due to cleaning.

Density of Water Table

Temp. °C	Density kg/L	Temp. °C	Density kg/L
20.0	0.99823	23.0	0.99756
20.5	0.99813	23.5	0.99744
21.0	0.99802	24.0	0.99732
21.5	0.99791	24.5	0.99720
22.0	0.99780	25.0	0.99707
22.5	0.99768	25.5	0.99694

The density at temperatures between the above values should be obtained by interpolation.

Calculate the volume of the density cup as follows:

$$\text{Volume of cup (mL)} = \frac{\text{mass of water (g)}}{\text{Density of water at the same temperature (kg/L)}}$$

PROCEDURE

Stir the material under test thoroughly without entrapping air bubbles. Weigh the clean density cup on the laboratory balance to 0.1 g. Fill the density cup with the material at a temperature within the range 20-25°C and place the cap on the cup, removing excess material with clean tissue. A slight amount should be forced through the hole in the cap to show that the cup is full. Reweigh to 0.1 g and calculate the density as follows:

$$\text{density (kg/L) (at 20-25°C)} = \frac{\text{mass of paint (g)}}{\text{volume of cup (mL)}}$$

$$\text{weight per gallon (lb/gal) (at 20-25°C)} = \text{density (kg/L)} \times 10.02$$

PRECISION

Based on a cooperative paint exchange in which sixteen laboratories participated, this method has been found capable of the following precision at the 95% confidence level:

Repeatability — Two separate determinations by the same operator should not differ by more than 0.0017 kg/L. The range of three determinations should not exceed 0.002 kg/L.

Reproducibility — The difference between the mean of duplicates or triplicates obtained in two different laboratories should not exceed 0.007 kg/L. For three laboratories the range of the mean should not exceed 0.01 kg/L.

Withdrawn/Retirée

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	SPECIFIC GRAVITY	METHOD 2.2 August 1974

SCOPE

Supersedes Issue of
August 1963

This method is for use in determining the specific gravity of liquids that have a viscosity not greater than Z (Gardner-Holdt scale).

APPARATUS

- Weld Pycnometer* - A pycnometer of 25 ml capacity with a ground-glass stopper having a capillary opening and a cap to prevent evaporation and to form a chamber for expansion.
- Water bath* - A water bath that can be adjusted to $25 \pm 0.1^{\circ}\text{C}$ ($77 \pm 0.2^{\circ}\text{F}$).
- Thermometer* - An ASTM Low Softening Point thermometer having a range of -2 to 80°C and conforming to the requirements for thermometer 15C of ASTM E 1 Standard Specification for ASTM Thermometers.
- Analytical balance and weights.

PROCEDURE

Clean the pycnometer by filling it with a saturated solution of chromic acid in H_2SO_4 (sp gr 1.84) and allowing it to stand a few hours. Empty and rinse well with distilled water. Fill the pycnometer with freshly boiled distilled water that has been cooled to a few degrees below 25°C (77°F). Set it in the water bath maintained at that temperature, to a depth just below the outer ground-glass joint. Put the stopper firmly in place, taking care not to trap any air bubbles. If the humidity is low, evaporation through the capillary may be retarded by capping the pycnometer after 5 min immersion. Allow the pycnometer and contents to come to constant volume at the constant temperature. After immersion in the bath for 1 h, remove the cap and wipe any excess water from the capillary and stopper with lens paper. Cap the pycnometer immediately and remove from the bath. Wipe the pycnometer dry and weigh.

Empty the pycnometer, rinse successively with alcohol and ether and remove the ether vapor by warming in an oven at 50 – 60°C (120 – 140°F). (Or empty and dry the pycnometer in the oven.) Cool in a desiccator and weigh. Subtract the weight of the empty pycnometer from the weight when filled with distilled water to obtain the weight of water (W) contained at 25°C . Where a high degree of accuracy is required, the pycnometer should be calibrated three or four times.

Cool a sample of the material to a few degrees below 25°C and fill the pycnometer, taking care to prevent formation of bubbles. Set in the water bath, put the stopper in place and bring to exact temperature as above. With relatively volatile materials the pycnometer should be capped after several minutes immersion. At the end of 1 h remove the cap, reset the stopper, and wipe excess material from the stopper and joints with lens paper. For oils and resins the paper should be moistened slightly with benzene to ensure complete removal. Cap immediately and take the pycnometer from the bath. Wipe dry and weigh. Subtract the weight of the empty pycnometer from the weight when filled with material to obtain the weight of material (S) contained at 25°C .

Calculate the specific gravity at 25°C as follows:

$$\text{Specific gravity} = \frac{S}{W}$$

PRECISION

This method has been found capable of the following precision at the 95% confidence level:

- Two single determinations by the same operator should not differ by more than 0.0009. The range of three determinations by the same operator should not exceed 0.0011.
- The range between mean results from different laboratories should not exceed those given in the table below; where more than one operator is used in each laboratory, the range is taken between the over-all mean for each laboratory.

Number of Operators in each Laboratory	Ranges for Two Labs- Number of Determina- tions by each Operator			Ranges for Three Labs- Number of Determina- tions by each Operator		
	1	2	3	1	2	3
1	0.0017	0.0016	0.0015	0.0022	0.0020	0.0019
2	0.0015	0.0014	0.0013	0.0019	0.0017	0.0017
3	0.0014	0.0013	0.0013	0.0017	0.0016	0.0016

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	SPECIFIC GRAVITY Viscous Liquids	METHOD 2.3 August 1974

Supersedes Issue of
April 1960

SCOPE

This method is for use in determining the specific gravity of oils and resins having a viscosity greater than Z (Gardner-Hold scale).

APPARATUS AND MATERIALS

- Water bath and thermometer as described in Method 2.2.
- Analytical balance and weights.
- Hubbard-Carmick Pycnometer - A pycnometer of 25 ml capacity with a wide-mouth ground-glass stopper having a capillary opening diameter not greater than 1.5 mm.
- Odorless Solvent - A hydrocarbon solvent with a kauri-butanol value (ASTM D1133) not greater than 27 and an initial boiling point (ASTM D86) not less than 170°C (340°F). Use of stronger solvents will introduce an error due to contraction in volume.

PROCEDURE

Determine the specific gravity of the solvent at the specified temperature according to Method 2.2. Determine the weight of distilled water that the Hubbard-Carmick pycnometer contains at the specified temperature, following Method 2.2 except that this pycnometer does not have a cap. New pycnometers should be calibrated several times until the stopper becomes well seated and the weight of water does not decrease with successive determinations.

Warm the viscous material at 60-105°C (140-220°F). If the material contains volatile solvents, precautions should be taken to prevent evaporation. Remove any bubbles from the surface of the material and slowly pour 5-10 g into the dry, tared pycnometer, taking care to avoid getting material on the side. If bubbles are formed during the pouring, place the pycnometer and contents in the oven until the bubbles have risen to the surface. Cool in a desiccator and reweigh.

Cool the pycnometer and some of the solvent to a few degrees below the specified temperature. Slowly add the solvent to the pycnometer, pouring down the side to avoid mixing with the material. Allow the solvent to release air bubbles from the surface of the material before the stopper is inserted. Immerse the pycnometer up to the neck in the water bath maintained at the specified temperature and allow to come to constant volume at the constant temperature. At the end of 1 h firmly seat the stopper and remove excess solvent from the top with lens paper. Remove the pycnometer from the bath, wipe dry and weigh immediately.

Calculate the specific gravity of the material at the specified temperature as follows:

$$\text{Specific gravity at ---/---}^{\circ}\text{F (---/---}^{\circ}\text{C)} = \frac{C-A}{(B-A) - \frac{(D-C)}{(E)}}$$

Where A = weight of empty pycnometer

B = weight of pycnometer plus water

C = weight of pycnometer plus sample

D = weight of pycnometer plus sample plus solvent

E = specific gravity of solvent at same temperature determined according to Method 2.2

PRECISION

The precision of this method has been calculated from the laboratory work that led to the method. However, permissible ranges based on results from one operator only are usually smaller than where several operators and laboratories have performed the test.

Two single determinations by the same operator should not differ by more than 0.0011. The range of three determinations by the same operator should not exceed 0.0013.

(Reference - Specific Gravity of Viscous Materials, by H.E. Ashton, in publication, March 28, 1960.)

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	FLASH POINT PIGMENTED MATERIALS BY THE PENSKY-MARTENS CLOSED CUP TESTER	METHOD 3.1 August 1975

Supersedes Issue of
August 1974

SCOPE

This method is for determining the flash point of paints and related products that require stirring to obtain uniform distribution of heat. Part A is for materials with a flash point above 10°C (50°F) and Part B for those flashing below this temperature.

PART A - Flash Point Above 10°C (50°F)

APPARATUS

- Pensky-Martens Flash Tester - The Pensky-Martens Closed Flash Tester as specified in ASTM D 93.
- Thermometer - For tests in which the indicated reading falls between 10 and 110°C (50 and 230°F), use the ASTM Low-Range Pensky-Martens (#9) thermometer graduated in either Celsius or Fahrenheit degrees, with a range of -5 to +110°C (20 to 230°F) and conforming to the requirements for this thermometer in ASTM E 1, Standard Specification for Thermometers. Mount the thermometer so that the bottom of the bulb is 45 mm (1.75 in.) below the rim of the cup (which corresponds to the level of the lower surface of the portion of the lid inside the rim).

PROCEDURE

Thoroughly clean and dry all parts of the cup and its accessories before starting the test, being sure to remove any solvent used to clean the apparatus. Gasoline or other low-flashing materials should not be used as cleaners.

Cool the sample in a sealed container and also cool the cup to a temperature at least 17°C (30°F) below the expected flash point and then, immediately prior to running the flash point test, fill the cup to the level indicated by the filling mark.

Place the lid on the cup and set the cup in the stove. Ensure that the locating devices are properly engaged and insert the thermometer. Light the test flame and adjust it to the size of a bead 4 mm (5/32 in.) in diameter. Start the stirrer turning at a rate of 100 to 120 rpm in a downward direction.

Commence heating at such a rate that the temperature reading on the thermometer increases at $1.25 \pm 0.15^\circ\text{C}$ ($2.25 \pm 0.25^\circ\text{F}$) per min. Make the first application of the test flame at a temperature not less than 17°C (30°F) below the actual flash point, by operating the device controlling the shutter and test flame burner so that the flame is lowered into the cup in 0.5 s, left in its lowered position for 1 s, and quickly raised to its high position. Discontinue stirring during application of the test flame. Apply the test flame at each temperature reading that is a multiple of 1°C (2°F).

The flash point is the temperature read on the thermometer at the time the test flame causes a distinct flash in the interior of the cup. Do not confuse the true flash with the bluish halo that sometimes surrounds the test flame during applications preceding the one that causes the actual flash.

BAROMETRIC PRESSURE

Observe and record the barometric pressure at the time of the test but make corrections only in cases of dispute. When required, correct the observed flash point as follows:

For each 25 mm (1 in.) below 760 mm (29.92 in.) barometric reading, add 0.9°C (1.6°F) to the flash point.

For each 25 mm (1 in.) above 760 mm (29.92 in.), subtract 0.9°C (1.6°F).

After applying the correction, round off the values obtained to the nearest 0.5°C (1°F).

PRECISION

The flash point is usually determined by running a preliminary test to obtain the approximate flash point and then carrying out at least two fully controlled tests. The preliminary test is not included in the reported result. On this basis the method has been found to have the following precision at the 95% confidence level:

Repeatability - Two determinations by the same operator should not differ by more than 1.1°C (2°F). The range of three determinations by the same operator should not exceed 1.3°C (2.4°F).

Reproducibility - The difference between the mean of duplicates or triplicates obtained in two different laboratories should not exceed 4.4°C (8°F). For three laboratories the range of means should not exceed 5°C (9.5°F).

PART B - FLASH POINT BELOW 10°C (50°F)

For measuring flash points below 10°C (50°F) one of the following methods shall be used:

(1) *Referee Method* - The flash point is carried out in either a low temperature room or cold box large enough to conduct the tests and to provide the specified rate of temperature increase. It has been found that a temperature of -18°C (0°F) is required to meet these conditions. The Pensky-Martens Closed Flash Tester specified in ASTM D 93 shall be used except for samples which solidify above their flash point. For such samples the Tag Closed Cup Tester specified in ASTM D 56 shall be used.

(2) *Modified Pensky-Martens Method* - The flash point is carried out at room temperature, in the range 21 to 27°C (70 to 80°F) using the Pensky-Martens Closed Flash Tester modified as shown in Figure 1.

APPARATUS AND PROCEDURE

(1) *The Referee Method*

(a) Tester - The Pensky-Martens Closed Flash Tester as described in ASTM D 93.

(b) Thermometer

- (i) For tests in the range -18 to +10°C (0 to 50°F) use either an ASTM Low-Range Tag Closed Tester Thermometer (#57) or an Aniline Point Thermometer (#33).
- (ii) For tests in the range -35 to -18°C (-30 to 0°F) use the Aniline Point Thermometer (#33) only.
- (iii) For tests below -35°C (-30°F) use ASTM Low Cloud and Pour Point Thermometer (#6)

Thermometer in the range -35 to +10°C (-30 to +50°F). The thermometers shall conform to the requirements of ASTM E 1. Mount the thermometers in the flash point tester as specified in Part A.

Cold Room - A suitably designed walk-in cold room which can be maintained at a temperature of about -18°C (0°F). This temperature has been found suitable to provide the specified rate of rise of sample temperature required for the test,

or a *Cold Chamber* - A suitably designed cold chamber which can be maintained at the same temperature described for the cold room.

Procedure - Follow the procedure for cleaning the apparatus as described in Part A. Cool the sample in a tightly sealed container to prevent loss of fast evaporating solvents, and cool the flash point apparatus for not less than 1 h at a temperature of 17°C (30°F) below the expected flash point. Carry out the flash point test in the cold room or chamber.

Fill the cup as described in Part A. Place the lid on the cup, set the cup in the stove, and insert the thermometer. Light the test flame and adjust it to the size of a bead 4 mm (5/32 in.) in diameter. Start the stirrer turning at a rate of 100 to 120 rpm in a downward direction.

Make the first application of the test flame as described in Part A at -35°C (-30°F) or at a temperature not less than 17°C (30°F) below the actual flash point, whichever is higher. Allow the sample to warm up or, if necessary, heat at such a rate that the temperature increases at $1.4 \pm 0.3^\circ\text{C}$ ($2.5 \pm 0.5^\circ\text{F}$) per min. It may be necessary to adjust the temperature of the environment to obtain the specified increment. Apply the test flame at each temperature reading that is a multiple of 1°C (2°F). Record the flash point as described in Part A.

The reference to barometric pressure as described in Part A applies here.

(2) *The Modified Pensky-Martens Method*

Tester - The Pensky-Martens Closed Flash Tester apparatus without the top plate, air bath and stand as shown in Figure 1. The shutter, stirrer shaft and gas jet dipper arms shall have a thin layer of general purpose, low-temperature lubricating oil (such as 3-GP-335) applied to them prior to the test to overcome the problem of icing-over and sticking of these parts at low temperature.

A laboratory stand with clamps as shown in Fig. 1.

An imperial pint container, insulated on the sides with asbestos and a woolen fabric.

A 50/50 solution (by volume) of ethylene glycol and water.

Thermometer - The same used for Part B, Method (1).

A suitable Low Temperature Chamber.

An electric heater with rheostat.

Procedure - Fill the pint paint container with sufficient glycol/water solution to surround the flash point cup completely up to at least the filling mark. Place the sample in a tightly sealed container. Cool the flash tester, the pint paint container and contents and the sample for not less than 1 h in the low temperature chamber cooled at a temperature of not less than 17°C (30°F) below the expected flash point. Fill the flash point cup with the sample and place the cup in the apparatus. Transfer the apparatus to room temperature condition, 21 to 27°C (70 to 80°F) and determine the flash point as described in Part B, Method (1).

The reference to barometric pressure as described for Part A also applies here.

PRECISION

The flash point is usually determined by running a preliminary test to obtain the approximate flash point and then carrying out at least two fully controlled tests. The preliminary test is not included in the reported result.

Based on two exchanges in which 3 and 4 labs determined the flash points of 6 samples flashing between -37 and -7°C (-35 and +20°F) using both flash point procedures, the method has been found to have the following precision at the 95% confidence level:

Repeatability - two separate determinations by the same operator should not differ by more than 2°C (4°F). The range of three determinations by the same operator should not exceed 3°C (5°F).

Reproducibility - Two determinations, each the mean of duplicate determinations, obtained by operators in different laboratories should not differ by more than 5.8°C (10.5°F).

Modified Pensky-Martens
Closed Cup Tester

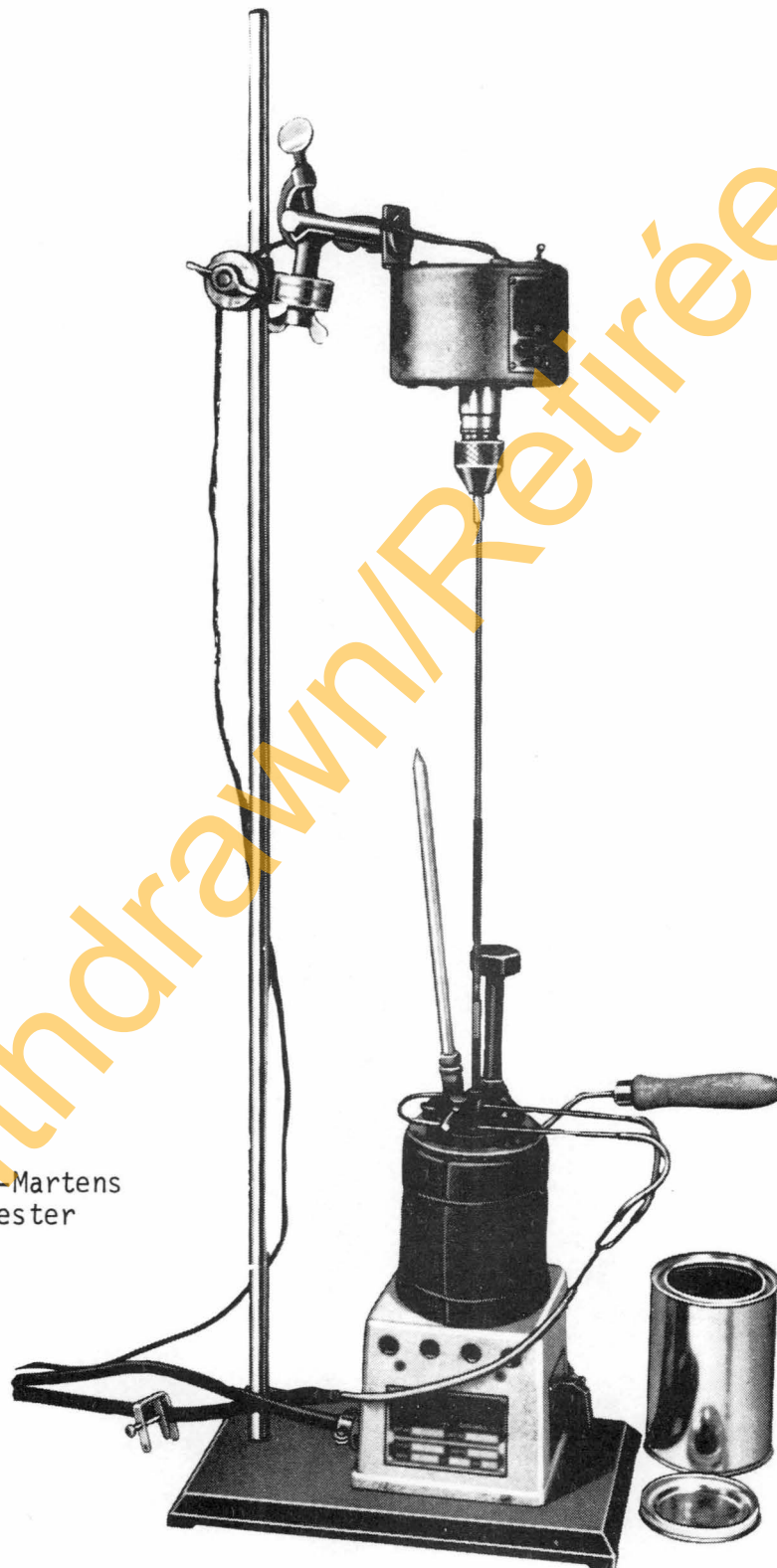


FIGURE 1

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	CONSISTENCY STORMER CONSISTENCY	METHOD 4.5 August 1974

Supersedes Issue of
June 1962

SCOPE

The consistency is determined in accordance with ASTM D 562, Consistency of Exterior House Paints and Enamel-Type Paints, with the following exceptions:

Container - Any cylindrical container having a diameter of not less than 2-7/8 in. (73 mm); a 1/2 pt (0.3 l) can may be used. When the paddle is immersed to the mark, the distance between the bottom of the paddle and the bottom of the can shall be not less than 3/4 in. (19 mm). For referee purposes a cylindrical 1 pt (0.3 l) can having a diameter not less than 3-1/4 in. (83 mm) shall be used and the instructions in ASTM D 562 for filling the can shall apply.

Rotor - The center-vane paddle rotor is used unless otherwise specified. Other rotors that may be required are the fork rotor and the original Stormer cylinder.

Report - Report the consistency of the material, as required by the specification, in one of the following units:

- Grams required to produce 100 revolutions of the rotor in exactly 30 s, using the results from two weights as specified in ASTM D 562.
- Krebs Units (K.U.) obtained from Table 1 for the weight required to produce 100 revolutions in 30 s. Where the weights supplied with the instrument do not give the required 30 s, the time and the weight that provide 100 revolutions in 27 - 33 s are used. Shearing rates above and below these limits shall not be used.
- Seconds required for 100 revolutions with a specified weight.

TABLE I. - KREBS-STORMER CHART WITH INTERPOLATIONS

(Weight in Grams)

Seconds per 100 rev.	75	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550	575	600	625	650	675	700	725	750	775	800	825	850	875	900	950	1000
24-----	42	52	---	65	---	75	---	83	---	90	---	95	---	99	---	103	---	108	---	111	---	115	---	118	---	122	---	125	---	128	---	130	---	132	---	136
25-----	45	54	---	66	---	76	---	84	---	90	---	95	---	100	---	104	---	109	---	112	---	116	---	119	---	122	---	125	---	129	---	131	---	133	---	137
26-----	47	56	---	68	---	78	---	85	---	91	---	96	---	101	---	105	---	110	---	113	---	117	---	120	---	123	---	126	---	130	---	132	---	134	---	138
27-----	49	57	63	69	74	79	83	86	89	92	95	97	100	102	104	106	109	111	113	114	116	118	120	121	123	124	126	127	129	130	131	132	133	134	136	138
28-----	51	59	65	70	75	80	84	87	90	93	96	98	100	102	105	107	110	112	114	115	117	118	120	121	123	124	126	127	129	130	131	132	133	134	137	139
29-----	53	60	66	71	76	81	85	88	91	94	97	99	101	103	105	107	110	112	114	115	117	119	121	122	124	125	127	128	130	131	132	133	134	135	137	139
30-----	54	61	67	72	77	82	86	89	92	95	98	100	102	104	106	108	110	112	114	116	118	120	121	122	124	125	127	128	130	131	133	134	135	136	138	140
31-----	55	62	68	73	78	82	86	90	93	95	98	100	102	104	106	108	111	113	115	116	118	120	122	123	125	126	128	129	131	132	133	134	135	136	138	140
32-----	56	63	69	74	79	83	87	90	93	96	99	101	103	105	107	109	111	113	115	116	118	120	122	123	125	126	128	129	131	132	133	134	135	136	138	140
33-----	57	64	70	75	80	84	88	91	94	96	99	101	103	105	107	109	112	114	116	117	119	121	122	123	125	126	128	129	131	132	134	135	136	137	139	141
34-----	58	64	---	75	---	84	---	91	---	97	---	102	---	106	---	110	---	114	---	118	---	122	---	124	---	127	---	130	---	132	---	135	---	137	---	141
35-----	59	65	---	76	---	85	---	92	---	98	---	102	---	106	---	110	---	114	---	118	---	122	---	124	---	127	---	130	---	133	---	135	---	137	---	142
36-----	60	66	---	76	---	85	---	92	---	98	---	103	---	107	---	111	---	115	---	118	---	122	---	125	---	128	---	130	---	133	---	135	---	137	---	142
37-----	61	67	---	77	---	86	---	93	---	99	---	103	---	107	---	111	---	115	---	119	---	123	---	125	---	128	---	131	---	133	---	136	---	138	---	142
38-----	62	68	---	78	---	87	---	93	---	99	---	104	---	108	---	112	---	116	---	119	---	123	---	126	---	129	---	131	---	134	---	136	---	138	---	142
39-----	62	68	---	78	---	88	---	94	---	100	---	104	---	108	---	112	---	116	---	120	---	124	---	126	---	129	---	131	---	134	---	136	---	138	---	143
40-----	63	69	---	79	---	88	---	94	---	100	---	104	---	108	---	112	---	116	---	120	---	124	---	127	---	130	---	132	---	134	---	136	---	138	---	143

NOTE 1. - On some paints a Krebs' Unit rating obtained at a low number of seconds per 100 rev will not check a rating obtained at a high number of seconds. This difference can be minimized by using only determinations made close to 30 s per 100 rev; consequently, for good reproducibility only the blocked section of the chart should be used.

Since using 50-g increments in the weight may fail to give a reading within the preferred section, 25-g increments may be used and a reading obtained directly from the interpolated values shown for this section of the chart.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	CONSISTENCY CONSISTENCY OF PUTTY BY MEANS OF GARDNER MOBILOMETER	METHOD 4.7 August 1974

Supersedes Issue of
July 1959

The consistency is determined by means of the Gardner Mobilometer using a 1 kg load on the tray and the 3-hole disk.

The time required for a 10 cm fall is determined on material that has been conditioned to bring it to standard temperature (Method 103.1).

Withdrawn/Retirée

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	DRYING TIME GENERAL METHOD	Method 5.1 May 1978

Supersedes issue of
August 1974

SCOPE

This method is for use in determining the various stages of drying of paints, varnishes, enamels, lacquers and related coatings.

APPARATUS

- (a) Doctor blades to give specified film thicknesses.
- (b) Standard drying conditions (Method 103.1).
- (c) Glass panels.

PROCEDURE

Unless otherwise specified, apply the material by means of a doctor blade to a thoroughly cleaned nonabsorbent surface* to yield a dry film thickness** in accordance with Method 98.2. Place the panel in a horizontal position under standard conditions and under diffused light. For referee purposes, place the panel under an illumination of 320 ± 50 lx.

At appropriate intervals, or at the specified time, test the film at points not less than 20 mm from any edge. Determine the different stages of drying as follows:

To test for the Set-to-Touch and Tack-Free conditions, apply the finger (it is important that it be clean and dry) lightly to the film for 1 s.

To test for Surface-Dry, lightly rub the finger across the film.

To test for Hard-Dry, place the panel on one pan of a pair of scales, balance the scales, and place a 1 kg mass on the other pan; then balance the scales again for 20 s by pressing the thumb on the panel. Remove the thumb, assessing whether there is any tackiness, and examine the film for marks. If a mark is evident, wipe the area gently with a soft or dry absorbent cotton. After 5 min examine the panel for the presence or absence of the mark.

To test for After-Tack, exert maximum pressure on the panel between the thumb and forefinger for 2 s.

To test for Dry-for-Recoat, apply an additional coat of material at the specified time, by brush on one panel and by spray on a second panel. After the panels have dried, examine the system for blistering, wrinkling, loosening, loss of adhesion or other film irregularities.

DEFINITIONS

Set-to-Touch — The film is considered to have set-to-touch when a light touch of the finger shows a tacky condition but none of the coating adheres to the finger.

Tack-free — The film is considered to be tack-free when the surface does not feel sticky to a light touch of the finger.

Surface-Dry — The film is considered surface-dry when it is tack-free to the finger and does not rub up appreciably when the finger is lightly rubbed across the surface.

* For referee purposes use plate glass panels (Method 102.1).

** Where a second coat of the same material is applied over the first coat, the dry-film thicknesses of both coats shall be the same.

Dry-Hard — The film is considered to have dried hard when the pressure exerted by the thumb on the film (without twisting), shows no tackiness and does not move the film or leave a mark that remains noticeable after the film is lightly polished with a soft cloth or absorbent cotton.

After-Tack — The film is considered to be free from after-tack when it shows no pull on the thumb. In the event of disagreement on the results for after-tack, Method 5.10 shall be used as a referee method.

Dry-for-Recoat — The film is considered dry for recoating when an additional coat can be applied without the development of any film irregularities such as lifting or loss of adhesion of the first coat.

Withdrawn/Retirée

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	DRYING TIME AFTER-TACK	METHOD 5.10 August 1974

Supersedes Issue of
February 1958

SCOPE

This method is the referee method for determining after-tack of coatings.

APPARATUS

- (a) No. 1 Kraft wrapping paper, 80 lb (130 g/m²) basis weight, to CGSB 9-GP-5.
- (b) Cylindrical weight 2 in. (50.8 mm) in diameter, weighing 6.28 lb (2.85 kg) (this produces a pressure of 2 psi) (13.8 kPa)).

PROCEDURE

Apply the material and allow to dry as specified in Method 5.1. At the specified time place a 2 x 3 in. (50 x 75 mm) piece of Kraft paper on the film and place the weight on the paper for 5 s. Remove the weight, invert the panel and note the time required for the paper to drop off.

RESULTS

The film is considered to be free from after-tack if the paper drops off within 10 s of the inversion of the panel.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	DRYING TIME SURFACE-DRY AND DRY-HARD OF STENCIL INK PASTE	METHOD 5.11 August 1974

Supersedes Issue of
October 1958

SCOPE

This method is for use in determining the surface-dry and dry-hard times of stencil ink paste.

APPARATUS

Brayer (Hand-Ink Roller)
Glass Panels.

PROCEDURE

Place about 10 g of the material on a clean glass plate (Method 102.1) and roll it out uniformly with the brayer for 15 s. Roll the brayer over a second glass panel so as to apply a film that will dry to 0.4 ± 0.1 mil (10 ± 2.5 μm) thick.

Place the panel under standard conditions (Method 103.1) and test the film for Surface-Dry and Dry-Hard as described and defined in Method 5.1.

Canadian General Standards Board

CGSB Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	DRYING TIME DRYING TIME OVER ELASTOMERS	METHOD 5.12 August 1974

SCOPE

Supersedes Issue of
October 1958

This method is for use in determining the Tack-Free drying time of a material applied over a synthetic-rubber-like material.

PROCEDURE

Preparation of Elastomer

<u>Formula</u>	<u>Parts by Weight</u>
Chlorosulfonated polyethylene (DuPont Hypalon)	100
Petroleum wax (DuPont Heliozone)	2
Phenyl-beta-naphthylamine	3.3
Diphenyl-para-phenylenediamine	0.7
Toluene	300
Ethyl acetate	125

Prepare the elastomer by agitating the dry ingredients in the solvents until dissolved. The mixture is stable and may be kept indefinitely in a closed container at room temperature.

Drying Time Determination - Using a doctor blade with a clearance of about 6 mils (150 μ m), draw down a wet film of the elastomer 3 mils (75 μ m) thick (ASTM D 1212) and at least 3 in. (75 mm) wide on a clean glass panel (Method 102.1). Allow to dry (Method 103.1) for 23 h and then apply a coat of the material by spray (Method 98.1) to the whole panel to yield a dry film of 1.0 ± 0.1 mils (25 ± 2.5 μ m).* The panel is placed under standard conditions and the film tested for Tack-Free condition over the elastomer as described and defined in Method 5.1.

* The film thickness may be determined more conveniently by measuring the thickness of the sprayed coat where it has been applied directly over the glass panel.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	DRYING TIME SURFACE-DRY OF STENCIL INK	METHOD 5.13 August 1974

Supersedes Issue of
July 1959

SCOPE

This method is for use in determining the surface-dry time of stencil ink.

APPARATUS

- (a) Stencil Brush (CGSB 22-GP-5)
- (b) Stencil boards (3/4 in. (19 mm) high letters).
- (c) Wood or glass panels, as specified (Method 97.1 for wood; Method 102.1 for glass).

PROCEDURE

Stencil a number of letters about 3/4 in. (19 mm) high, by means of a CGSB 22-GP-5 stencil brush and a stencil board, onto the specified panels using the ink under examination. Apply the ink only in sufficient amount to make legible, opaque letters.

Place the panel under standard conditions (Method 103.1) and test the film for surface-dry as described and defined in Method 5.1.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	DRYING TIME SURFACE-DRY OF STENCIL INK	METHOD 5.13 August 1974

Supersedes Issue of
July 1959

SCOPE

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Place the panel under standard conditions (Method 103.1) and test the film for surface-dry as described and defined in Method 5.1.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	DRYING TIME COMPLETE CURE	METHOD 5.14 August 1974

Supersedes Issue of
August 1970

Apply the material to glass panels (Method 102.1) to the specified film thickness and cure the film 7 days (Method 103.1).

Fill a 2.5 in. (63.5 mm) diameter watch glass, having a smooth edge, with methyl isobutyl ketone (MIBK) or other specified solvent and place the panel over the watch glass to form a tight seal. Invert the panel and the watch glass, and allow the solvent to remain in contact with the film at $23 \pm 2^{\circ}\text{C}$ ($73 \pm 3.5^{\circ}\text{F}$).

After the specified time, pour off the solvent and allow any solvent remaining on the panel to evaporate. Examine the area under the watch glass as required, and compare with the untreated area for softening using the Knife Test (Method 135.1). Where specified, check the area for softening by the Knife Test, after the specified recovery period.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	WORKING PROPERTIES	METHOD 9.4 August 1974

Supersedes Issue of
February 1959

Reduce the filler as specified and apply an amount, in excess of that required to fill the pores, by brush in the direction of the grain to a 6 by 9 in. (150 x 230 mm) white oak panel (Method 97.1) containing bands of characteristic open-pore areas. Place the panel in a horizontal position under standard conditions (Method 103.1) and determine the time required for the coat to "set --i.e. become flat or dull due to solvent evaporation. At the end of this time wipe off the surface of the panel across the grain with a clean pad of cheesecloth so as to work the filler into the pores and remove the excess. During this operation note whether the filler "cuts" well--i.e., whether the excess is removed without streaking or removing material from the pores.

Dry the panel for 18 h and the surface for smoothness, excess filler and discoloration. Examine the pores for shrinkage.

Withdrawn

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	SKINNING PROPERTIES	METHOD 10.1 August 1974

Supersedes Issue of
May 1966

Half-fill a half-pint (0.3 l) paint can with the material, carry out this operation in a room at standard conditions of temperature and relative humidity (Method 103.1). Cover the can with a tight-fitting lid and then invert it. Allow the inverted container to stand 48 h at $23 \pm 2^{\circ}\text{C}$ ($73 \pm 3.5^{\circ}\text{F}$). At the end of this time remove the bottom of the container with a can opener, and examine the material.

NOTE:

The sample for this test should be taken from the original container immediately after that container has been first opened, and preferably before any of the material is removed for other tests.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	VISCOSITY GARDNER-HOLDT VISCOSITY AT ELEVATED TEMPERATURES	METHOD 11.2 August 1974

Supersedes Issue of
November 1959

The reference standards, sample tubes and method of filling the sample tubes shall be as specified in ASTM D 154, Methods of Testing Varnishes.

Tightly stopper the filled tube, invert and immerse it in a bath maintained at the specified temperature for sufficient time (at least 1/2 h) to attain equilibrium. The applicable standard tubes, also in the inverted position, are brought to equilibrium at $25 \pm 0.25^{\circ}\text{C}$ ($77 \pm 0.5^{\circ}\text{F}$). When the appropriate temperatures have been attained, place the sample and standard tubes side by side, and quickly and simultaneously revert them to the upright position.

Note the standard tube that most nearly matches the sample tube in rate of bubble rise, and report the letter of the standard as the viscosity of the material at the specified temperature.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	COLOR COLOR DIFFERENCE BY INSTRUMENTAL EVALUATION	METHOD 12.1 August 1974

Supersedes Issue of
June 1972

Prepare the panels according to the specified method and, where required, carry out such tests on the prepared panels as specified. Special attention shall be given to selection of panels and preparation of uniform coatings.

If a 3 x 5 in. (75 x 130 mm) CGSB 1-GP-12c Standard Color Chip is being used in measuring color difference between the 1-GP-12c color and a sample under test, the color chip shall be backed with a neutral grey background consisting of the 3 x 5 in. (75 x 130 mm) color chip Grey 301-302.

Determine the total color difference in the Adams Color Space and calculate the ΔE (or E) in accordance with ASTM D 2244. Report the instrument used for the color difference measurement and identify the color scale system used.

Canadian General Standards Board

CGSB Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	COLOR LOVIBOND COLOR	METHOD 12.2 August 1974

Supersedes Issue of
June 1962

The Lovibond Tintometer, British Drug Houses Pattern, is used for this test. Fill a square white porcelain dish of inside dimensions 1-3/8 x 1-3/8 in. (35 x 35 mm) and 3/8 in. (9 mm) deep with the sample and carefully level it. Place the dish in the instrument and determine the color.

Withdrawn/Retirée

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	COLOR COLOR OF NITROCELLULOSE SEALERS AND LACQUERS	METHOD 12.7 August 1974

Supersedes Issue of
July 1959

The color of clear gloss lacquers of normal solids content (15-22%) is determined directly by comparison with the Gardner Color Standards according to ASTM D 154, Methods of Testing Varnishes.

Reduce high-solids gloss lacquers to approximately 21% solids (Method 18.3) with 1-GP-50 thinner and test the reduced material for color according to ASTM D 154.

Centrifuge normal-solids lacquers containing sanding or flattening agents until the agent has settled, and use the clear liquid for the color comparison. Reduce high-solids lacquers in which these agents are present to 21% solids with 1-GP-50 thinner before centrifuging. Then test the clear, centrifuged material in accordance with D 154.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	COLOR COLOR UNIFORMITY	METHOD 12.8 August 1974

Supersedes Issue of
April 1961

Draw down the material on a glass panel (Method 102.1) to obtain a 3 mil (75 μ m) wet film and allow to dry 2 h under standard conditions (Method 103.1).

Draw down a second coat of the material, also having a wet film thickness of 3 mils (75 μ m), over the film on the panel. Immediately after application of the second coat, rub an area of about 1 to 2 in. (25 to 50 mm) diameter in a circular motion with a clean finger until the material begins to set or for not more than 5 min. For slower drying materials repeat the test, on different areas of the panel, at intervals of one-half h until the material begins to set.

After the coating has dried hard, examine it for a difference in color between the rubbed and the unrubbed areas.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	COLOR VISUAL COMPARISON	METHOD 12.9 August 1974

Supersedes Issue of
August 1970

SCOPE

This method describes the preparation of test specimens and the visual color comparison of the prepared specimens with a prescribed standard, including colors from 1-GP-12c, Standard Paint Colors.

PANEL PREPARATION

- Air-Drying Finishes* - Apply air-drying finishes by either brush or spray to a smooth nonabsorbent panel at least 3 x 5 in. (75 x 130 mm) to provide a dry film thickness as specified in Method 98.2. The applied finish shall be smooth and uniform in appearance, color and gloss. At the same time, apply the finish to a black-and-white hiding-power chart as described in Method 14.1. Allow the finish to dry for the time specified in Method 98.3. If the finish applied to the hiding-power chart shows complete hiding, condition the panel for a total of 24 h (Method 103.1), including the drying period specified in Method 98.3, and proceed with the color matching. If the finish does not show complete hiding, apply a second coat (Method 98.2) and allow it to condition 24 h (Method 103.1).
- Baking Finishes* - Apply baking finishes by either brush or spray to a smooth nonabsorbent panel at least 3 x 5 in. (75 x 130 mm) to provide a dry film thickness as specified in Method 98.2. The panel shall withstand heating without distortion at the temperature required in baking the finish under test. The applied baking finish shall be smooth and uniform in appearance, color and gloss. At the same time, apply the finish to a black-and-white hiding-power chart as described in Method 14.1. Bake the finishes (Method 103.2) at the specified temperature for the specified time. If the finish applied to the hiding-power chart shows complete hiding, condition the panel for 24 h (Method 103.1), and proceed with the color matching. If the finish does not show complete hiding, apply a second coat (Method 98.2), bake as specified for the first coat, and condition 24 h (Method 103.1).
- Drawdown Application of Finishes* - For referee purposes, apply the finish by drawblade (Method 98.1) but in all other respects follow the panel preparation as described in par. (a) or (b) as applicable.

VISUAL COLOR COMPARISON

The gloss and surface texture of the prepared specimens should match the standard as closely as possible. Where the standard is a 1-GP-12c color, the 3 x 5 in. (75 x 130 mm) color chip supplied in Part II of 1-GP-12c shall be used. All color chips that show any transparency shall be backed with a neutral grey background consisting of the 3 x 5 in. (75 x 130 mm) color chip, Grey 301-302.

Carry out the referee method for visual color comparison with a MacBeth Daylight Lamp* (color temperature of 7400°K and 125 to 175 foot candles (1350 to 1890 lm/m^2) intensity at the viewing level) in a neutral grey (approximately Grey 301-302) cabinet. View the specimen and the standard side by side in the central area of the color-matching cabinet. For specimens with perceptible gloss characteristics, and where the light source is directly overhead, view the specimen at an angle of 45°. Where the light source is above but forward of the observer (as usual in color-matching cabinets), tilt the specimen away from the observer by an angle of 8 or 9° from the horizontal and view at 45° from the perpendicular. View flat or mat specimens perpendicular to the surface with the incident light at an angle of 45° to the surface.

When specified, also compare the panels under a Macbeth Horizon Sunlight Lamp*. This is a redder colored light with a much lower color temperature and usually of lower intensity than the Daylight Lamp. The specimen under investigation should appear a close match to the standard under this Horizon Sunlight Lamp, otherwise it indicates a metameric condition.

* The following unit is known to meet the spectral quality limits set forth in the method: Macbeth Super Color Matching Skylight, Model BX-848-A, obtainable from the Macbeth Daylighting Corporation, Newburgh, New York.

Where a color matching cabinet is not available, carry out the color matching using north daylight. Place the specimen and standard side by side, on a table covered with a neutral grey background (approximately the grey of Grey 301-302), so that the north daylight reaches the table top from the observer's side. The surround should not have large brightly colored objects nor glossy surfaces. Select a north window through which there is no reflected light from any strongly colored object such as a red brick wall or a large tree. View the panels from the perpendicular.

Make a qualitative evaluation of visual color difference between the specimen and standard. Observe the color departure of the specimen from the standard in terms of lightness, saturation and hue. For critical evaluation, interchange the positions of the specimen and the standard and again evaluate the color match.

An example of a color comparison for a blue color may be expressed as follows: Moderately greener (hue), slightly darker (lightness), very slightly greyer (saturation); over-all color match, fair.

Withdrawn/Retirée

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	GLOSS AFTER 48 HOURS	METHOD 13.1 August 1975

Supersedes Issue of
August 1974

GLOSS

AFTER 48 HOURS

Apply (Method 98.2) pigmented coating materials under test to clean plate-glass panels (Method 102.1) by means of a drawblade, unless otherwise specified, to cover an area at least 3 by 6 in. (75 x 150 mm). Apply (Method 98.2) clear coating materials under test to polished black Carrara structural glass that has a maximum reflectance (ASTM E 97) of 1%. Dry the film 48 h, under standard conditions, (Method 103.1) in a horizontal position.

Determine the 20, 60 or 85° specular gloss, as required, and in accordance with ASTM D 523, Method of Test for Specular Gloss, using primary standards only.

Take at least 3 readings across and 3 readings along a 3 by 6 in. (75 x 150 mm) panel and report the mean. Do not apply the diffuse correction when calculating the gloss of the film.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	GLOSS AFTER 7 DAYS	METHOD 13.2 August 1975

Supersedes Issue of
August 1974

GLOSS

AFTER 7 DAYS

Apply (Method 98.2) pigmented coating materials under test to clean plate-glass panels (Method 102.1) by means of a drawblade, unless otherwise specified, to cover an area at least 3 by 6 in. (75 x 150 mm). Apply (Method 98.2) clear coating materials under test to polished black Carrara structural glass that has a maximum reflectance (ASTM E 97) of 1%. Dry the film 7 d, under standard conditions, (Method 103.1) in a horizontal position.

Determine the 20, 60 or 85° specular gloss, as required and in accordance with ASTM D 523, Method of Test for Specular Gloss, using primary standards only.

Take at least 3 readings across and 3 readings along a 3 by 6 in. (75 x 150 mm) panel and report the mean. Do not apply the diffuse correction when calculating the gloss of the film.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	GLOSS GLOSS AFTER ONE HOUR BAKING	METHOD 13.3 August 1975

Supersedes Issue of
August 1974

GLOSS

GLOSS AFTER ONE HOUR BAKING

Apply (Method 98.2) pigmented coating materials under test to clean plate-glass panels (Method 102.1) by means of a drawblade, unless otherwise specified, to cover an area at least 3 by 6 in. (75 x 150 mm). Apply (Method 98.2) clear coating materials under test to polished black Carrara structural glass that has a maximum reflectance (ASTM E 97) of 1%. Dry the film, under standard conditions, (Method 103.1) for 30 min and bake (Method 103.2) for 1 h at $121 \pm 2^{\circ}\text{C}$ ($250 \pm 3.5^{\circ}\text{F}$) or other specified time and temperature. Keep the test panels under standard conditions for 24 h and determine the 20, 60 or 85° specular gloss, as required, and in accordance with ASTM D 523, Method of Test for Specular Gloss, using primary standards only.

Take at least 3 readings across and 3 readings along a 3 x 6 in. (75 x 150 mm) panel and report the mean. Do not apply the diffuse correction when calculating the gloss of the film.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	GLOSS TEST PANELS	METHOD 13.4 August 1975

Supersedes Issue of
August 1974

GLOSS

TEST PANELS

SCOPE

This method is for use in determining the gloss of materials applied to metal, wood or glass panels where gloss measurement is required prior to or after conducting other tests.

PROCEDURE

Prepare the panels according to the specified method, and where required measure the original gloss according to the directions given below. Subject the panels to the specified test. Before measuring the final gloss, dry the panels from exposure tests or, where necessary, rinse thoroughly with tap water and distilled water, and dry. Wash panels exposed outdoors according to Method 143.1, but other panels shall not be scrubbed by sponge, brush or other means except where specified.

After completion of the test, measure the gloss at the required time. When a time is not stated, condition the panels 2 h, under standard conditions, (Method 103.1) before the measurements are taken.

Determine the 20, 60 or 85° specular gloss, as required, and in accordance with ASTM D 523, Method of Test for Specular Gloss, using primary standards only and without the application of the diffuse correction. Take at least 6 readings on a 3 x 6 in. (75 x 150 mm) panel if it is relatively plane. Where planarity has been disrupted, such as on exposed wood panels, it is necessary to take a larger number of readings and to eliminate extreme values caused by changes in the angle of reflection.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	HIDING POWER	METHOD 14.1 January 1981

SCOPE

Supersedes Issue of
August 1974

This procedure is used to determine whether a pigmented material obliterates a contrasting surface at the required spreading rate.

APPARATUS

Black-and-white or black-and-grey checkerboard hiding power-charts, 0.1 m² in area.* The reflectances (ASTM E 97) of the charts shall be not less than 75% for the white areas, not more than 4% for the black areas and 34 ± 3% for the grey areas. (Black-and-grey charts should be checked frequently since the reflectance of the grey areas has been found to vary considerably between different charts and occasionally on the same chart.)

50 mm paint brush complying with CGSB 22-GP-1M.

Laboratory balance accurate to 0.1 g.

PROCEDURE

Chart Selection

The appropriate chart to be used depends upon the color of the material and is selected according to the following list of color numbers taken from 1-GP-12c.

COLORS TO BE TESTED ON BLACK-AND-GREY CHARTS

Grey	101-101	101-102	101-103	101-106	101-107	101-108	101-109
	101-201	101-202	101-203	101-206	101-207	101-208	101-209
	101-301	101-302	101-303	101-306	101-307	101-308	101-309
	101-113	---	501-118				
	101-213	---	501-218				
	101-313	101-323	501-318				
	502-101	502-102	502-112				
	---	502-202	---				
	---	502-302	---				
Blue	103-103	103-118	103-119	103-120	503-106		
	103-203	103-218	103-219	103-220	---		
	103-303	103-318	103-319	103-320	---		
Green	105-101	105-102	105-103	105-106	105-107	105-108	
	105-201	105-202	105-203	105-206	105-207	105-208	
	105-301	105-302	105-303	105-306	105-307	105-308	
Yellow	105-109	105-110	105-111	205-101	205-102	---	
	105-209	105-210	105-211	---	---	---	
	105-309	105-310	105-311	---	---	---	
						405-303	

*Charts with a design area of 0.1 m² are available from the Leneta Company; P.O. Box 86; Ho-Ho-Kus, N.J. 07423, U.S.A.

METHOD 14.1

1-GP-71

Yellow (cont)	----	505-101	505-103	----	505-109	505-110
	----	505-201	505-203	----	----	505-210
	405-305	505-301	505-303	505-308	----	505-310
	505-111					
	505-211					
	505-311					
Orange	108-111	108-117	108-118	508-101	508-103	
	108-211	108-217	108-218	508-201	508-203	
	108-311	108-317	108-318	508-301	508-303	
Red	209-101	509-101	509-102	509-103	----	209-101
	----	509-201	509-202	509-203	509-209	509-210
	----	509-301	509-302	509-303	----	509-310
Pink	110-119	110-120	110-121	110-122		
	110-219	110-220	110-221	110-222		
	110-319	110-320	110-321	110-322		
Purple	511-104					
	511-204					
	511-304					
White	513-101					
	513-201					
	513-301					

COLORS TO BE TESTED ON BLACK-AND-WHITE CHARTS

Grey	101-104	101-105	101-111	101-112	101-114	101-115	101-116
	101-204	101-205	101-211	101-212	101-214	101-215	101-216
	101-304	101-305	101-311	101-312	101-314	101-315	101-316
	101-117	101-118	101-120	101-121	101-122	101-124	101-125
	101-217	101-218	101-220	101-221	101-222	101-224	101-225
	101-317	101-318	101-320	101-321	101-322	101-324	101-325
	101-126	101-127	201-101	201-102	201-103	301-101	301-102
	101-226	101-227	----	----	----	----	301-202
	101-326	101-327	----	----	----	----	301-302
	----	----	----	501-101	501-102	501-103	501-104
	----	----	----	501-201	----	501-203	----
	401-301	401-302	401-303	501-301	501-302	501-303	----
	501-105	501-106	501-107	501-108	501-109	501-110	----
	501-205	----	----	501-208	501-209	501-210	501-211
	501-305	----	----	501-308	501-309	501-310	----
	----	----	----	----	----	----	----
	501-212	501-213	501-214	501-215	----	----	----
	----	501-313	501-314	501-315	501-316	501-317	501-319
	----	----	----	----	----	----	----
	----	----	----	----	----	----	----
	501-320	501-321					

Blue	102-101	102-102	102-103	102-104	102-105	102-106	102-107
	102-201	102-202	102-203	102-204	102-205	102-206	102-207
	102-301	102-302	102-303	102-304	102-305	102-306	102-307
	102-108	102-109	102-110	102-111	102-112	102-113	102-114
	102-208	102-209	102-210	102-211	102-212	102-213	102-214
	102-308	102-309	102-310	102-311	102-312	102-313	102-314
	102-115	102-116	102-117	102-118	102-119	102-120	102-121
	102-215	102-216	102-217	102-218	102-219	102-220	102-221
	102-315	102-316	102-317	102-318	102-319	102-320	102-321
	102-122	202-101	202-102	202-103	----	----	----
	102-222	----	----	----	----	----	----
	102-322	----	----	----	402-301	402-302	402-303
	----	502-103	502-104	502-105	502-106	202-101	----
	----	----	502-204	----	502-206	502-207	502-208
	402-304	----	502-304	----	502-306	502-307	502-308
	----	----	----	502-113	502-114		
	502-209	----	----	502-213	----		
	502-309	502-310	502-311	502-313	----		
Green	103-101	103-102	103-104	103-105	103-106	103-107	103-108
	103-201	103-202	103-204	103-205	103-206	103-207	103-208
	103-301	103-302	103-304	103-305	103-306	103-307	103-308
	103-109	103-110	103-111	103-112	103-113	103-114	103-115
	103-209	103-210	103-211	103-212	103-213	103-214	103-215
	103-309	103-310	103-311	103-312	103-313	103-314	103-315
	103-116	103-117	203-101	203-102	203-103	303-101	----
	103-216	103-217	----	----	----	----	----
	103-316	103-317	----	----	----	303-301	403-301
	----	----	503-101	503-102	503-103	503-104	503-105
	----	----	503-201	----	503-203	----	----
	403-302	403-303	503-301	----	503-303	----	503-305
	503-107	503-108	503-109	503-110	503-111	503-112	503-113
	----	503-208	503-209	503-210	503-211	503-212	----
	----	503-308	503-309	503-310	503-311	503-312	----
	503-114	503-115	503-116	----	503-118	503-119	503-120
	----	503-215	503-216	503-217	503-218	503-219	503-220
	----	503-315	503-316	----	503-318	503-319	503-320
	503-121	----	----	----	503-125	503-126	503-127
	503-221	----	----	----	503-225	503-226	503-227
	503-321	503-322	503-323	503-324	503-325	503-326	503-327

METHOD 14.1

1-GP-71

Brown	204-101	204-102	204-103	204-104	204-105	204-106	304-101
	----	----	----	----	----	----	----
	----	----	----	----	----	----	----
	304-102	----	----	----	----	----	----
	----	----	----	----	----	----	----
	----	404-301	404-302	404-303	404-304	404-305	404-306
	504-101	504-102	504-103	504-104	504-105	504-106	504-107
	----	----	----	504-204	----	----	----
	----	----	504-303	504-304	----	504-306	----
	----	----	----	----	504-212	----	----
Yellow	504-308	504-309	504-310	504-311	----	----	----
	105-104	105-105	105-112	105-113	----	----	205-103
	105-204	105-205	105-212	105-213	----	----	----
	105-304	105-305	105-312	105-313	105-314	105-315	----
	205-104	205-105	205-106	205-107	205-108	----	----
	----	----	----	----	----	----	----
	----	----	----	----	----	405-301	405-302
	----	505-102	505-104	205-105	----	----	----
	----	505-202	505-204	505-205	505-206	505-207	----
	405-304	505-302	505-304	505-305	505-306	----	----
Orange	108-101	108-102	108-103	108-104	108-105	108-106	108-107
	108-201	108-202	108-203	108-204	108-205	108-206	108-207
	108-301	108-302	108-303	108-304	108-305	108-306	108-307
	108-108	108-109	108-110	108-112	108-113	108-114	108-115
	108-208	108-209	108-210	108-212	108-213	108-214	108-215
	108-308	108-309	108-310	108-312	108-313	108-314	108-315
	108-116	108-119	108-120	508-102	----	----	----
	108-216	108-219	108-220	508-202	----	----	----
	108-316	108-319	108-320	508-302	508-304	----	----
	209-102	209-203	----	----	----	----	----
Red	----	----	----	----	----	----	----
	----	----	309-301	409-301	409-302	409-303	409-304
	----	509-104	509-105	----	----	509-108	----
	----	----	----	509-206	509-207	509-208	----
	409-305	----	----	----	110-313	509-308	----
Pink	110-101	110-102	110-103	110-104	110-105	110-106	110-107
	110-201	110-202	110-203	110-204	110-205	110-206	110-207
	110-301	110-302	110-303	110-304	110-305	110-306	110-307
	110-108	110-109	110-110	110-111	110-112	110-113	110-114
	110-208	110-209	110-210	110-211	110-212	110-213	110-214
	110-308	110-309	110-310	110-311	110-312	110-313	110-314
	110-115	110-116	110-117	110-118	110-123	110-124	----
	110-215	110-216	110-217	110-218	110-223	110-224	----
	110-315	110-316	110-317	110-318	110-323	110-324	----
	110-315	110-316	110-317	110-318	110-323	110-324	----

	111-101	111-102	111-103	111-104	111-105	111-106	111-107
	111-201	111-202	111-203	111-204	111-205	111-206	111-207
	111-301	111-302	111-303	111-304	111-305	111-306	111-307
	111-108	111-109	111-110	111-111	111-112	111-113	111-114
	111-208	111-209	111-210	111-211	111-212	111-213	111-214
	111-308	111-309	111-310	111-311	111-312	111-313	111-314
	511-101	511-102	511-103				
	511-201	511-202	511-203				
	511-301	511-302	511-303				
Black	512-101						
	512-201						
	512-301						
Bronze	514-101						
Aluminum	515-101						

Calculation of Amount of Sample to be Applied

Calculate the amount of material to be applied to obtain the specified coverage, on a weighing basis.

Method of Application, on a Weight Basis

First, mix the material well, dip the paint brush into it and work it out on a clean surface until the brush is well wetted with material. Place a convenient amount of material in a small container and weigh together with the brush. Transfer the material to the chart and brush uniformly over the checkerboard portion until the calculated amount has been applied, determined by reweighing the container and brush.

Weighing Procedure — Determine the density in kg/L (Method 2.1) and calculate the amount required to 0.1 g using the formula:

$$\text{Mass of material (g)} = \frac{1000 DA}{SR}$$

where D = Density, kg/L
SR = Spreading rate, m²/L
A = Area of hiding-power chart, m²

Calculation of Volume of Sample to be Applied

Calculate the amount of material to be applied to obtain the specified coverage on a volume basis.

Volume Procedure — Calculate the volume of material required to 0.1 mL using the formula:

$$V \text{ (mL)} = \frac{1000 A}{SR}$$

where V = Volume, mL
SR = Spreading Rate, m²/L
A = Area of hiding power chart, m²

Method of Application, on a Volume Basis

First, work the brush out as directed above and weigh on the balance. Measure the required volume in an accurate syringe and then apply it over the checkerboard surface. Brush the material out uniformly, then reweigh the brush to ensure that material has not been removed or added.

Method of Application by Drawblade

Where specified, use a draw-blade to apply a film of the material of the required wet-film thickness. Mechanical drawdown is preferable to manual operation. Place the chart on a suction plate and keep the chart as flat as possible with a vacuum. After application of the material, remove the chart from the plate and tape it onto a flat surface to eliminate curling during drying. Wet-film measurements on cardboard charts are not accurate, so the actual wet-film thickness is determined by drawing the material down on a solid substrate with the same blade and speed of draw used on the chart, and measuring its thickness (ASTM D 1212 Method A) immediately after application.

Allow the film of air-dry coatings to dry thoroughly (Method 103.1) and then examine.

Curing and Examination Procedures

For baking-type coatings, bake the coated hiding power charts in an oven (Method 103.2) for 30 min at 121°C (250°F). Remove the charts from the oven and allow them to condition under standard conditions for 1 h and then examine.

View the coated and dried hiding-power charts in a direction normal to the surface when the charts are illuminated by diffuse daylight at an angle of 45°. Evaluate if there are differences in appearance between the black and white or the black and grey areas.

In case of dispute the hiding power shall be determined by Method 14.7. For colors applied over black and white charts, the contrast ratio at the specified coverage shall be not less than 98%.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	HIDING POWER QUICK-DRYING MATERIALS	METHOD 14.2 January 1981

Supersedes Issue of
August 1974

Carry out the test on a hiding-power chart of black-and-white or black-and-grey checkerboard design. The appropriate chart to be used depends upon the color of the material to be tested and is selected according to the list in Method 14.1. The reflectances of the charts shall be not more than 4% for the black areas, $34 \pm 3\%$ for the grey areas, and not less than 75% for the white areas when measured by ASTM E 97.

Trim the chart to remove unmarked areas and measure area* to 0.01 m^2 , if a lacquer is being tested, uniformly spray a thin coat of white shellac and dry prior to application of the material being tested.

For the test, weigh a chart to the nearest 0.1 g. Spray on the material being tested in successive thin coats until the dried film is sufficiently thick to hide the design completely when viewed in diffuse daylight in a direction normal to the surface. Dry the coating thoroughly and weigh the chart.

The hiding power may be calculated on a wet or dry basis.

On the dry basis, calculate the mass of the dry coating that gives complete hiding, in kg/m^2 .

On the wet basis, calculate the coverage in m^2/L of the material from the known nonvolatile content. The dry mass of the material on the chart may be considered as the nonvolatile portion of the liquid paint. The calculations may be carried out as follows:

$$\text{Mass of wet paint on chart} = \frac{\text{Mass of dry paint on chart}}{\% \text{ Nonvolatile of the paint}} \times 100$$

$$\text{Coverage, m}^2/\text{L} = \frac{\text{Density (kg/L)} \times 1000 \times \text{area}}{\text{Mass of wet paint on chart, g}}$$

*Charts with a design area of 0.1 m^2 are available from the Leneta Company; P.O. Box 86; Ho-Ho-Kus, N.J. 07423, U.S.A.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	HIDING POWER CONTRAST RATIO METHOD	METHOD 14.7 October 1982

Supersedes Issue of
August 1974

SCOPE

This method is used to evaluate the hiding power of coating materials in terms of the contrast ratio produced at a given spreading rate or dry film thickness.

APPARATUS

Reflectometer — as defined in ASTM E 97. All reflectance measurements referred to below shall be made in accordance with E 97.

Glass Panels — 150 × 300 mm panels of black and of white mechanically polished structural plate glass*. Black glass shall have a reflectance of not more than 1%. The white glass may vary in reflectance from batch to batch, but it is possible to purchase a series of panels having a uniform reflectance of $84 \pm 2\%$. The reflectance of the white glass shall be measured to 0.1%.

Draw-down Applicator — All films shall be applied by automatic draw-down applicator in accordance with Method 98.1.

PROCEDURE

Clean (Method 102.1) at least two white and two black panels. If contrast ratio at a given spreading rate (SR) is to be measured, determine the corresponding wet film thickness from the formula $\frac{1000}{SR}$. By means of a draw-down applicator, apply two wet films that fall on both sides of the required value and do not differ by more than 25 μm . If contrast ratio at a given dry film thickness is required, determine the clearance needed to deposit two dry films on both sides of the required value that do not differ by more than 12.5 μm .

Then apply the material at these thicknesses to two black and two white glass plates. For the spreading rate procedure, measure wet film thicknesses (Method A, ASTM D 1212) immediately to 2.5 μm and allow the films to dry (Method 103.1) for 7 d. For the dry film thicknesses procedure, measure the dry film thicknesses (Method 128.1) after 7 d.

* Commercially available Carrara structural glass manufactured by PPG Industries Canada Ltd., or Vitrolite structural glass manufactured by Libby-Owens-Ford Company.

After drying and curing, determine the reflectances (ASTM E 97) to 0.1%. If the thicknesses of the corresponding films on black and white glass are identical, calculate the contrast ratio for each thickness as follows:

$$CR = \frac{\text{Reflectance over Black glass}}{\text{Reflectance over White glass}}$$

If the films differ in thickness, it is necessary to plot film thickness against reflectance for both glasses. Two reflectances at equal film thicknesses can then be obtained for each glass and the two contrast ratios calculated as above.

These contrast ratios must be corrected for variation of reflectance of the white glass. For this purpose a theoretical standard white glass having a reflectance of 80% is assumed. The contrast ratio is calculated as though the film laid down on white glass were laid down on the standard 80 glass. This correction is accomplished for each material through the use of the formula:

$$CCR^* (\text{White} = .80) = \frac{\frac{WR_b (1 - 0.80R_b)}{R_w}}{W \left(\frac{R_b}{R_w} - 0.80R_b \right) + 0.80 \left(1 - \frac{R_b}{R_w} \right)}$$

where W = Reflectance of white glass alone

where R_b = Reflectance of coated black glass

and R_w = Reflectance of coated white glass, where all reflectances are expressed as decimal fractions.

Plot CCR* against the dry film thickness and from this graph read the contrast ratio at the specified value.

* CCR = Corrected Contrast Ratio

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	COARSE PARTICLES	METHOD 15.2 June 1980

Supersedes Issue of
August 1974

Place 50 g sample of the material in a 250 mL beaker and gradually add 50 mL of water at 20-25°C while stirring. Allow the mixture to stand for 30 min with occasional stirring. Unless otherwise specified, use a 45 μ m size sieve (CGSB 8-GP-2M). Dry the sieve in an oven, cool in a desiccator and weigh accurately. Strain the mixture through the sieve with the aid of a camel-hair brush to break up agglomerates. Wash the residue well with water, dry to constant mass, together with the sieve, at $105 \pm 2^\circ\text{C}$ and weigh. Subtract the original mass of the sieve and report the mass of the dried residue in grams as % coarse particles.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	COARSE PARTICLES IN STUCCO AND MASONRY COATINGS	METHOD 15.5 June 1980

Supersedes Issue of
August 1974

SCOPE

This method is for use in determining the per cent by mass of the coarse particles in stucco and masonry coatings, exclusive of any fiber that may be present in such coatings.

PROCEDURE

Weigh 20 g of the well-mixed material into a 250 mL beaker and add 50 mL of the specified wash liquid. Thoroughly stir the sample and the wash liquid to break up any lumps but not to grind the solid particles. Pour the mixture through an 850 μm sieve to remove as much fiber as possible but without retaining any aggregate. Then pass it through a 45 μm (CGSB 8-GP-2M) sieve following par. 6 of ASTM D 185, except that the specified wash liquid shall be used. After drying and cooling, transfer the material retained on the 45 μm sieve to a tared 400 mL beaker. Wash any residue off the screen with a little alcohol and then water. Fill the beaker with water and stir the contents. After the beaker has stood about 10 s while the aggregate settles, decant about half the water, which will contain suspended fiber. Repeat the process until the contents are relatively clear of fiber. The last significant traces may be removed by conducting a steady stream of water down the side of the beaker until it overflows, adjusting the flow so that the fiber but not the aggregate is kept in suspension. Finally, decant the water and wash the residue first with alcohol and then ether. After evaporation of the ether, dry the beaker (Method 103.2) to constant mass at $105 \pm 2^\circ\text{C}$, cool it in a desiccator and weigh. Calculate the per cent aggregate by mass of the coating retained on the 45 μm sieve.

Subject the separated sand to a sieve analysis using 600 and 300 μm sieves for Type I, and 300 and 212 μm sieves for Type II. Either the wet-sieving method (ASTM D 185) or the dry-sieving methods (ASTM D 546 or D 1214) may be used with the above sieves, except that when using ASTM D 546 or D 1214 the sample size will depend on the quantity of sand obtained in the above separation.

Calculate the per cent of the total aggregate that passes the coarser sieve, and the per cent retained on the finer sieve.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	VOLATILE MATTER PAINTS, ENAMELS AND LACQUERS	METHOD 17.1 June 1980

Supersedes Issue of
May 1978

SCOPE

This method is for use in determining the volatile and nonvolatile content of pigmented coatings of the oil, oleoresinous or synthetic type. It is not intended for use with unpigmented drying oils or shellacs unless otherwise specified.

APPARATUS

- (a) An 80 to 100 mm diameter flat-bottom dish* that does not change in mass when subjected to the heating schedule described below. A piece of wire may be included in the tare of the dish
- (b) Ventilated oven capable of maintaining a temperature of $105 \pm 2^{\circ}\text{C}$ for 3 h
- (c) Analytical balance

PROCEDURE

Accurately weigh 1 to 1.5 g of well-mixed material into the tared flat-bottom dish. Spread the material over the bottom by tilting the dish or stirring with the wire, if used. Spreading of high-viscosity materials may be aided by stirring with a few millilitres of low-boiling solvent (toluene or ethyl ether).

Heat the dish and contents in the oven at 105°C for 3 h. At intervals, skins may be broken by stirring with the wire. At the end of 3 h, cool in a desiccator and weigh.

RESULTS

Calculate and report the results as per cent volatile matter or per cent nonvolatile matter, as specified. The per cent nonvolatile matter is obtained by subtracting the per cent volatile matter from 100. If the per cent water (Method 24.1) has been determined, subtract it from the per cent volatile matter as determined above and report the difference as the per cent nonaqueous volatile thinner.

* Suitable containers are disposable aluminum foil dishes, petri dishes, or clean lids for friction-top cans. Some can lids may have small amounts of drawing compounds that are volatile under test conditions. When can lids are used, it is advisable to run a blank test on an empty lid.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	NONVOLATILE VEHICLE NONVOLATILE VEHICLE BY DIFFERENCE	METHOD 19.1 June 1980

Supersedes Issue of
August 1974

For solvent base coatings, add the per cent of volatile matter (Method 17.1) and the per cent pigment (Method 21.1) together and subtract the sum from 100%. For emulsion type coatings, add the per cent of volatile matter (Method 17.1) and the per cent pigment (Method 21.3) together and subtract the sum from 100%.

Report the difference in each case as nonvolatile vehicle, per cent by mass.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	RESIDUE ON EVAPORATION	Method 20.1 May 1978

Supersedes Issue of
August 1974

Perform the determination as specified in ASTM D 1353 except that dishes other than those made of platinum may be used. Calculate the results in accordance with the requirement in the appropriate standard.

Withdrawn/Retirée

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	PIGMENT CONTENT ORDINARY CENTRIFUGE METHOD	METHOD 21.1 January 1981

Supersedes Issue of
August 1974

REAGENTS

Extraction Mixture A

10 volumes ethyl ether
6 volumes benzene*
4 volumes methyl alcohol
1 volume acetone

Extraction Mixture C

1 volume toluene
1 volume acetone

Extraction Mixture B

6 volumes benzene*
2.5 volumes 95% ethanol
1.5 volume petroleum ether

PROCEDURE

Weigh accurately 15 to 20 g of the paint into a weighed 50 mL centrifuge tube**. Add 20 mL of the specified extraction mixture, mix thoroughly with a glass rod, wash the rod with more of the extraction mixture, and add enough of the reagent to make a total of 45 mL in the tube. Place the tube in a centrifuge tube shield containing water and counter-balance with a duplicate tube. Whirl at a moderate speed until well settled. Decant the clear supernatant liquid. Repeat the extraction twice with 40 mL of the extraction mixture for a total of three with the extraction mixture, and once with 40 mL ether. After drawing off the ether, hold the tube in a nearly horizontal position, tap the side of the tube to dislodge the pigment cake from the bottom of the glass tube; set the tube in a beaker of water at room temperature and gradually raise the temperature, or set it on top of a warm oven, until all the ether has evaporated. Dry to constant mass in an oven at $105 \pm 2^{\circ}\text{C}$ cool in a desiccator, weigh, and calculate the percentage of pigment. Grind the pigment to a fine powder, pass through a 180 μm (No. 80) sieve and preserve in a stoppered tube for pigment analysis.

For all pigmented coatings except vinyl coatings use Extraction Mixture A. If the pigment does not separate readily use Extraction Mixture B.

For vinyl coatings use Extraction Mixture C.

*Caution: Benzene is a highly toxic solvent and inhalation of this solvent should be avoided.

**Larger or smaller samples may be used, with proportionately larger or smaller centrifuge tubes and volumes of extraction mixture.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	PIGMENT CONTENT PIGMENT VOLUME CONCENTRATION (PVC)	METHOD 21.2 January 1981

Supersedes Issue of
August 1974

SCOPE

This method is for use in determining the per cent by volume of pigment in the total nonvolatile material of paints, enamels and related coatings. If the sample of material is accurately weighed, the per cent by mass of pigment in the material may be determined simultaneously.

MATERIALS AND APPARATUS

- Extraction Mixture B (Method 21.1)
- Toluene (distilled)
- Antioxidant solution: 2% di-tert-butyl-p-cresol* in toluene
- Centrifuge and 50 mL centrifuge tubes
- Stirring rods (metal or glass)
- Steam bath
- Vacuum oven
- Florence flasks, 125 mL S.T. joints
- Evaporating dishes, size 0
- Analytical balance and weights
- Eye droppers for washing rods and flasks.

PROCEDURE

Place, or accurately weigh (See Scope), about 15 mL of material in a tared 50 mL centrifuge tube. Add 10 mL antioxidant solution and mix with a tared stirring rod. Add 15 mL Extraction Mixture, mix again and wash the rod with extraction mixture to make a total volume of about 45 mL. Place the tube in a centrifuge tube shield containing water and counterbalance with a duplicate tube. Whirl at a moderate speed until the pigment is well settled. Decant the supernatant liquid into a tared Florence Flask using toluene as wash liquid. Repeat the extraction twice with 40 mL extraction mixture for a total of three with the extraction mixture, and once with 40 mL ether. During extractions, distill most of the solvents from the flask by immersing it in a hot water bath to a depth equal to the level of contents.

After the last extraction, transfer** the concentrated resin solution to a tared evaporating dish***, using toluene to wash the flask thoroughly. Heat the dish on the steam bath until only traces of solvent remain when it is placed in a vacuum oven. Heat at 105°C and 13.3 to 0 kPa below ambient vacuum until the total loss in mass from the consecutive 3 h periods is less than 10 mg. Cool in a desiccator and weigh. Warm in the oven and transfer as much resin as possible to a Hubbard-Carmick pycnometer. Determine the relative density of the nonvolatile vehicle according to Method 2.3.

$$\text{Volume of nonvolatile vehicle (VNV) (mL)} = \frac{\text{Mass of Vehicle (g)}}{\text{Relative Density}}$$

Meanwhile, dry the pigment in the centrifuge tube to constant mass using first warm water and then an oven at 105°C. Cool in a desiccator and weigh. Add the mass of any pigment obtained in the flask or adhering to the stirring rod. Grind the pigment to a fine powder and determine the relative density according to ASTM D 153.

$$\text{Pigment Volume (PV) (mL)} = \frac{\text{Mass of Pigment (g)}}{\text{Relative Density}}$$

*Known commercially as DBPC, Ionol-CP, or BHT (butylated hydroxytoluene).

**During the distillations some colloidal pigment will flocculate. The vehicle can then be decanted from it and the mass obtained by difference from the tared flask.

***This double transfer may appear unwieldy, but if each extract is evaporated separately from the dish, the antioxidant is exhausted and the vehicle may solidify.

CALCULATIONS

$$\text{Pigment Volume Concentration, \%} = \frac{PV}{PV + VNV} \times 100$$

$$\% \text{ Pigment by Mass} = \frac{\text{Mass of Pigment}}{\text{Mass of Sample}} \times 100$$

PRECISION

Duplicate tests by the same operator, should check within 0.6% PVC.

Literature Reference — Official Digest, Vol. 34 No. 455, December 1962, p 1343-1354.

Withdrawn/Retirée

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	WATER CONTENT	METHOD 24.1
	DISTILLATION METHOD	June 1980

Supersedes Issue of
August 1974

Mix 100 g of the sample in a short-neck round-bottom 500 mL boiling flask with 100 mL of toluene (water saturated)*. Add suitable boiling aids. Connect the flask to a Dean-Stark water receiver, graduated from 0 to 10 mL in 0.1 mL divisions, which in turn is connected to a suitably water-cooled condenser. Insert a loose cotton plug in the top of the condenser tube to prevent condensation of atmospheric moisture in the condenser tube.

Apply heat to the flask, adjusting the rate of boiling so that condensed distillate discharges from the condenser at a rate of 2 to 5 drops per s. Reflux for 1 h after the receiver first fills with distillate and refluxing starts. Wash down with toluene any water drops that may adhere to the apparatus and allow to settle. If turbidity is present, allow the distillate to cool until it becomes clear.

The number of millilitres of water collected under the toluene in the receiver is the percentage of water in the sample.

PRECISION STATEMENT

Based on a co-operative exchange in which 12 laboratories participated, this method has been found capable of the following precision at the 95% confidence level at water contents of less than 1%:

Repeatability — Two separate determinations by the same operator should not differ by more than 0.1%. The range of three determinations should not exceed 0.15%.

Reproducibility — The difference between the means of duplicates or triplicates obtained in two different laboratories should not exceed 0.2%. For three laboratories the range of the mean should not exceed 0.25%.

* Saturate the toluene by vigorously shaking with a few millilitres of water. Allow to stand until the toluene is clear; the supernatant toluene is water-saturated.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	WATER CONTENT TOLUENE SOLUBILITY METHOD	METHOD 24.2 June 1980

Supersedes Issue of
August 1974

One volume of material is shaken with nine volumes of water-saturated* toluene and the mixture is observed for turbidity.

* Saturate the toluene by vigorously shaking with a few millilitres of water. Allow to stand until the toluene is clear; the supernatant toluene is water-saturated.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	SOLVENT POWER	METHOD 26.1 June 1980

Supersedes Issue of
August 1974

Thoroughly dry a quantity* of 1/2 second cellulose nitrate (Regular Soluble Grade) at 65°C. Dissolve 5.0 ± 0.01 g in 25.0 mL of the thinner under test in a 250 mL ground-glass-stoppered flask by an occasional shaking of the mixture until homogeneous. Titrate the solution with reagent grade toluene dropwise, with constant shaking, at a temperature of $23 \pm 2^\circ\text{C}$. After each addition of about 1 mL, stopper the flask and shake for several minutes so that any cellulose nitrate locally precipitated can be dispersed and redissolved.

Continue the titration until the cellulose nitrate begins to precipitate and remains insoluble. Make additions of toluene in smaller increments towards the end, thoroughly shake the mixture, and allow it to stand to permit any re-solution. The end point is indicated when, on swirling some of the solution against the side of the flask, small lumps of gelatinous precipitate are observed. Allow 15 min at the presumed end point to check for re-solution.

* CAUTION: Every precaution must be exercised in the drying of cellulose nitrate. For safety reasons do not dry more than 15 g at any one time and do not use glass for the drying tube because of the danger of building up a static charge. First remove most of the solvent by pressing the resin between filter or blotting paper. Then dry the cellulose nitrate by blowing with hot air at a temperature not exceeding 65°C until the mass is constant within 1%. Remove the dried resin from the drying apparatus immediately after turning off the air or an explosion may occur.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	DISTILLATION RANGE	METHOD 28.4 June 1980

Supersedes Issue of
August 1974

Place a 150 g sample of the resin component in a 500 mL round-bottom flask, attach a water condenser and place the flask in a bath whose temperature shall not exceed 200°C. Heat the flask and distill over all the thinner, taking care to avoid local overheating and foaming.

Place 100 g of thinner distilled from the resin component (or 150 mL if distilling the acid component) in a 250 mL flask that has a ground-glass neck to fit a 6-ball Snyder column or equivalent. The column shall be jacketed with an air condenser, and provided with a fractionating head and a stopcock for controlling the amount of distillate being removed. The rate of removal of distillate shall be 1 mL/min. The flask shall be heated by means of a oil bath to provide a rapid reflux. The temperature of the bath should be approximately 175 to 200°C.

When fractionating the thinner distilled from the resin component, change receivers when the distillation temperature reaches 117°C to obtain the portion of the distillate to be used in the test for butanol.

The above distillation method is used only when the GLC chromatographic apparatus (Method 28.5) is not available. In case of a dispute, gas/liquid chromatography (Method 28.5) shall be used to determine quantitatively the amount of each solvent present in the sample.

Withdrawn

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	ANALYSIS OF SOLVENTS BY GAS-LIQUID CHROMATOGRAPHY	METHOD 28.5 August 1979

Scope — This method covers the determination by GLC of the composition of solvent mixtures.

Summary — Internal standard is added to the material under test and the mixture is diluted with an appropriate solvent. An aliquot of the diluted material is introduced into a gas chromatograph column maintained at isothermal conditions. The concentration of each component is determined from calibration curves obtained from synthetic solvent mixtures treated in the same way.

Apparatus and Materials — General

Chromatograph — Gas-liquid chromatograph equipped with a flame ionization detector, provided the system has sufficient sensitivity to obtain for 0.01% of a solvent a recorder deflection of at least 2 mm at a signal to noise ratio of at least 5 to 1. Other detectors that meet this requirement may be used.

Column — Stainless steel or glass tube packed with solid support material that has a particle size of usually 60-80 mesh (250-180 μm) and that has been treated with a liquid phase which provides a good separation of the components. Columns may be obtained commercially or prepared by the conventional slurry and evaporation procedure outlined in Anal. Chem., Vol. 35, No. 4, p. 592, April 1963. Useful information on column materials and preparation may be found in ASTM E 260 Recommended Practice.

Micro-syringe — 10 μL or less capacity.

Recorder — A recording potentiometer with a full scale deflection of 10 mV or less and a full scale response time of 2 s or less. Use of an integrator improves the measurement of peak areas.

Standards — Standard samples of components are needed for identification by retention time. Specific internal standards may be used in quantitative determinations.

Operation — General

Conditioning — Attach one end of freshly packed or purchased columns to the inlet side of the instrument with the other end of the column free. With carrier gas flowing through the column, heat it to rise at the rate of 10° C/min from ambient to 25° C above the maximum temperature used in the determination. Maintain at the latter temperature for 1 h to strip the column of volatiles that might interfere with subsequent determinations.

Operation — Mount the column(s) in the chromatograph and establish the instrument conditions and sample size required to give the necessary sensitivity and resolution. Adjust the attenuation so that peak heights are within the range of 25 to 95% of the chart scale.

Calibration — Calibrate and standardize the column and chromatograph for the materials for which identification is required. Determine the relative retention time by injecting small amounts of each component or mixtures of known composition. Consider the area under each peak of the chromatogram a quantitative measure of the corresponding compound. The relative area is proportional to concentration only if the detector responds equally to all components in the material. When flame ionization or thermal conductivity detectors are used the response to different components is generally significantly different. This difference in response may be corrected by the use of relative response factors obtained by injecting and measuring the response to pure components or known blends.

Peak Area Measurement — Areas of peaks may be measured by integrator, planimeter, triangulation or paper cut-out. Integration is considered to be most accurate.

Analysis of 1-GP-124M (Thinner for Vinyl Coatings)

Materials — Reagent grade benzene, ethanol (95% or absolute) and toluene. Purified grade of methyl isobutyl ketone (ASTM D 1153).

Standard — n-octane, 99 + mol%.

Apparatus

Columns — 1.8 mm of 6.3 mm outside diameter tube (See Apparatus and Materials — General) packed with 5% diisodecyl phthalate and 5% organic derivative of bentonite* on 60-80 mesh nonacid washed calcined diatomaceous silica**.

Calibration — Prepare five standard mixtures of toluene and MIBK in ratios by volume of 60:40, 55:45, 50:50, 45:55 and 40:60, accurately measured. Prepare a 10% by volume solution of benzene in ethanol. Add to five, 10 mL volumetric flasks 4.00 mL of the standard mixtures, one mixture per flask. To each flask add 2.00 mL n-octane and to the equal parts mixture 1.00 mL of 10% benzene solution. Dilute each to volume with ethanol and mix thoroughly. Operate the instrument with the conditions specified in the table for 1-GP-124M analysis*** and after obtaining a steady baseline adjusted to zero, inject 1 μ L of each standard mixture and obtain a chromatogram for each, changing the attenuation as necessary to record the peaks. Measure the areas of the peaks on each chromatogram. For each standard mixture calculate the ratios of the areas of the MIBK and toluene peaks to that of the internal standard. Plot the ratios against the respective concentration of MIBK and toluene in the standard mixtures to obtain calibration curves.

Analysis — Transfer 4.00 mL of the sample to a 10 mL volumetric flask, add 2.00 mL n-octane and dilute to volume with ethanol. Mix thoroughly. Using the exact instrument conditions as for calibration inject 1 μ L of diluted sample and obtain the chromatogram, changing the attenuation as necessary to record the peaks. Measure the areas of the peaks and calculate the ratios of the areas of MIBK and toluene to that of n-octane. From the calibration curves interpolate the concentrations of MIBK and toluene. If the presence of benzene is indicated separately inject 2 μ L of the diluted sample and 2 μ L of the equal parts mixture containing benzene. From the benzene peaks on the chromatograms estimate the benzene content of the sample.

Precision

Repeatability — Based on repeated determinations by one laboratory, two determinations by the same operator should not differ by more than 3.5% absolute for MIBK and 0.9% absolute for toluene at contents of about 50% for each.

Analysis of 1-GP-197M (Thinner for Epoxy Coatings)

Materials — Reagent grade benzene, ethanol (95% or absolute) and xylene. Purified grade methyl isobutyl ketone (ASTM D 1153) and 2-ethoxyethyl acetate (ASTM D 331).

Standards — n-octane, 99 + mol % and undecane.

Apparatus — See apparatus for 1-GP-124M.

Determination of Benzene

Calibration — Add to four 100 mL volumetric flasks respectively 0.20, 0.50, 1.00 and 1.50 mL of benzene and dilute to 100 mL with ethanol. Mix thoroughly. Operate the instrument with the conditions specified in the table for 1-GP-197M analysis and after obtaining a steady baseline adjusted to zero, separately inject 1 μ L of each standard and obtain a chromatogram for each, changing the attenuation as necessary to record the peaks. Measure the area of the peaks and plot area versus benzene concentration to obtain the calibration curve.

Analysis — Using the exact instrument conditions as for calibration inject 1 μ L of sample and obtain the chromatogram, changing the attenuation as necessary to record the peaks. Examine the chromatogram for peaks of interest and if benzene is present**** measure the area of its peak. Determine the concentration of benzene from the calibration curve.

*Bentone 34 obtainable from Enelchem Products has been found suitable.

**Chromasorb W, NAW manufactured by Johns-Manville Co. has been found suitable.

***Under these operating conditions the components have the following retention times relative to Ethanol: Benzene 1.8, n-Octane 2.1, Toluene 3.0, MIBK 3.5.

****Under the above operating conditions, the constituents have the following retention times: Benzene 1.6 min, MIBK 2.8 min, Xylene (isomers) 4.1 and 5.0 min, 2-Ethoxyethyl Acetate 7.0 min.

Analysis of Solvent

Calibration — Prepare a standard blend of MIBK, xylene and 2-ethoxyethyl acetate in the exact ratio by volume of 20:20:10 and prepare a mixture of internal standards n-octane and undecane in the exact ratio of 20:6. Add to four, 10 mL volumetric flasks 4.00, 4.50, 5.00 and 5.50 mL respectively of the standard blends. To each flask add 2.60 mL of internal standard mixture and dilute each to volume with ethanol. Mix thoroughly. Operate the instrument with the conditions specified for 1-GP-197M analysis* and after obtaining a steady baseline adjusted to zero, separately inject 1.5 μ L of each standard solution and obtain a chromatogram for each, changing the attenuation as necessary to record the peaks. Measure the area of the peaks on each chromatogram. For each standard solution calculate the ratios of the areas of the MIBK and of the xylene peaks to that of n-octane and the ratio of 2-ethoxyethyl acetate to undecane. Plot the ratios against the respective concentration of MIBK, xylene and 2-ethoxyethyl acetate in the standard solutions to obtain calibration curves.

Analysis — Transfer 5.00 mL of sample to a 10 mL volumetric flask, add 2.60 mL of internal standard mixture and dilute to volume with ethanol. Mix thoroughly. Using the exact instrument conditions as for calibration inject 1.5 μ L of diluted sample and obtain the chromatogram, changing the attenuation as necessary to record the peaks. Measure the areas of the peaks and calculate the ratios of the areas of MIBK and xylene to that of n-octane and the ratio of 2-ethoxyethyl acetate to undecane. From the calibration curves interpolate the concentrations of MIBK, xylene and 2-ethoxyethyl acetate in the diluted sample. Multiply by two to obtain the concentration in the original sample.

Precision

Repeatability — Based on repeated determinations by one laboratory, two determinations by the same operator should not differ by more than 0.1% absolute for MIBK, 1.5% absolute for xylene and 0.7% absolute for 2-ethoxyethyl acetate at contents of about 40% for MIBK and xylene and about 20% for 2-EEA.

ANALYSIS OF SOLVENT IN RESIN COMPONENT OF 1-GP-121M. [COATING, VINYL, PRETREATMENT, FOR METALS (VINYL WASH PRIMER)]

Materials — Reagent grade methanol, ethanol (absolute), n-butanol and isopropanol.

Standard — Reagent grade t-butanol.

Apparatus

Column — 1.8 m of 6.3 mm outside diameter tube (See apparatus and Materials — General) packed with 80 to 100 mesh copolymer of ethylvinylbenzene and divinylbenzene**.

Centrifuge

Sample

Sample Preparation — Accurately weigh about 5 g of the resin component and 3 g of t-butanol into a 50 mL volumetric flask. Dilute to volume with methanol and mix well. Transfer about 30 mL to a 35 mL glass-stoppered centrifuge tube. Centrifuge for about 30 min at approximately 2000 r/min until the pigment is well settled.

Qualitative Solvent Determination — Take two 5 mL aliquots of the centrifuged solution and add about 0.25 mL ethanol to one and 0.25 mL isopropanol to the other. Mix each well. Operate the instrument with the conditions specified in the table for 1-GP-121M analysis. After obtaining a steady base-line adjusted to zero, separately inject 2 μ L of centrifuged solution and of each mixture and obtain chromatograms of each. Compare the three chromatograms for peaks attributable to ethanol and isopropanol. If the sample contains ethanol, the ethanol peak will be greater on the chromatogram from the aliquot to which ethanol was added. If it contains isopropanol a new peak will appear in the ethanol-added aliquot. Conversely for the aliquot to which isopropanol was added.

*Under these operating conditions the components have the following retention times relative to Ethanol: Benzene (if present) 1.3, n-Octane 1.5, MIBK 2.0, Xylene (incompletely resolved isomers) 3.0 and 3.5, 2-Ethoxyethyl Acetate 4.8, and Undecane 6.4.

**Porapak Q obtainable from Waters Associates has been found suitable.

METHOD 28.5

Calibration — Prepare standards containing ethanol or isopropanol or both according to the results of the qualitative determination. Accurately weigh into four, 50 mL volumetric flasks 0.60, 1.00, 1.40 and 1.80 g n-butanol and 2.20, 2.80, 3.40 and 4.00 g ethanol or isopropanol, respectively. Accurately weigh 3.00 g t-butanol into each, dilute to 50 mL with methanol and mix thoroughly. Operate the instrument according to the specified conditions and separately inject 2 μ L of each standard to obtain a chromatogram of each. Measure the area of the peaks on each chromatogram. For each standard solution calculate the ratios of the areas of the ethanol, isopropanol and n-butanol peaks to that of t-butanol. Plot the area ratios against the weight ratios of the materials to t-butanol in the standard solutions to obtain calibration curves.

Analysis — Using the exact instrument conditions as for calibration inject 2 μ L of the centrifuged solution and obtain the chromatogram. Measure the areas of the peaks and calculate the ratios of the areas of n-butanol, ethanol and/or isopropanol to that of t-butanol. From the calibration curves determine the mass of the alcohols in the sample and using the sample weight calculate the percent by mass of the components.

Precision

Repeatability — Based on repeated determinations by one laboratory, two determinations should not differ by more than 0.65% absolute for n-butanol, 0.8% absolute for ethanol and 0.6% absolute for isopropanol at contents of about 17% for n-butanol and about 63% for ethanol and isopropanol.

TABLE 1
TYPICAL CONDITIONS FOR SOLVENT DETERMINATIONS

	1-GP-124M	1-GP-197M	1-GP-121M
Temperatures, °C			
Column, isothermal	80	120	225
Injection port	205	200	225
Detector block	240	225	250
Carrier gas flow rate, mL/min	30	40	40
FID gases			
Hydrogen flow rate, mL/min	30	40	30
Air flow rate, mL/min	300	300	300
Recorder chart speed mm/min	6	6	6
Sample size, μ L	1.0	1.5	2

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	ACCELERATED STABILITY AT 60°C (140°F)	METHOD 30.3 August 1974

Supersedes Issue of
November 1966

Fill a half-pint (0.3ℓ) container with the material under test and determine the viscosity (Method 4.5) unless otherwise specified). If change in gloss is also to be checked, measure the initial gloss by Method 13.1 or 13.2. Close the lid tightly and place the filled container in an oven (Method 103.2) maintained at $60 \pm 2^{\circ}\text{C}$ ($140 \pm 3.5^{\circ}\text{F}$) for 96 h or other specified temperature or time. At the end of this time remove the container from the oven and allow to condition (Method 103.1) for 24 h. Open the container and examine the contents. Determine the viscosity of the heat-treated material.

Prepare a film on a glass plate using a drawblade (Method 98.2), dry for 18 h (Method 103.1) and examine. Where required, measure the gloss by the same method as used on the original material and determine to specified drying time (Method 5.1).

Withdrawn

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	ACCELERATED STABILITY AT 45° C	METHOD 30.4 June 1980

Supersedes Issue of
August 1974

Fill a 150 mL or 250 mL paint can with the material and cover with a tight-fitting lid. Place the container for 5 d in an oven at $45 \pm 2^{\circ}\text{C}$. At the end of this time remove the can and cool for 24 h (Method 103.1). Open the container, stir the contents and examine for homogeneity and seeding. Determine the reflectance by Method 39.1 and examine the dried film for uniformity of appearance, streakiness, mottling and seeding.

Withdrawn/Retiré

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	ACCELERATED STABILITY STABILITY AT 40°C	METHOD 30.5 January 1981

Supersedes Issue of
August 1974

Fill a 250 mL, wide-mouth, colorless, transparent glass bottle provided with a screw cap with aluminum-foil-covered liner, to one-half capacity with the material under test. Place a strip of mild steel (Method 100.1) 20 x 75 mm in the bottle. Tightly seal the bottle and store it 1 month at $40 \pm 2^{\circ}\text{C}$. At the end of this time examine the material and the steel strip. Then stir the material and re-examine it.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	ACCELERATED STABILITY HEAT STABILITY	METHOD 30.6 June 1980

Supersedes Issue of
August 1974

Place 200 mL of the material in a 250 mL glass bottle that is loosely stoppered, and immerse halfway in a water bath at $75 \pm 2^{\circ}\text{C}$. When the material has reached the bath temperature, close the jar tightly and leave it in the bath for 24 h.

At the end of this time allow the material to return to standard temperature (Method 103.1). Use this material to check the properties outlined in the standard.

Withdrawn/Retirée

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	FREEZE-THAW TEST	METHOD 31.1 August 1974

Supersedes Issue of
June 1972

Thoroughly mix and strain sufficient of the sample to remove any coarse material, such as skins, that may be present* into two 1/2 pt (0.3 l) friction-top cans, which are filled with material so that when the paddle-type viscometer rotor is immersed to the mark, the distance between the bottom of the paddle and the bottom of the can shall be not less than 3/4 in. (19 mm). Tightly cap both cans. Keep one under standard conditions (Method 103.1) and subject the other to the following cycle: freezing at $-18 \pm 2^{\circ}\text{C}$ ($0 \pm 3.5^{\circ}\text{F}$) Method 103.3 for 17 ± 1 h, followed by thawing at $23 \pm 2^{\circ}\text{C}$ ($73 \pm 3.5^{\circ}\text{F}$) for 7 ± 1 h. During the test the sample should not be subjected to excessive agitation.

At the end of the final freezing period of the specified number of cycles, allow the freeze-thaw sample to thaw 24 h under standard conditions. Then examine it in the container for such defects as coagulation, curdling, etc. Stir the material thoroughly and allow it to stand 1 h before determining its consistency (Method 4.5). Treat the control sample similarly. Any difference in viscosity between the tested sample and the control is considered to be due to the action of freezing and thawing.

Make draw-downs by applicator (Method 98.2) on clean glass panels (Method 102.1) of the control sample and the freeze-thaw sample and examine the resulting films.

* A suitable strainer consists of two layers of gauze having a thread count of 20 x 12 and weighing about 17 g/yd² (USP XVI, Type 7).

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	STABILITY AT LOW TEMPERATURE	METHOD 31.2 January 1981

Supersedes Issue of
August 1974

Fill a 250 mL wide-mouth, colorless, transparent glass bottle provided with a screw cap with aluminum-foil-covered liner to one-half capacity with the material under test. Tightly seal the jar and store it 72 h at $-20 \pm 2^{\circ}\text{C}$, then remove to room conditions for 5 h.

Invert the bottle and note the flow. Determine the presence of gel particles by pouring a small quantity of the material on a clean glass plate and observing the coating.

Withdrawn/Retirée

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	LOW-TEMPERATURE STABILITY STABILITY AT -20°C	METHOD 31.3 October 1982

Supersedes Issue of
August 1974

Fill a 250 mL friction-top can with a well-mixed sample of the material under test. Close the container, allow it to stand for 1 h under standard conditions (Method 103.1) and measure the consistency of the sample (Method 4.5). Close the lid tightly and place the filled container in a suitable cold box or cold room (Method 103.3) maintained at a temperature of $-20 \pm 2^{\circ}\text{C}$ for 24 h. Remove the filled container and allow it to stand under standard conditions for 24 h. Stir the sample thoroughly, allow to stand for a additional 1 h under standard conditions and then measure the consistency. Calculate the difference in consistency of the sample before and after exposure to the low-temperature environment. In addition, examine the sample for evidence of inhomogeneity.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	SAGGING	METHOD 32.1 January 1981

Supersedes Issue of
August 1974

Apply one coat of 1-GP-38M enamel undercoat by spray (Method 98.2) to a nonabsorbent panel 0.1 m² in area and allow to dry (Method 103.1) at least 24 h.

Calculate to 0.1 g the mass of the test material to be applied to obtain the specified coverage from the density (Method 2.1) according to the formula:

$$\text{Mass of material, g} = \frac{1000 \text{ DA}}{\text{SR}}$$

where D = Density in g/mL (kg/L)
SR = Spreading rate in m²/L
A = Area in m²

Mount the panel firmly in a vertical position. Place a convenient amount of well-mixed material in a small container and weigh together with a 50 mm paint brush. Apply the material to the entire face of the panel, using vertical strokes first, until approximately the calculated amount has been applied. Finish off with horizontal strokes. Allow the panel to dry in its vertical position for 18 h and examine it.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	SLUMPING	METHOD 36.1 January 1981

Supersedes Issue of
August 1974

APPARATUS

The slumping trough is shown on the accompanying diagram. It is 15 mm wide, 20 mm deep and 175 mm long, and is made of brass (approximately 1 mm thick). The right-angled bends are made as sharply as possible and the interior surface is finished plane and free from scratches. A score mark is made on the outside of the trough 125 mm from the top. The trough is attached to a suitable base in a vertical position.

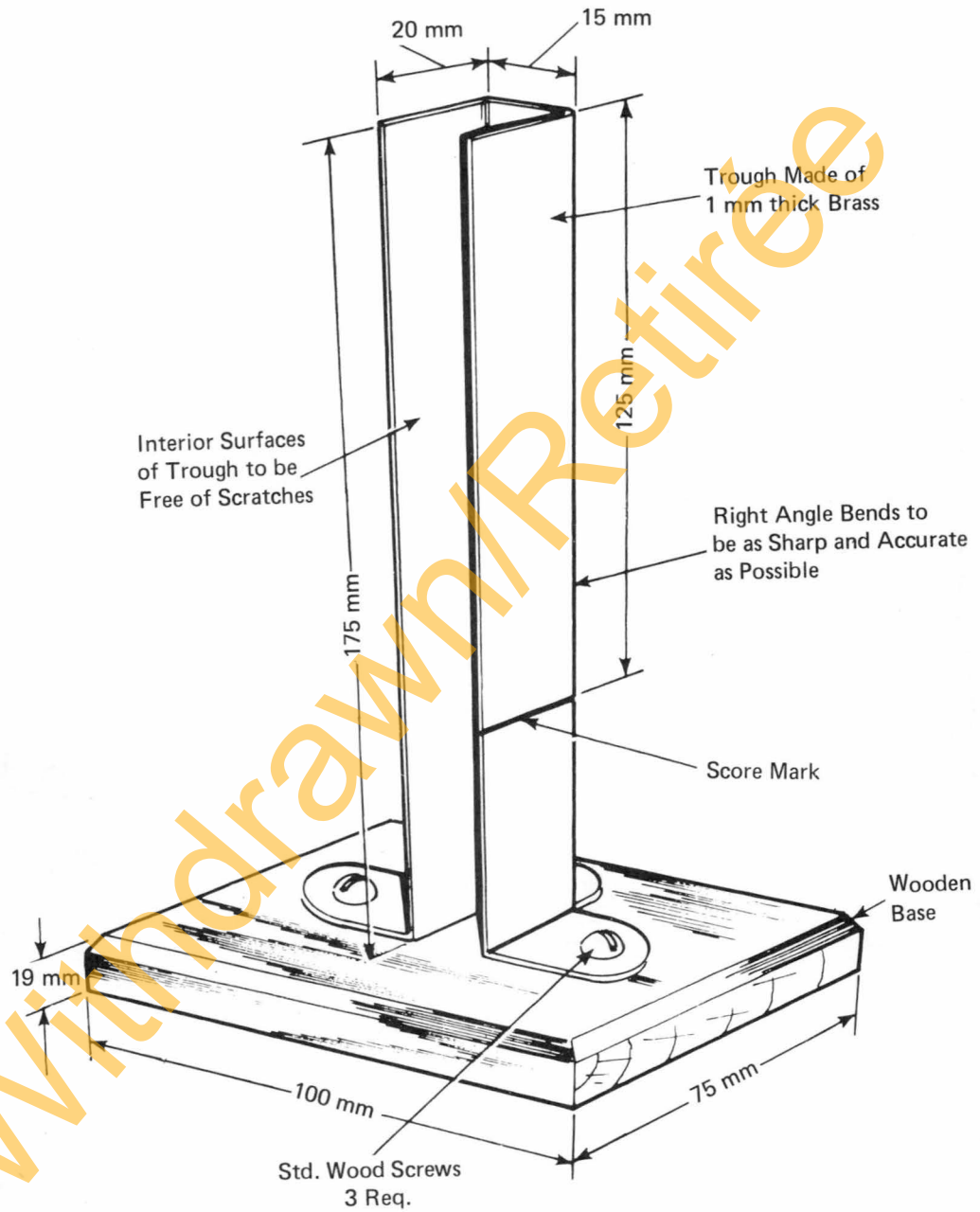
PROCEDURE

Thoroughly clean the slumping trough with acetone and fill the top 125 mm with a sample of the material to be tested. Work the sample well into the groove to eliminate air pockets and to secure the best possible adhesion to the metal. Level the outer surface of the material flush with the sides of the trough and cut off the bottom of the material sharply at the mark. Allow the filled trough to stand undisturbed 24 h in a vertical position (Method 103.1) and then 24 h at 50°C.

At the end of this time observe:

- whether there has been any slippage of the sample at the top of the column
- the maximum distance any of the sample has slumped below the 125 mm mark.

Make duplicate determinations and report the mean as the amount of slump.



APPARATUS FOR SLUMP TEST

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	BLEEDING RESISTANCE	METHOD 37.3 June 1980

Supersedes Issue of
August 1974

Apply (Method 97.2) the material without reduction to one-half of a white pine panel (Method 97.1) and allow to dry 48 h (Method 103.1). Apply (Method 97.3), a coat of 1-GP-60M enamel, 1-GP-12c Color White 513-101 to the whole panel and dry 18 h.

At the end of this time examine the panel by comparing the color of the enamel film over the stained and unstained areas.

Withdrawn/Retiré

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	BLUSHING RESISTANCE LACQUER THINNER	METHOD 38.1 June 1980

Supersedes Issue of
August 1974

Dissolve 5 g of cellulose nitrate in 25 mL of the thinner being tested, as described in Method 26.1. Apply some of the solution to a glass panel by means of a drawblade set to a clearance of 75 μm . The application is made and the test performed at $23 \pm 2^\circ\text{C}$, $65 \pm 2\%$ R.H. and an air velocity over the panel of 1.0 m/s. Examine the film throughout and at the end of the test.

Withdrawn/Retiré

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	BLUSHING RESISTANCE LACQUERS AT NORMAL HUMIDITY	METHOD 38.2 June 1980

Supersedes Issue of
August 1974

Apply the material to a glass panel (Method 102.1) by means of a drawblade having a clearance of 75 μm . The application is made and the test performed at $23 \pm 2^\circ\text{C}$, $65 \pm 2\%$ R.H. and an air velocity over the panels of 1.0 m/s. Examine the film throughout and at the end of the test.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	BLUSHING RESISTANCE LAQUERS AT HIGH TEMPERATURE AND HUMIDITY	METHOD 38.3 June 1980

Supersedes Issue of
August 1974

Apply the material to a glass panel (Method 102.1) by means of a drawblade having a clearance of 75 μm . The application is made and the test performed at $35 \pm 1^\circ\text{C}$, $92 \pm 5\%$ R.H. and an air velocity over the panels of 1.0 m/s. Examine the film throughout and at the end of the test.

Withdrawn/Retiré

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	BLUSHING RESISTANCE CELLULOSE NITRATE LACQUER AT HIGH HUMIDITY	METHOD 38.4 January 1981

Supersedes Issue of
August 1974

Thin the test material with 1-GP-50 or 1-GP-110 thinner to a consistency of 65 - 70 Krebs units (Method 4.5). Dip clean (Method 98.2) 75 x 150 mm tinplate (Method 101.1), steel (Method 100.1), or gilded metal panels in the thinned lacquer and withdraw them at a uniform rate.

Air dry the film on the test panel at $25 \pm 2^{\circ}\text{C}$ and $92 \pm 5\%$ R.H., with an air velocity of 1.0 m/s over the panel, and examine the film after 1 h.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	REFLECTANCE	METHOD 39.1 June 1980

Supersedes Issue of
August 1974

Uniformly coat (Method 98.1) a clean nonabsorbent flat panel at least 100 mm square with one coat of $25 \pm 3 \mu\text{m}$ dry film thickness in the case of aluminum finishes, and two coats with a dry film thickness of $35 \pm 5 \mu\text{m}$ for each coat, with 24 h drying between coats, in all other cases. The surface should be free from any variation in appearance or texture and should be plane. Dry the paint 24 h under standard conditions (Method 103.1).

Determine total luminous reflectance by means of an integrating sphere photometer* that provides either diffuse lighting and perpendicular observation or direct lighting and diffuse observation, using a secondary standard white as reference. If secondary standards are not available a standard white barytes or magnesium oxide** surface may be used (diffuse reflection taken as 100%). Where the apparatus employs direct lighting, direct the light from the collimating tube at the standard placed in the sphere opening.

Replace the standard with a sample panel and make a minimum of six readings over different locations on the panel. Test a number of replicate panels and make frequent standardization. Record all values and calculate the mean. Report the mean, the range, and the instrument used.

* Two types of instruments that have been used are the Taylor-Baumgartner Photometer and the Zeiss Electric Reflectance Photometer (Elrepho). The Zeiss Elrepho using the green (FMY/C) filter is to be used as the referee instrument. Equivalent equipment may be used.

** Prepare reference white reflectance standards in accordance with ASTM E 259 Part 46. For referee purposes calibrate the standards according to ASTM E 306 Part 46.

Canadian General Standards Board

CGSB Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	REFLECTANCE ON BAKED FINISHES	METHOD 39.3 June 1980

Supersedes Issue of
August 1974

Apply (Method 98.2) the material to a clean nonabsorbent flat panel and bake it in accordance with the specification or standard.

At the end of 0.5 h conditioning (Method 103.1), determine the total luminous reflectance by means of a photometer in accordance with Method 39.1.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	BAKING PROPERTIES	METHOD 44.1 January 1981

Supersedes Issue of
August 1974

Apply (Method 98.2) the material to a thoroughly clean, plane, nonabsorbent surface and allow to dry 0.5 h. Bake the film (Method 103.2) for the specified time at the specified temperature, condition 30 min at 45°C and at this temperature examine for the tack-free condition (Method 5.1). After cooling the panel for 30 min under standard conditions (Method 103.1) examine the film for hard-dry condition (Method 5.1).

Withdrawn/Retirée

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	DILUTION STABILITY GENERAL TEST	METHOD 45.1 June 1980

Supersedes Issue of
August 1974

Dilute the material in a colorless, transparent glass container with the specified amount of the required thinner, all materials being at standard temperature (Method 103.1) unless otherwise specified. Stir the materials and observe whether they are compatible.

If the materials are compatible on mixing, fill a clear-glass container, close tightly and place under standard temperature conditions for the specified time. At the end of this time examine for separation, precipitation and curdling. Stir the contents and, if necessary, flow the mixture on a glass panel (Method 102.1) for immediate inspection and inspection after drying.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	DILUTION STABILITY	METHOD 45.2 June 1980

Supersedes Issue of
August 1974

Conduct the dilution stability test in a 100 mL stoppered graduated cylinder having a distance of approximately 170 mm between the 0 and 100 mL marks. Transfer the product being tested, previously diluted as specified, to the cylinder and stopper the cylinder. Allow the material to settle for the specified time and examine.

After further specified standing, shake the cylinder and, when required, note the time required for all pigment to go into suspension.

When specified, flow out a quantity of the mixed material on a clean glass panel (Method 102.1) and subsequently examine the dry film.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	ABSORPTION	METHOD 46.1 August 1974

Supersedes Issue of
June 1958

Invert a clean lid from a 1/2 pt (0.3 l) friction-top can. Thoroughly mix the material and fill the lid level with the rim. Place a No. 2 Whatman or equivalent filter paper (11 or 12.5 cm diameter) flat on the material so that the center of the paper is approximately in the center of the lid. When the material contains a dye, draw a reference line on the filter paper at the original boundary.

After 3 h (Method 103.1) measure the average radial distance on the filter paper from the edge of the area originally wetted by the material (this area is outlined by the pigment or the reference line) to the farthest extent of the absorption of the vehicle.

Withdrawn Retirée

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	EFFECT ON STENCIL BRUSHES	METHOD 47.1 August 1974

Supersedes Issue of
December 1958

Wet a stencil brush (22-GP-5) thoroughly with the test sample, and allow the excess to drain off. Lay the brush on its side so that the bristles do not touch an absorbent surface, and allow it to remain for 18 h. Immerse the brush in 1-GP-4 thinner for 15 min, rinse with the thinner, dry and examine.

Withdrawn/Retirée

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	REFRACTIVE INDEX	METHOD 49.1 August 1974

Supersedes Issue of
October 1960

Immerse clean glass beads in a drop of pure benzene on a microscope slide and observe, using a polarizing microscope. After the microscope has been focused on some of the beads, slowly raise its body tube and observe the movement of the bright Becke line surrounding each bead.

Movement of the line toward the center of the bead indicates that the glass bead has a higher refractive index than the surrounding benzene (1.5005 at 25°C (77°F)).

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	PIGMENT ANALYSIS	METHOD 50.3 June 1980
	RED LEAD WITH GRAPHITE OR IRON OXIDE	

Supersedes Issue of
August 1974

SCOPE

This method is for use in the analysis for red lead in mixed pigments that contain iron oxide or graphite.

REAGENTS

Ethyl alcohol, C_2H_5OH , 95%
Sodium acetate crystals, CH_3CO_2Na , A.R.
Acetic acid, CH_3CO_2H , A.R.
Potassium iodide crystals, KI, A.R.
0.1 mol/L Sodium thiosulfate, $Na_2S_2O_3$ Standard Solution (standardized against resublimed iodine)
0.1 mol/L Iodine solution (recently standardized against 0.1 mol/L thiosulfate solution); the iodine solution contains about 30 g/L of KI
Starch solution (2 g in 100 mL distilled water).

PROCEDURE

Weigh 1 g oven-dried separated pigment (Method 21.1) into a 250 mL beaker. Add several drops of a 1:1 alcohol solution and work the pigment into a smooth paste with a glass rod. Place 30 g sodium acetate crystals, 10 mL water, 10 mL 1:1 by volume acetic acid/water solution and 2.4 g KI crystals into a 150 mL beaker and stir well.

Add the contents of the 150 mL beaker to the paste and stir for several minutes. To this mixture add, from a burette, 0.1 mol/L sodium thiosulfate solution as follows:

- (1) 15.00 mL if the expected red lead content is less than 50%.
- (2) 35.00 mL if the expected red lead content is more than 50%.

Continue stirring, rubbing up the bottom and sides of the beaker, for at least 30 min to break up red lead particles and ensure complete liberation of iodine. (Alternatively, a magnetic stirrer may be used by operating it at a high speed to produce a bouncing rather than a whirling motion of the stirring bar. This action assists in the rapid break-up of red lead particles and subsequent iodine liberation.)

Filter the contents of the beaker through a Gooch crucible under vacuum and wash the residue well with water. Add 1 mL freshly prepared 2% starch solution to the filtrate, and back titrate with a recently standardized 0.1 mol/L iodine solution until a blue coloration persists.

Calculate the % Pb_3O_4 as follows:

$$\% Pb_3O_4 = \frac{0.3428 (V_1 C_1 - V_2 C_2)}{M} \times 100$$

where V_1 = volume of thiosulfate solution (mL)

C_1 = concentration of thiosulfate solution (mol/L)

V_2 = volume of iodine solution (mL)

C_2 = concentration of iodine solution (mol/L)

M = mass of sample (g)

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	PIGMENT ANALYSIS SOLUBLE LEAD	METHOD 50.9 August 1974

Supersedes Issue of
July 1957

Moisten 1/2 g of pigment, extracted when required by Method 21.1, with a few drops of alcohol and shake continuously for 1 h with 500 ml HCl (0.25% hydrogen chloride by weight) at a temperature of 18-30°C (64-86°F). After shaking, allow the mixture to stand for 1 h and then filter.

Determine the lead content of the filtrate as lead sulfate by ASTM D 215, and calculate as lead (Pb).

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	PIGMENT ANALYSIS	METHOD 50.10 June 1980
	CARBON DIOXIDE IN CARBONATES	

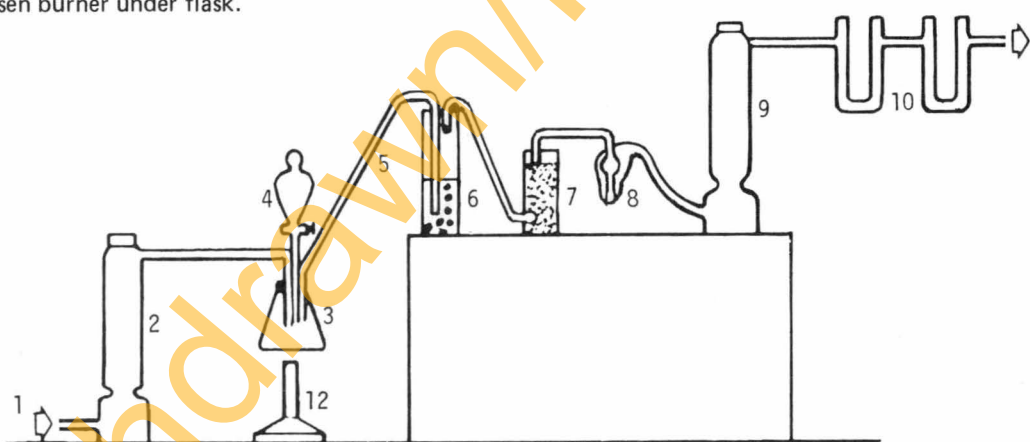
SCOPE

Supersedes Issue of
August 1974

This method is for use in determining the amount of carbon dioxide present in extracted putty and paint pigments, cement paint powder, limestone and lime.

APPARATUS

1. Air supply at beginning of system or vacuum at end.
2. Soda-lime tower to remove CO_2 from incoming air. The soda-lime must be porous, not hard and unabsorptive.
3. Erlenmeyer flask, 125 mL, with 3-hole stopper.
4. Separatory funnel, 125 mL, running into flask.
5. Tube inclined upward from flask to drying system.
6. Gas washer containing water to act as condenser and retain most of volatilized acid.
7. Absorption jar containing mossy zinc to remove last traces of acid.
8. Bubble counter containing concentrated H_2SO_4 to dry gases and show rate of gas flow.
9. Drying tower containing CaCl_2 , P_2O_5 or $\text{Mg}(\text{ClO}_4)_2$ to complete drying.
10. Two tared absorption tubes, the first containing soda-lime and the second containing one-third soda-lime followed by two-thirds CaCl_2 .
11. If the sample evolves H_2S , a bubble counter containing CdCl_2 solution is inserted between item (7) and (8).
12. Bunsen burner under flask.



PROCEDURE

Run a blank with absorption tubes until there is not more than 1 mg change in mass, or check with reagent grade sodium or calcium carbonate.

Accurately weigh about 0.5 g of separated pigment (Method 21.1) or limestone, or about 5 g of cement paint or lime, into the Erlenmeyer flask and attach the flask to the system. Pour 25 mL hot water through the funnel onto the powder and force a current of air through the whole system, except the weighed absorption tubes, until the original air has been displaced.

Close the stopcock on the funnel, half fill with 1:1 HCl and replace the stopper. Insert the absorption tubes in the system, reduce the air flow to a slow current and allow the acid to flow slowly into the flask, the rate being governed by the evolution of gas. When effervescence diminishes, light the burner under the flask. Keep the flame low to secure steady but quiet boiling for 2 or 3 min. Extinguish the flame, increase the air current and continue to pass air for 30 min. Disconnect the absorption tubes (10) from the apparatus and allow to stand in the balance case until two masses taken 30 min apart agree within 0.5 mg. Do the test in duplicate.

RESULTS

The mass of CO_2 is the increase in mass of the absorption tubes.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	PIGMENT ANALYSIS IRON OXIDE AND SILICEOUS MATTER	METHOD 50.11 January 1981

Supersedes Issue of
August 1974

SCOPE

This method is for use in the analysis for iron oxide and siliceous matter in mixed pigments that:

- contain zinc chromate yellow
- do not contain zinc chromate yellow.

PROCEDURE

a. Zinc Chromate Yellow Present

Fold the paper over the residue from the zinc chromate yellow separation in Method 50.12 and place it in a pre-heated tared porcelain crucible. Char the paper and then ignite it at red heat, 600°C for 1 h. Cool in a desiccator, transfer the residue to a 400 mL beaker by means of a camel hair brush, and break up the particles with a glass rod to a powder consistency. Partially fill the crucible with concentrated HCl and boil for a few minutes to dissolve any adhering iron. Add this solution to the 400 mL beaker.

Add 25 mL concentrated HCl and 2 drops of SnCl₂ solution (50 g in 500 mL 1:1 HCl) to the beaker and cover it with a watch glass. Heat to boiling with constant swirling; continue heating for several minutes and then place on a steam bath until solution of Fe₂O₃ is complete. Add 50 mL water and bring to a boil. Filter through an ashless No. 40 Whatman or equivalent filter paper into a 500 mL Erlenmeyer flask and wash well with hot water. Retain the insoluble matter for the determination of the siliceous matter as in Method 50.14.

Heat the iron solution to boiling; add the SnCl₂ solution dropwise with constant swirling until the solution is decolorized, and then add one drop in excess. Cool the solution to room temperature and add 10 mL of saturated HgCl₂ solution. Swirl the flask vigorously for 1 min, add 15 mL of 1:1 H₃PO₄, and 6 drops of barium diphenylamine sulfonate indicator, and titrate with a standardized 0.017 mol/L K₂Cr₂O₇ solution until the green color just changes to purple. Calculate the iron present as iron oxide from the formula:

$$\% \text{Fe}_2\text{O}_3 = \frac{V \times c \times 47.91}{M}$$

where V = mL of standard K₂Cr₂O₇ solution used

c = Concentration of the standard K₂Cr₂O₇ solution in mol/L

M = Mass of the sample in grams

b. Zinc Chromate Yellow Not Present

Put 1 g sample of oven-dried pigment into a 400 mL beaker and proceed as in par. 2 and 3 above.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	PIGMENT ANALYSIS ZINC CHROMATE YELLOW	METHOD 50.12 January 1981

Supersedes Issue of
August 1974

SCOPE

This method is for determining zinc chromate yellow in pigment mixtures that contain iron oxides and siliceous extenders extenders as well as other pigments.

SEPARATION OF ZINC CHROMATE YELLOW

Weigh 1 g of oven-dried separated pigment (Method 21.1) into a 250 mL beaker. Add 25 mL concentrated NH_4OH and stir well. Add 100 mL H_2O and stir frequently for about 30 min (DO NOT HEAT). Filter through an ashless No. 40 Whatman or equivalent filter paper into a 250 mL volumetric flask and wash thoroughly with 1:4 NH_4OH . Dilute to the mark with distilled water and swirl the flask to mix the solution uniformly.

CHROMIUM BY DICHROMATE METHOD

Pipette 100 mL of solution from the 250 mL volumetric flask into a 500 mL Erlenmeyer flask. Add 150 mL water and 20 mL 1:1 H_2SO_4 . Cool to 35°C or below.

Add 25 mL Mohr's Salt solution (50 mL concentrated H_2SO_4 and 80 g ferrous ammonium sulfate made up to 1 L with distilled water) from a pipette, 5 mL 85% H_3PO_4 , and 6 drops barium diphenylamine sulfonate (1 g in 100 mL concentrated H_2SO_4 as indicator. Back titrate with standardized 0.017 mol/L $\text{K}_2\text{Cr}_2\text{O}_7$ solution until the green solution just takes on a purple tinge.

Titrate a blank solution consisting of 100 mL 1:4 NH_4OH solution, 150 mL water, 20 mL 1:1 H_2SO_4 , 25 mL of the same Mohr's Salt solution added from a pipette, 5 mL 85% H_3PO_4 , and 6 drops barium diphenylamine sulfonate with the 0.017 mol/L $\text{K}_2\text{Cr}_2\text{O}_7$ solution until a purple or blue-black color is obtained.

Calculate the chromium to CrO_3 or to zinc chromate yellow:

$$\% \text{CrO}_3 = \frac{50.01 c (B-V)}{M}$$

where B = mL 0.017 mol/L $\text{K}_2\text{Cr}_2\text{O}_7$ solution required for blank

V = mL 0.017 mol/L $\text{K}_2\text{Cr}_2\text{O}_7$ solution required for back titration

c = Concentration of 0.017 mol/L $\text{K}_2\text{Cr}_2\text{O}_7$

M = Mass of sample, g

To convert to percentage of zinc chromate yellow ($\text{K}_2\text{O} \cdot 4\text{ZnO} \cdot 4\text{CrO}_3 \cdot 3\text{H}_2\text{O}$) multiply the per cent CrO_3 by 2.1843.*

* As zinc chromate yellow has a variable composition, the converted value is approximate, not exact.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	PIGMENT ANALYSIS RED LEAD WITH ZINC CHROMATE YELLOW AND IRON OXIDE	METHOD 50.13 June 1980

Supersedes Issue of
August 1974

SCOPE

This method is for use in the analysis for red lead in mixed pigments that contain zinc chromate yellow and iron oxide.

REAGENTS

- Ammonium hydroxide, concentrated NH_4OH (relative density 0.90)
- Sodium acetate, $\text{CH}_3\text{CO}_2\text{Na}$, A.R.
- Acetic acid, $\text{CH}_3\text{CO}_2\text{H}$, A.R.
- Potassium iodide, KI , A.R.
- 0.1 mol/L Sodium thiosulfate, $\text{Na}_2\text{S}_2\text{O}_3$ Standard Solution (recently standardized against resublimed iodine).
- 0.1 mol/L Iodine Standard Solution (recently standardized against 0.1 mol/L sodium thiosulfate solution. The iodine solution contains about 30 g/L of KI .)
- Starch solution (2 g in 100 mL distilled water).

PROCEDURE

Weigh into a 250 mL beaker a 1 g oven-dried sample of separated (Method 21.1) pigment. Add 25 mL of NH_4OH **AND STIR WELL**. Add 100 mL of water and stir frequently for 30 min. Do not heat. Filter through an ashless No. 40 filter paper or alternatively through a gooch crucible with an asbestos pad. Wash thoroughly with 1:4 NH_4OH and then with water. Discard the filtrate.

Place a 400 mL beaker under the funnel used in the above filtration. Where the filter paper was used, pierce the apex of the filter paper with a pointed glass rod and wash the residue into the beaker with the aid of a jet of water from a wash bottle. Wash the glass rod and filter paper well. Where the gooch crucible was used, wash the residue and asbestos filter pad into the beaker with the aid of a jet of water from a wash bottle. Remove the pigment adhering to the walls of the crucible with a glass rod and rubber policeman. Wash the crucible, glass rod and policeman well with water.

To the 400 mL beaker add the following solution:

30 g $\text{NaC}_2\text{H}_3\text{O}_2$, 10 mL water, 10 mL of 1:1 by volume acetic acid and water, 2.4 g KI . Then add 15.00 mL of a standard 0.1 mol/L $\text{Na}_2\text{S}_2\text{O}_3$ solution from a burette and stir thoroughly. Rub up the sides of the beaker with a rubber policeman, breaking up all particles to ensure complete liberation of iodine, and stir thoroughly. (Alternatively, a magnetic stirrer may be used by operating it at high speed to produce a bouncing rather than a whirling motion of the stirring bar.) Transfer the filter paper or asbestos pad, and residue to the 400 mL beaker and macerate the filter paper or asbestos pad. Rinse the gooch crucible 3 times with 10 - 15 mL portions of warm 1:1 acetic acid and then with water to remove last traces of red lead.

Filter the contents of the beaker rapidly under vacuum through a Buchner funnel, gooch crucible or sintered glass filter of medium porosity. Wash all particles into the filtering device and then wash several times with cold water. Add 1 mL of freshly prepared starch solution to the filtrate, and back titrate with a recently standardized 0.1 mol/L iodine solution until a blue color persists. Calculate the per cent Pb_3O_4 as follows:

$$\% \text{Pb}_3\text{O}_4 = \frac{0.3428 (V_1C_1 - V_2C_2)}{M} \times 100$$

where V_1 = volume of thiosulfate solution (mL)
 C_1 = concentration of thiosulfate solution (mol/L)
 V_2 = volume of iodine solution (mL)
 C_2 = concentration of iodine solution (mol/L)
 M = mass of sample (g)

Withdrawn/Retirée

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	PIGMENT ANALYSIS	METHOD 50.14 June 1980
	INSOLUBLE SILICEOUS MATTER	

Supersedes Issue of
August 1974

SCOPE

This method is for use in the analysis for siliceous matter in mixed pigments that:

- A. Contain titanium dioxide.
- B. Do not contain titanium dioxide.

PROCEDURE

A. Titanium Dioxide Present

1. *Total HCl, Insoluble Matter* — Weigh into a 250 mL beaker 1 g oven-dried separated pigment (Method 21.1), add 25 mL concentrated HCl, boil and add KClO_3 crystals as required until all iron (if present) has dissolved. Evaporate the solution to dryness on a steam bath and heat for 30 min in an oven at 105°C . Cool and add 4 mL concentrated HCl. Dilute to 100 mL with boiling distilled water, boil for 5 to 10 min, filter through a Whatman No. 40 or equivalent filter paper and wash with boiling water until free from chlorides. Transfer to a tared platinum crucible, ash and ignite at 950°C . Cool in a desiccator, weigh, and calculate the per cent total matter insoluble in HCl.

2. *Removal of TiO_2* — With a jet of distilled water from a wash bottle transfer the total matter insoluble in HCl to a 250 mL pyrex beaker and grind this matter well with a stirring rod. Add 20 mL concentrated H_2SO_4 and 7 to 8 g $(\text{NH}_4)_2\text{SO}_4$, and heat on a hotplate under a hood until dense white fumes are evolved. Continue heating over a strong flame until solution is complete (usually required not over 5 min of boiling), or it is apparent that the residue is composed of SiO_2 or siliceous matter. Cool the solution, dilute carefully with 100 mL water and heat to boiling while stirring. Allow to settle and filter through a Whatman No. 40 or equivalent filter paper, transferring the residue completely to the filter. Wash the residue with cold 1:18 H_2SO_4 until titanium is removed. Dilute the filtrate to 200 mL and determine the amount of TiO_2 according to ASTM D 1394.

3. *Determination of BaSO_4* — Transfer the insoluble matter to a tared platinum crucible, ash and ignite. Cool and add 20 mL HF^* and 5 to 6 drops concentrated H_2SO_4 . Evaporate the solution slowly to dryness and ignite in a furnace to remove the last traces of H_2SO_4 . Cool, add 50 mL 1:4 HCl and heat gently for 30 min. Filter through a Whatman No. 40 or equivalent filter paper and wash with hot water. Place the filter in the crucible, ash and ignite at 950°C . Cool in a desiccator and weigh as BaSO_4 . Calculate the insoluble siliceous matter by subtracting the percentages of TiO_2 and BaSO_4 from the per cent total matter insoluble in HCl.

B. **Titanium Dioxide Not Present** — Proceed as in par. 1 and 3 above, omitting par. 2.

* Caution — Extremely Dangerous Acid.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	PIGMENT ANALYSIS SOLUBLE CALCIUM COMPOUNDS	METHOD 50.15 January 1981

Supersedes Issue of
August 1974

SCOPE

This method is for use in determining the amount of calcium compounds soluble in dilute (3%) hydrochloric acid in pigment mixtures containing iron oxide, titanium dioxide, zinc chromate, zinc oxide, aluminum silicate or silica.

REAGENTS

- Hydrochloric acid, 3% by mass
- Hydrochloric acid, 1:1
- Ammonium hydroxide 1:4
- Ammonium oxalate, $(\text{NH}_4)_2\text{C}_2\text{O}_4$ Solution, 30 g/L
- Ethanol, $\text{C}_2\text{H}_5\text{OH}$ 95% or absolute
- 0.02 mol/L Potassium Permanganate, KMnO_4 Standard Solution

PROCEDURE

Accurately weigh about 1 g of separated pigment (Method 21.1) into a 400 mL beaker and moisten with 5 mL ethanol. Add 150 mL 3% HCl, agitate 1 h and allow to stand 1 h, keeping the solution cool. If all the material dissolves, add 150 mL water; if a residue remains, filter and wash with 150 mL cold water.

Boil the filtrate and washings for 5 min or until any chromium present is reduced as indicated by a green color. Add NH_4OH until just alkaline, boil 5 min and digest until hydroxides are coagulated. Filter, washing well with slightly ammoniacal cold water, and reserve the filtrate. Dissolve the precipitate in 1:1 HCl, washing back into the beaker where first precipitated. Reprecipitate, filter and wash as before.

Combine the filtrates and washings, adjust to 400 mL and heat nearly to boiling. Add 500 mL ammonium oxalate solution and continue heating until the precipitate assumes a dense crystalline appearance. Filter the precipitate on quantitative paper and wash with hot water. If much zinc is present, redissolve the oxalate in a minimum of 1:1 HCl, dilute to 400 mL, add NH_4OH in excess and again precipitate from dilute boiling solution with ammonium oxalate solution.

Transfer the washed precipitate to a tared crucible, ash, ignite at 1300°C , cool in a desiccator and weigh as CaO . Alternatively the precipitate may be dissolved in dilute H_2SO_4 and titrated hot with 0.02 mol/L KMnO_4 that has been standardized by a similar titration against ammonium oxalate.

CALCULATION

$$1 \text{ mL } 0.02 \text{ mol/L } \text{KMnO}_4 = 0.0028 \text{ g CaO}$$

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	PIGMENT ANALYSIS	METHOD 50.16 June 1980
	ZINC OXIDE	

Supersedes Issue of
August 1974

SCOPE

This method is for determining total zinc oxide present in both zinc chromate yellow and pigment mixtures consisting of zinc chromate yellow, zinc oxide, iron oxide, and siliceous extenders.

PROCEDURE

Weigh 1 g of oven-dried separated pigment (Method 21.1) into a 250 mL beaker. Add 25 mL concentrated NH_4OH and 3 g NH_4Cl and stir.

Filter through an ashless No. 40 Whatman or equivalent filter paper into a 250 mL volumetric flask and wash thoroughly with 1:4 NH_4OH . Dilute to the mark with distilled water and swirl the flask to mix the solution uniformly.

Pipette 100 mL of this well-mixed filtrate into a 400 mL beaker and dilute to 200 mL. Add 5 g NH_4Cl and heat to boiling. Add a few mL NH_4OH in excess and let stand a few minutes to allow any precipitate that might form to coagulate. If a precipitate does form, filter through a No. 41 Whatman or equivalent paper into a 400 mL beaker and wash thoroughly with 1:4 NH_4OH .

Heat the solution to boiling and add 10 mL 8-hydroxyquinoline solution (5 g in 100 mL of acetone). Let the beaker stand on a steam bath 10-20 min and filter through a weighed medium-porosity sintered-glass crucible. Wash the precipitate well with distilled water, then dry 2 h in an oven at 165°C . Cool in a desiccator and weigh as zinc oxyquinolate. Calculate the amount of ZnO in the pigment mixture as follows:

$$\% \text{ ZnO} = \frac{M_1 \times 0.2303}{M_2} \times 250$$

where M_1 = g of zinc oxyquinolate

M_2 = g of sample

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	PIGMENT ANALYSIS MATTER INSOLUBLE IN HYDROCHLORIC ACID	METHOD 50.17 June 1980

Supersedes Issue of
August 1974

SCOPE

This method is for use in determining the amount of matter insoluble in concentrated hydrochloric acid.

PROCEDURE

Weigh into a 250 mL beaker 1 g oven-dried separated pigment (Method 21.1), add 25 mL concentrated HCl, boil and add KClO_3 crystals as required, until all iron (if present) has dissolved. Evaporate the solution to dryness on a steam bath; heat for 30 min in an oven at 105°C . Cool and add 4 mL concentrated HCl. Dilute to 100 mL with boiling distilled water, boil for 5 to 10 min, filter through a Whatman No. 40 or equivalent filter paper and wash with boiling water until free from chlorides. Transfer to a tared crucible, ash, and ignite at 950°C . Cool in a desiccator, weigh and calculate as per cent matter insoluble in HCl.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	PIGMENT ANALYSIS ZINC AND CHROMIUM IN BASIC ZINC CHROMATE	METHOD 50.18 January 1981

Supersedes Issue of
August 1974

SCOPE

This method is for use in the analysis for zinc and chromium in mixed pigments that contain basic zinc chromate, also referred to as zinc tetroxy chromate.

REAGENTS

- Sulfuric acid, concentrated (relative density 1.84)
- Nitric acid, concentrated (relative density 1.42)
- Phosphoric acid, concentrated (85%)
- Ammonium hydroxide, concentrated (relative density 0.90)
- Ammonium chloride
- Silver nitrate solution AgNO_3 (2.5%)
- 8-hydroxyquinoline (5% in acetone)
- Ammonium persulfate, $(\text{NH}_4)_2 \text{S}_2 \text{O}_8$ solution (20%)
- Standard potassium permanganate solution (0.02 mol/L)
- Standard ferrous ammonium sulfate, $\text{FeSO}_4 \cdot (\text{NH}_4)_2 \text{SO}_4$ solution (0.1 mol/L)
- O-phenanthroline indicator (0.01 mol/L) obtained by dissolving 1.49 g of O-phenanthroline monohydrate in 100 mL of cold water containing 0.7 g of $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$

PRELIMINARY SEPARATION

Extract the resin from the pigment (Method 21.1) using extraction mixture C. Weigh accurately about 2 g of the dried pigment into a 250 mL beaker. Moisten the pigment with acetone and add 25 mL of 1:4 sulfuric acid. Let stand on a steam bath 1 h with occasional stirring. Filter and wash with 1:4 sulfuric acid until free from chromium. Dilute the filtrate and washings to 250 mL in a volumetric flask.

DETERMINATION OF ZnO

Pipette a 25 mL aliquot of the solution obtained from the preliminary separation into a 250 mL beaker and dilute to 100 mL. Add 5 to 10 g NH_4Cl and heat to boiling. Add a slight excess NH_4OH and let stand a few minutes to allow any precipitate to coagulate. Filter through an ashless, rapid paper into a 400 mL beaker and wash.

Heat the filtrate and washings to boiling and add 5 mL concentrated NH_4OH . Add dropwise 10 mL 5% solution of 8-hydroxyquinoline in acetone. Let stand 10 to 20 min and filter through a tared medium-porosity sintered-glass crucible. Wash well with water. Dry the precipitate at least 2 h at 165°C and weigh as zinc oxyquinolate.

Calculation:

$$\% \text{ZnO} = \frac{M_1 \times 23.03}{M_2}$$

where M_1 = Grams of zinc oxyquinolate

M_2 = Grams of sample in aliquot used

DETERMINATION OF CrO_3

Pipette a 50 mL aliquot of the solution obtained from the preliminary separation into a 600 mL beaker. Dilute to 300 mL with distilled water and add 15 mL concentrated H_2SO_4 and 3 mL of concentrated HNO_3 . Add inert boiling aids, bring to a boil, then add 10 mL of AgNO_3 solution and 1 mL of 0.02 mol/L KMnO_4 ; then add slowly 10 mL of 20% ammonium persulfate, freshly prepared.

The pink color of permanganate should persist after 10 min of boiling; add more $(\text{NH}_4)_2\text{S}_2\text{O}_8$ if necessary and boil 10 min after last addition of persulfate. Then add 5 mL of 1:3 HCl and boil the solution for 10 min after the permanganate color is destroyed. Cool to 20°C and add standardized ferrous ammonium sulfate solution (approx. 0.1 mol/L) until approximately 5 mL in excess has been added. Add 3-4 mL phosphoric acid and 2-3 drops O-phenanthroline indicator and then titrate with standardized 0.02 mol/L KMnO_4 . The end point of the titration is indicated by a color change from pink to clear green which persists for at least 30 s.

Determine the $\text{Fe}(\text{NH}_4)_2(\text{SO}_4)_2$ equivalent of 1 mL of standardized KMnO_4 solution, by taking as much of the $\text{Fe}(\text{NH}_4)_2(\text{SO}_4)_2$ as was used in the test, diluting it in a solution having the same volume and acidity, and titrating with the standard 0.02 mol/L KMnO_4 used in the test.

$$\text{Fe}(\text{NH}_4)_2(\text{SO}_4)_2 \text{ equivalent} = \frac{\text{mL Fe}(\text{NH}_4)_2(\text{SO}_4)_2}{\text{mL KMnO}_4}$$

Calculation:

$$\% \text{CrO}_3 = \frac{(V_1 - V_2 E) c \times 16.67}{M}$$

where V_1 = Total mL $\text{Fe}(\text{NH}_4)_2(\text{SO}_4)_2$ used

V_2 = mL 0.02 mol/L KMnO_4 used

E = $\text{Fe}(\text{NH}_4)_2(\text{SO}_4)_2$ equivalent

c = Concentration $\text{Fe}(\text{NH}_4)_2(\text{SO}_4)_2$
(determined at the same time as the equivalent against the standardized KMnO_4 solution)

M = Grams sample in aliquot used

References:

1. ASTM D 444
2. MIL-P 15328B
3. Fed. Test Method Std. No. 141; Method 7111

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	PIGMENT ANALYSIS LEAD CHROMATE	METHOD 50.19 January 1981

Supersedes Issue of
August 1974

SCOPE

This method is for use in determining the amount of lead chromate in chrome yellow, chrome orange or molybdate orange pigments when these pigments are present singly or mixed with other pigments. This method is a suitable alternative to Section 8.1 of ASTM Method D 126 when potentiometric apparatus is not available.

REAGENTS

- Sulfuric acid, concentrated (relative density 1.84)
- Hydrochloric acid, concentrated (relative density 1.19)
- Phosphoric acid, concentrated (85%)
- Silver nitrate solution, AgNO_3 (2.5%)
- Ammonium persulfate, $(\text{NH}_4)_2\text{S}_2\text{O}_8$, solution (20%)
- Standard ferrous ammonium sulfate, $\text{FeSO}_4(\text{NH}_4)_2\text{SO}_4$ solution (0.1 mol/L)
- Standard potassium permanganate, KMnO_4 solution (0.02 mol/L)
- O-phenanthroline indicator (0.01 mol/L) obtained by dissolving 1.49 g of o-phenanthroline monohydrate in 100 mL of cold water containing 0.7 g of $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$

PROCEDURE

Accurately weigh about 0.5 g of separated pigment (Method 21.1) into a 250 mL beaker. Add 25 mL of concentrated H_2SO_4 , cover, heat to fumes, and fume lightly for 4 to 5 min (NOTE 1). Allow to cool, cautiously dilute to 125 mL with water, and heat slowly to boiling. Filter through a Whatman No. 40 or equivalent paper to remove insoluble material and wash well with hot water.

Dilute the filtrate and washings to 300 mL with water, and add 1 mL of 0.02 mol/L KMnO_4 . Add inert boiling aids to prevent bumping, and heat to boiling. To the boiling solution add 10 mL of AgNO_3 solution and carefully add 20 mL of $(\text{NH}_4)_2\text{S}_2\text{O}_8$ solution. The hot solution should show the usual permanganate color. If the color does not develop, or if it disappears, carefully add more persulfate until the color persists. Then boil for 15 min to destroy excess persulfate. Add 5 mL of HCl (1:3) and boil an additional 5 to 8 min to reduce oxidized manganese (NOTE 2). The color of the solution should now be the usual chromate yellow.

Cool the solution to room temperature, dilute to 400 mL and add 50 mL of standard ferrous ammonium sulfate from a burette (NOTE 3) to reduce the chromate solution. Add 3 to 4 mL of concentrated H_3PO_4 and 3 drops of O-phenanthroline indicator. Titrate the excess ferrous ion with standardized KMnO_4 solution to the end point, which is a clear well-defined change from a salmon color to clear green or blue-green.

To 400 mL of 1:15 H_2SO_4 add 50 mL of standard ferrous ammonium sulfate (NOTE 3) from a burette, 3 to 4 mL of concentrated H_3PO_4 and 3 drops of O-phenanthroline indicator. Titrate with the standardized KMnO_4 solution to the green or blue-green end point to determine the volume of KMnO_4 solution equivalent to 50 mL of ferrous ammonium sulfate.

NOTE 1 Excessive fuming or cooking should be avoided as it produces anhydrous chromium sulfate which is difficult to dissolve.

NOTE 2 After addition of the $(\text{NH}_4)_2\text{S}_2\text{O}_8$ solution, the total elapsed boiling time should be kept between 20 to 30 min.

NOTE 3 50 mL 0.1 mol/L ferrous ammonium sulfate is sufficient excess for a sample containing up to 100% PbCrO_4 . For samples up to 45% PbCrO_4 25 mL of ferrous ammonium sulfate provides sufficient excess.

CALCULATIONS

$$\% \text{PbCrO}_4 = \frac{(V_2 - V_1) \times c \times 53.85}{M}$$

where V_1 = mL of KMnO_4 required for samples

V_2 = mL of KMnO_4 equivalent to 50 mL of ferrous ammonium sulfate

M = Mass of sample, g

c = Concentration of KMnO_4

$$1 \text{ mL of } 0.02 \text{ mol/L } \text{KMnO}_4 = 0.1077 \text{ g of } \text{PbCrO}_4$$

Withdrawn/Retirée

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	PIGMENT ANALYSIS IDENTIFICATION OF BASIC SILICATE WHITE LEAD BY MEANS OF THE MICROSCOPE	METHOD 50.20 June 1980

Supersedes Issue of
August 1974

SCOPE

This method is to distinguish basic silicate white lead particles from a mechanical mixture of silica and lead silicate.

APPARATUS

Microscope equipped with 40X or 60X high dry objectives to give 600 to 1000 magnifications; glass microscope slide 50 x 75 mm; cover slips and 30% ethylene glycol solution in water.

REAGENTS

Potassium sulfide solution. Bubble hydrogen sulfide gas into a 10% potassium hydroxide solution for 1 h and filter.

Reference sample of basic silicate white lead, such as 45X, number B-995, Canadian Titanium Pigments Limited, Montreal, Quebec.

MOUNTING MEDIUM

Acrylic resin — Acryloid F-10, manufactured by Rohm and Haas. Dilute the resin with equal parts of xylene* and place in a dropping bottle for convenience in use.

PROCEDURE

Place a small amount of pigment on a clean microscope slide, add to it a drop of mounting medium and a drop of xylene.* Using a finger, incorporate the pigment into the resin and spread it out on the whole slide in the form of a thin film. This action must be fast and the finger must be withdrawn from the slide before the film sets. Prolonged action will cause objectionable streaking. As soon as the xylene evaporates and the film appears dry to the eye, place a drop of potassium sulfide solution on the film under a cover glass and, next to it under a separate cover glass, place a drop of 30% ethylene glycol solution also on the film for use as a blank. Place the slide on the microscope stage and first observe the potassium sulfide preparation and then the blank. Repeat the above using the reference sample of 45X basic silicate white lead for comparison.

Appearance of Particles after the Staining Test

a. Basic Silicate White Lead

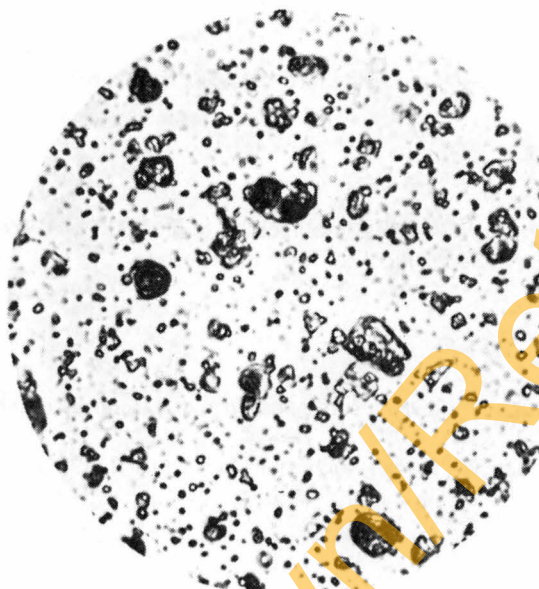
The particles of basic silicate white lead are easily recognized as they rapidly assume a greyish-brown color, which eventually changes to a transparent amber grey or black due to the lead sulfide formed on the surface. Depending on the thickness of the mount, it may take several minutes for this color to develop. The particles may also be distinguished and their proportion estimated by the characteristic shape, which is that of fine granular particles of silica with smooth surfaces. An illustration of the appearance of basic silicate white lead particles before and after staining is attached.

* It is recommended that a surgeon's glove be worn when working with xylene and that inhalation of this solvent be minimized or avoided.

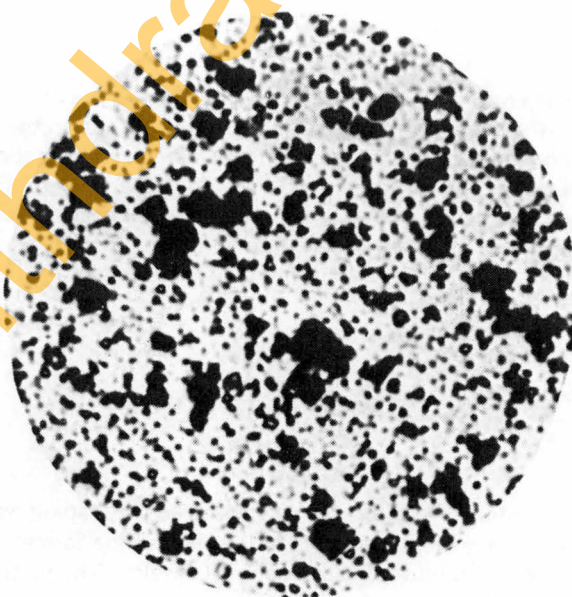
b. *Mechanical Mixture of Lead Silicate and Silica*

A mechanical mixture of lead silicate and silica differs from basic silicate white lead in two respects. First, the particle size of basic silicate white lead ranges from 5 - 7 μm whereas particle size of lead carbonate and lead silicate ranges from 2 - 4 μm . Second, in the mechanical mixture, the small lead particles alone show the blackish staining leaving the entire larger silica particles unstained. The basic silicate white lead particles, on the other hand all show the characteristic blackish staining.

Photomicrographs of Basic Silicate White Lead



Unstained — 1000X



Stained With K_2S — 1000X

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	PIGMENT ANALYSIS TOTAL ZINC CONTENT OF INORGANIC ZINC COATINGS	METHOD 50.29 June 1980

Supersedes Issue of
May 1978

SCOPE

This method determines the total zinc content in the mixed coating of two component inorganic zinc coatings.

REAGENTS

- Disodium dihydrogen ethylenediaminetetraacetate (EDTA). Grind and then dry in an oven at $105 \pm 2^\circ\text{C}$ for 1 h.
- Eriochrome Black T: 1-(1-hydroxy-2 naphthylazo)-5-nitro-2-naphthol-4-sulfonic acid sodium salt
- Water and other chemicals shall be of reagent grade.

SOLUTIONS

- Buffer Solution, (pH 10)
Dissolve 67.5 g of NH_4Cl in a little water, add 570 mL of concentrated NH_4OH (relative density 0.90) and dilute to 1 L with water.
- Calcium Chloride Primary Standard (0.1000 mol/L)
Dissolve exactly 10.009 g (accurately weighed to 1 mg) of anhydrous CaCO_3 in 25 mL of 1:1 HCl, heat gently to convert to the chloride, cool, and dilute to 1 L with water.
- Magnesium Chloride Standard Solution (0.10 mol/L)
Weigh and dissolve 20.324 g of $\text{MgCl}_2 \cdot 6\text{H}_2\text{O}$ and dilute to 1 L with water.
- Eriochrome Black T indicator (0.4%)
Dissolve 0.04 g of Eriochrome Black T in 10 mL of methanol. The solution should be used within a month.
- Disodium dihydrogen ethylenediaminetetraacetate (EDTA) Standard Solution (0.10 mol/L)
Weigh and dissolve 37.22 g of EDTA and dilute to 1 L with water. Standardize as follows: Into a 250 mL beaker containing exactly 25.00 mL of 0.1 mol/L Standard CaCl_2 Solution, 75 mL of water, and 10 mL of buffer, add from a microburette 2.00 mL of 0.1 mol/L MgCl_2 solution. Add 10 drops of the prepared Eriochrome Black T indicator and titrate with EDTA solution to a blue end point, adding about 0.5 mL of EDTA solution in excess. (see note 1). Then add 3.00 mL of 0.1 mol/L MgCl_2 solution and again titrate carefully to the blue end point (disappearance of the last trace of red). Call the total volume of magnesium chloride added V_4 . Call the total volume of EDTA added V_3 . Calculate the concentration in mol/L of EDTA as described in calculations par. 2.

Determination of Ratio of EDTA to Magnesium Chloride — Add from a burette 25.00 mL of 0.1 mol/L MgCl_2 into a 250 mL beaker. Add 75 mL of distilled water, 10 mL of buffer solution, and 10 drops of the prepared Eriochrome Black T indicator. Titrate with 0.1 mol/L EDTA solution to a blue end point. Call the volume of MgCl_2 solution used V_1 and the volume of EDTA, V_2 . Calculate the ratio (R) of EDTA to MgCl_2 as described in calculation par. 1.
Repeat the determination until triplicate values are obtained which agree within 3 parts per thousand.
- Formaldehyde — Acetic Acid Solution
Prepare the solution by mixing 15 mL of formaldehyde (37% stabilized grade) with 5 mL glacial acetic acid and 20 mL of water. Prepare a fresh solution for each day of use.

(g) Potassium Cyanide Solution, 10%

Dissolve 10 g of KCN in 90 mL of water.

Prepare a fresh solution for each day of use. CAUTION: SEE NOTE 2

PREPARATION OF A SAMPLE OF THE MIXED COATING

Perform the determination in triplicate. Weigh the individual components to 0.1 mg into a 250 mL beaker to give approximately 0.5 g of sample having exactly the same ratio of components specified by the manufacturer. To do this, weigh 1 g of NH_4Cl into a 250 mL beaker. If the liquid component is clear, weigh by difference from a syringe the required amount of liquid component into the 250 mL beaker. If the liquid component contains solid components, mix until homogeneous, preferably on a mechanical shaker. Then weigh by difference from a small glass stoppered Erlenmeyer flask the required amount of liquid component into the 250 mL beaker. Calculate to 0.1 mg the amount of pigment required to give exactly the same ratio of components specified by the manufacturer. Weigh this exact amount (to 0.1 mg) of pigment into a weighing scoop and transfer quantitatively to the 250 mL beaker. Add 5 mL of concentrated HCl. Digest the material for 30 min on a steam bath and evaporate to dryness. Add 10 mL of concentrated HCl, cover with a watch glass and heat for 5 min. Add 25 mL of water and boil on a hot plate for about 3 min. Filter the solution through a Whatman No. 40 or equivalent filter paper into a 250 mL beaker. Wash the siliceous material on the filter paper thoroughly with hot water.

TITRATION

To the filtrate and washings in the beaker add 5 mL of 0.1 mol/L EDTA solution (See Note 3). Add concentrated NH_4OH solution dropwise to the EDTA solution with constant stirring to bring the pH of the solution to 7.5. In a fumehood, add 30 mL of 10% KCN solution to the beaker (See Note 2). Add 5 mL of concentrated NH_4OH solution and 10 mL of buffer solution to the beaker and stir thoroughly. In the fumehood heat the solution almost to boiling and continue heating until the solution becomes practically colorless (See Note 4). Cool the solution to room temperature. Add 10 mL of 10% KCN solution and 10 mL concentrated NH_4OH solution (See Note 5). Add 10 drops of the Eriochrome Black T indicator to the solution. Titrate to a red end point with 0.1 mol/L MgCl_2 solution. Carefully backtitrate the solution dropwise with 0.1 mol/L EDTA solution to a blue end point (See Note 6). Refill the burette with 0.1 mol/L EDTA solution. Add 10 mL of formaldehyde-acetic acid solution to the beaker. This will bring back the red color to the solution. Again titrate the solution with 0.1 mol/L EDTA solution to the blue end point. Toward the end of the titration when the red color begins to fade add 5 to 10 additional mL of formaldehyde-acetic acid solution to bring back the red color and produce a sharp color change of red to blue at the end point. Call the volume of EDTA solution used after demasking with formaldehyde and acetic acid, V_5 . Calculate the per cent zinc as described in calculations par. 3.

CALCULATIONS

1. Ratio (R) of EDTA to Magnesium Chloride Solution

$$R = \frac{V_2}{V_1}$$

where V_1 = total volume of MgCl_2 solution used (mL) V_2 = total volume of EDTA used (mL)2. Concentration in mol/L of EDTA Solution

$$C = \frac{C_2 \times V_0}{V_3 - V_4 R}$$

where V_0 = volume of CaCl_2 solution used V_3 = total volume of EDTA added (mL) V_4 = total volume of MgCl_2 solution added (mL) R = ratio of EDTA to MgCl_2 C_2 = concentration in mol/L of CaCl_2 solution

3 Zinc Content by Titration with EDTA

$$\% \text{ Zinc} = \frac{V_s \times c \times 0.065 \times 100}{M}$$

where V_s = volume of EDTA used to titrate the zinc (after demasking) (mL)

c = concentration in mol/L of EDTA solution

0.065 = gram equivalent of zinc

M = total mass of sample taken (g)

NOTES

1. The first end point is slow in forming and may be overstepped. The readdition of a small amount of MgCl_2 solution and titration to a second end point is preferable because the indicator is more sensitive to magnesium ion.
 2. Disposal of Potassium Cyanide — Add the cyanide solution with stirring to a strong alkaline solution of sodium or calcium hypochlorite. Maintain an excess of sodium hydroxide and hypochlorite. Let the solution stand for 24 h. Then dilute with a large excess of water and dispose. Cyanides are extremely poisonous. Work in a fumehood and avoid contacting cyanide solution with the skin.
 3. The neutralization of the acid may cause some metals to precipitate, e.g. lead. The EDTA is added here to complex these metals to prevent precipitation from occurring. Later it will be necessary to remove the excess EDTA by complexing it with MgCl_2 .
 4. The solution may be yellow due to ferricyanide. After the iron is completely reduced to ferrocyanide, the solution is practically colorless.
 5. Hydrogen cyanide and ammonia are lost on heating. More potassium cyanide is added to keep the cyanide concentration high enough to give a sharp end point as in Note 6. More NH_4OH is necessary to keep the pH around the usual value of 9.3 after the formaldehyde-acetic acid is added. Titration of the first specimen will indicate whether sufficient KCN has been added to give a sharp end point.
 6. If the end point is not sharp, add additional 10% KCN solution until a sharp end point is obtained.
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Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	PIGMENT ANALYSIS SILICA IN SILICATE SOLUTION COMPONENT	Method 50.30 May 1978

Amended September 1980
Re-edited September 1982

1. SCOPE

- 1.1 This method determines the silica content of the liquid silicate component of inorganic zinc coatings.

2. REAGENTS

- a. Hydrofluoric Acid, HF (relative density 1.15 to 1.18) CAUTION see NOTE 1
- b. Nitric Acid HNO_3 (relative density 1.42)
- c. Dilute Nitric Acid 1:1
(one part HNO_3 , relative density 1.42, to one part water by volume)
- d. Dilute Nitric Acid 1:99
(one part HNO_3 , relative density 1.42, to 99 parts water by volume)
- e. Sulfuric Acid, H_2SO_4 (relative density 1.84)
- f. Dilute Sulfuric Acid 1:2 (one part H_2SO_4 , relative density 1.84 to 2 parts water by volume).

3. PROCEDURE

- 3.1 Weigh about 2.0 g of sample to the nearest 0.1 mg (M_1) and transfer to a 250 mL beaker. Add 50 mL of 1:1 HNO_3 solution to the beaker. Place on the steam bath and evaporate the contents to dense fumes of HNO_3 (almost a complete dry state). Add 10 mL concentrated HNO_3 to the residue and swirl to moisten all the solid material, and let acid remain in contact with residue for 2 to 3 min. Add 50 mL of distilled water to the beaker, cover with a watch glass and bring to a boil on a hot plate. Boil for 2 to 3 min. Filter the hot solution through a Whatman No. 40 filter paper (see Note 2). Completely transfer all of the insoluble material, with the aid of a rubber policeman if necessary, to the filter paper. Wash the precipitate in the paper thoroughly with 1:99 HNO_3

Method 50.30

solution. Carefully fold the filter paper around the precipitate and transfer it to a platinum dish. Char the filter paper over a burner. Completely moisten the ash with concentrated H_2SO_4 . Carefully heat the dish at a low temperature on a hot plate until the H_2SO_4 is evaporated. Transfer the dish to a muffle furnace set at 1050°C . After 1 h remove the dish and place in a desiccator to cool to room temperature and then weigh to the nearest 0.1 mg (M_2). Add 3 mL of 1:2 H_2SO_4 to the dish. Place the dish on a hot plate in a hood. Carefully (see Note 1) add 5 mL HF. Evaporate the contents until the copious fumes of sulfur trioxide have been driven off. Place the dish in the muffle furnace at 1050°C . After 1 h remove the dish and place in a desiccator to cool to room temperature and then weigh the dish to the nearest 0.1 mg (M_3). Calculate the per cent silica as follows:

$$\% \text{ SiO}_2 = \frac{(M_2 - M_3)}{M_1} \times 100$$

where M_1 = mass of sample (g)

M_2 = mass of silica and dish (g)

M_3 = mass of dish after evaporation of silicon fluoride (g)

4.

NOTES

1. Hydrofluoric acid is extremely dangerous. It can cause severe skin burns which are not immediately noticeable. Therefore, all personnel using hydrofluoric acid should wear long gloves and a face mask to guard against any splattering or spills. It should be used only in a well ventilated hood.
2. For referee purposes, repeat the evaporation, digestion and filtration procedure. Add the precipitated silica from the second dehydration to the first and put both papers into the platinum dish for further treatment.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	ANALYSIS OF METALLIC PORTION	METHOD 51.1
	DETERMINATION OF METALLIC ALUMINUM	January 1981

Supersedes Issue of
August 1974

REAGENTS

- a. Ferric Sulfate Solution — Dissolve 330 g reagent grade $\text{Fe}(\text{SO}_4)_3 \cdot 9\text{H}_2\text{O}$ in 750 mL water and 75 mL reagent grade H_2SO_4 (relative density 1.84). The ferric sulfate dissolves very slowly, even with agitation and heating, and one or two days should be allowed for its solution. When it has dissolved, make up the volume to 1 L.
- b. Sodium Bicarbonate Solution — A saturated solution of reagent grade sodium bicarbonate (approximately 10%).
- c. Phosphoric Acid — Concentrated 85% H_3PO_4 , reagent grade.
- d. 0.1 mol/L Potassium Permanganate, KMnO_4 Standard Solution

SAMPLING

As aluminum powders or pastes stored for some length of time may have a tendency to oxidize on the surface, the following precautions should be taken in obtaining samples:

Containers of powder should be shaken or rolled to ensure thorough mixing of the contents. After mixing, some time should be allowed for the powder to settle before the container is opened.

The surface of pastes should be scraped aside and a sample taken from deep in the center of the material.

PROCEDURE

Weigh roughly a 0.2 g sample into a tared 3 to 4 mL weighing bottle with an outside stopper. Dry for 45 min at 200°C . Place the top on the weighing bottle before removing the bottle from the oven (NOTE 1). Cool in a desiccator and weigh accurately. Remove the stopper and place the weighing bottle, containing the sample in a 500 mL wide-necked flask. Add 100 mL of ferric sulfate solution (NOTE 2) and stopper the flask tightly with a rubber stopper fitted with a 25 mL separatory funnel and an outlet tube. Immerse the end of the outlet tube in sodium bicarbonate solution contained in a small flask. Without agitation, add as quickly as possible 50 to 75 mL of sodium bicarbonate solution through the separatory funnel (NOTE 3) and then shake the flask gently. Place the flask on a hot plate, bring to the boil, and boil 5 min. Cool contents of the flask to 10 to 15°C , taking care that the rubber outlet tube is kept in the bicarbonate solution. Remove the stopper, add 15 mL of concentrated H_3PO_4 (NOTE 4), and titrate with potassium permanganate.

$$\% \text{ metallic aluminum} = \frac{\text{mL KMnO}_4 \times c \times 13.485}{\text{Mass of sample} \times 3}$$

where c = Concentration of KMnO_4 solution

NOTES ON PROCEDURE

1. To prevent immediate sorption of moisture, the stopper is placed on the weighing bottle before the bottle is removed from the oven. Contrary to what might be expected, the stopper is not difficult to remove later.
2. When the ferric sulfate solution is added, care must be taken not to pour it directly on the powder, which may be blown out of the flask.

3. The bicarbonate solution is added to evolve carbon dioxide, which removes the air from the flask and creates an inert atmosphere. It requires 50 to 75 mL to achieve this purpose, and the right condition is reached when a thick persistent orange foam is formed before shaking the flask.
 4. The addition of phosphoric acid prior to titration is necessary to produce an almost colorless acid phosphate complex, which allows the end point to be readily seen.
 5. The accuracy of the method is $\pm 0.1\%$ aluminum and the time required for the determination, exclusive of the drying, is approximately 1 h.
-

Withdrawn/Retirée

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	METAL CONTENT	METHOD 52.3 January 1981

Supersedes Issue of
August 1974

SCOPE

This method is for use in determining the amount of lead and manganese present in a non-pigmented material.

REAGENTS

- Concentrated Nitric Acid, HNO_3 (relative density 1.42)
- 1:2 Nitric Acid, HNO_3
- Sodium Bismuthate, NaBiO_3 A.R. or
- Lead Oxide, PbO_2 A.R.
- Sodium Sulfite, Na_2SO_3 or
- 0.1 mol/L Ferrous Sulfate, FeSO_4 or
- 0.1 mol/L Ferrous Ammonium Sulfate, $\text{FeSO}_4 (\text{NH}_4)_2 \text{SO}_4$, Standard Solution or
- 0.02 mol/L sodium Oxalate $\text{Na}_2\text{C}_2\text{O}_4$ Standard Solution.
- 0.01 mol/L Potassium Permanganate, KMnO_4 , Standard Solution
- 1:1 Sulfuric Acid, H_2SO_4
- Ethanol, 95%
- Isopropanol
- Ammonium Paramolybdate, $(\text{NH}_4)_6 \text{Mo}_7\text{O}_{24} \cdot 4\text{H}_2\text{O}$
- Acid Ammonium Acetate Solution
Mix 150 ml of 4:1 acetic acid, 100 mL of water and 95 mL of concentrated NH_4OH (relative density 0.90)

PREPARATION OF SOLUTION

To the residue obtained from ashing 25 g of the material under test, add 25 mL concentrated HNO_3 and evaporate to 2-3 mL. Add 75 mL 1:2 HNO_3 and boil for a few minutes. Filter, if necessary, to remove insoluble matter. Dilute the filtrate and washings to 100 mL in a volumetric flask.

MANGANESE DETERMINATION

Pipette a 20 mL aliquot of the prepared sample solution into a 100 mL beaker, add 0.5 g NaBiO_3 or PbO_2 and boil 2 to 3 min. If manganese is present, a pink or purple color is produced. Heat until the pink color disappears. If MnO precipitates, add enough FeSO_4 or Na_2SO_3 to dissolve it and boil to expel nitrogen oxides. Cool to about 15°C , add 0.5 to 1.0 g NaBiO_3 or PbO_2 and agitate. Allow to stand 3 min and add 50 mL 1:20 HNO_3 . Filter through ignited asbestos and wash the residue with cool 1:2 HNO_3 until the washings are colorless. Add a measured quantity of standard FeSO_4 , $\text{FeSO}_4 (\text{NH}_4)_2 \text{SO}_4$ or $\text{Na}_2\text{C}_2\text{O}_4$ solution sufficiently in excess that about 10 mL will be required in the back-titration. Stir thoroughly until the permanganic acid is decolorized, and titrate to a faint pink color with 0.01 mol/L KMnO_4 that has been freshly standardized against $\text{Na}_2\text{C}_2\text{O}_4$. Carry a blank determination through all the steps of the procedure, adding the same quantity of whichever reducing solution was used.

$$\% \text{ Mn} = \frac{5 \times 1.099 (B - V) c}{M} \times 5$$

- where V = mL KMnO_4 used in back titration of excess reducing solution
B = mL KMnO_4 used in titration of blank
c = Concentrated of KMnO_4 solution against sodium oxalate
M = Mass of material before ashing

NOTE:

Factor 1.099 is derived by converting the molecular weight of Mn (54.938) to its equivalent weight $\frac{54.938}{5} = 10.99$, dividing its equivalent weight (10.99), by 1000 to convert to milliequivalent weight, and multiplying by 100 to convert to per cent by mass, $10.99 \times \frac{100}{1000} = 1.099$.

LEAD DETERMINATION

Pipette a 75 mL aliquot of the prepared sample solution into a beaker or flask and add 10 mL H_2SO_4 diluted 1:1. Evaporate with frequent agitation until copious fumes are evolved. Cool, wash down the sides of the vessel with water, add 2 mL 1:1 H_2SO_4 and again evaporate to strong fumes of the acid. Cool and add 30 mL water followed by 30 mL ethanol 95% or isopropanol. Stir and allow to settle until the liquid is clear. Filter into a Gooch crucible fitted with a pad or layer of filtration grade asbestos fiber both of which have been previously ignited and weighed. Wash the precipitate first with 10% H_2SO_4 (1:9) and then with diluted alcohol. The precipitate can now be weighed as PbSO_4 after drying in an oven at 105°C and igniting at a moderate heat ($400\text{--}500^\circ\text{C}$). Cool in a desiccator before weighing. Calculate the per cent lead as follows:

$$\% \text{ lead} = \frac{91.09 M_1}{M_2}$$

where M_1 = Mass of PbSO_4

M_2 = Mass of material before ashing

NOTE: The Factor 91.09 is derived from:

$$\text{Gravimetric Factor } \frac{\text{Pb}}{\text{PbSO}_4} \times 0.68323 \times \text{Aliquot } \frac{100 \text{ mL}}{75 \text{ mL}} \times 100 \text{ (per cent)}$$

If a volumetric procedure is preferred, the lead sulfate can be dissolved in acid ammonium acetate and titrated with ammonium paramolybdate using tannin as external indicator. The $(\text{NH}_4)_6\text{Mo}_7\text{O}_{24} \cdot 4\text{H}_2\text{O}$ must be standardized against a pure compound (Treadwell-Hall p. 665).

ATOMIC ABSORPTION METHOD

As an alternative to the above wet chemical methods the determination for manganese and lead may be carried out by suitable atomic absorption methods.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	ALKALINITY AND ACIDITY	METHOD 53.5 June 1980

Supersedes Issue of
August 1974

Shake 10 g of material with 100 mL freshly boiled and cooled distilled water for at least 5 min. Filter, and titrate the filtrate with 0.005 mol/L H_2SO_4 or 0.01 mol/L NaOH, as necessary, using phenolphthalein as the indicator.

Run a blank on an equal amount of the water used.

Withdrawn/Retirée

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	ACIDITY OF SHELLAC	METHOD 56.3 June 1980

Supersedes Issue of
August 1974

Pour the material under test onto a clean glass plate to give a uniform film and place approximately vertically in a well-ventilated room to drain for at least 1 h. Use sufficient sample so that the resulting dry film will weigh at least 3 g.

Place the glass plate horizontally overnight in an air bath maintained at $45 \pm 2^{\circ}\text{C}$. Scrape the film from the glass plate using a razor blade and discard the thick pieces.

Weigh 1 g of shellac and put it into 50 mL of neutral distilled water. Shake vigorously for about 30 min and allow to settle. Add 6 drops of methyl orange indicator. If the aqueous solution turns pink or red, acid is present.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	PHTHALIC ANHYDRIDE CONTENT	METHOD 57.1 June 1980

Supersedes Issue of
August 1974

Extract the vehicle from the pigment as in Method 21.1. Retain and combine the extract and washings, place in a 500 mL Erlenmeyer standard taper-jointed flask, and distill off most of the solvent.

Determine phthalic anhydride according to ASTM D 563. Calculate according to the procedure in Section 4 of ASTM D 563, and divide phthalic anhydride content of sample by per cent nonvolatile vehicle of sample to obtain the per cent phthalic anhydride of the nonvolatile vehicle. The nonvolatile vehicle may be obtained by Method 19.1.

Where other acids* or resins are present that would interfere with the procedure in ASTM D 563, use the following methods:

ASTM D 1306 — Method of Test for Phthalic Anhydride Content of Alkyd Resins and Esters Containing Other Dibasic Acids (gravimetric).

ASTM D 1307 — Method of Test for Phthalic Anhydride Content of Alkyd Resins and Esters Containing Other Dibasic Acids (spectrophotometric).

* Isophthalic acid is not to be considered as an interfering dibasic acid for the purposes of ASTM D 563. Where infrared analysis, or the appearance of the precipitate** from ASTM D 563, indicates the presence of isophthalic acid, ASTM D 1651 shall be followed at the discretion of the testing authority. After weighing, the precipitate of potassium phthalate alcoholate obtained in ASTM D 563 is dried at 105°C, dissolved in water and diluted to 500 mL before commencing with par. 6.4 of ASTM D 1651. The amount of orthophthalic acid found with this procedure has to be converted to phthalic anhydride.

** When only orthophthalic acid is present, the precipitate has the characteristic silvery, plate-like form and may vary in color from white to light ivory. The presence of isophthalic acid produces a whitish precipitate resembling melting ice. If there is not sufficient isophthalic acid present to alter the appearance, the error in assuming that the precipitate is stoichiometrically correct is considered insignificant.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	ROSIN QUALITATIVE DETERMINATION	METHOD 60.1 August 1974

Supersedes Issue of
October 1957

SCOPE

This method is for the qualitative determination of the presence of rosin in coating materials.

MATERIALS AND APPARATUS

- (a) Acetic anhydride, Reagent grade
- (b) Sulfuric acid, 63% (sp gr 1.53)
- (c) Test tubes 16 or 20 mm diameter
- (d) Spot plates or crucible covers
- (e) Oven set at $105 \pm 2^{\circ}\text{C}$ ($221 \pm 3.5^{\circ}\text{F}$)

PROCEDURE

If the material is unpigmented, place 6 to 8 drops of 50% solution (or the corresponding number of drops for other concentrations) in a test tube and place in an oven at 105°C (221°F) for at least one h*. If the material is pigmented, extract the vehicle from about 5 g (Method 21.1 except that accurate weights are not required and two extractions will suffice). Concentrate the resin to about 50% by distilling off solvent and place 6 to 8 drops in the test tube as above.

Add 5 ml of acetic anhydride and heat half an hour in the oven or over a small flame for a few minutes. Allow the solution to cool.

Place 10 drops of the solution in a spot plate or crucible cover, add 1 drop of sulfuric acid and observe the color that develops.

RESULTS

Rosin and rosin esters produce a transient violet color that becomes brown on standing. When rosin is present in small amounts, or in rosin-modified resin, the color first produced is red with a purple overtone.

Other resins produce varying shades of orange or orange-red, some of which change to brown or olive-green on standing. Simultaneous tests on resins of known composition will aid in evaluating the results for the presence or absence of rosin.

Coumarone-indene resins produce an orange-red color that does not fade. When this color interferes with the detection of rosin, 5 g of clear material should be saponified, unsaponifiable matter removed (Method 62.2) and the fatty acids recovered (Method 63.2). When most of the ether has been distilled off, a few drops of the fatty acid solution are dissolved in 5 ml of acetic anhydride and the test performed as in the last paragraph of the Procedure.

* If amino resins are present, the resin will solidify and subsequently fail to dissolve in the acetic anhydride. In such cases, heating of the clear vehicle should be omitted and the procedure resumed at the second paragraph.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	TOTAL ROSIN ACIDS CONTENT OF COATING VEHICLES	METHOD 60.2 August 1974

SCOPE AND APPLICATION

Supersedes Issue of
February 1972

This method covers a procedure for determining quantitatively the total rosin acids content of normal rosin esters, varnishes, and alkyd resins, unmodified by such materials as maleic or fumaric acid, or phenols. Total rosin acids determined include free rosin, esterified rosin and metallic salts of rosin (driers). This method is designed for material containing 0.5 to 5 % of rosin on a non-volatile basis.

Before proceeding with the quantitative determination of rosin, run the qualitative test by Method 60.1. If the test is negative no further analysis need be done. If the test is positive, carry out the quantitative determination as described hereunder.

SUMMARY OF METHOD

The sample is saponified with potassium hydroxide-ethylene glycol reagent, acidified with hydrochloric acid, and refluxed to hydrolyze metallic driers. The rosin, fatty acids and unsaponifiables are extracted with benzene, the benzene is removed by evaporation and the rosin acids are determined by a selective esterification and titration.

APPARATUS

- (a) Air condenser, 30 in. (75 cm), with a tapered glass joint.
- (b) Burette, 10 ml capacity, fitted with soda-lime traps to protect against absorption of atmospheric CO₂, for use in dispensing the standard potassium hydroxide solution.
- (c) Erlenmeyer flasks, 500 ml capacity, with a tapered glass joint.
- (d) Separatory funnels; three, 1 l; one, 500 ml.
- (e) Steam bath, located in a fume hood, for evaporation of volatile solvents.

REAGENTS

- (a) Benzene, C₆H₆
- (b) Hydrochloric acid, HCl concentrated (sp gr 1.19)
- (c) KOH - ethylene glycol saponification reagent (approximately 2N). Dissolve 132 g of potassium hydroxide (KOH) pellets in 1 litre of ethylene glycol, in a 2 l Erlenmeyer flask. Insert a thermometer and boil to eliminate water until the temperature of the boiling liquid reaches 190-195°C (374 - 383°F). Cool and store in a rubber-stoppered bottle.
- (d) Acetone, CH₃COCH₃.
- (e) Methanol (absolute), CH₃OH.
- (f) Methyl orange indicator, 0.1% aqueous
- (g) Standard alcoholic potassium hydroxide solution (0.2N). Dissolve 13.1 g of KOH pellets in methanol and dilute to 1 l. Standardize against potassium acid phthalate primary standard.
- (h) Sodium sulfate solution (100 g/l). Dissolve 100 g of Na₂SO₄ in water and dilute to 1 l.
- (j) Sulfuric acid, H₂SO₄ concentrated (sp gr 1.84).
- (k) Thymol blue indicator solution. Dissolve 0.1 g Thymol Blue in 100 ml 95% ethyl alcohol.
- (l) Ethanol, C₂H₅OH 95% and absolute.

PREPARATION OF SAMPLE

- (a) Clear Resin Solutions - Determine the per cent nonvolatile vehicle of the material by ASTM D 1644. Accurately weigh sufficient material to provide approximately 10 ± 1 g of nonvolatile vehicle and transfer the material to a 500 ml Erlenmeyer flask.
- (b) Pigmented Materials - Determine the per cent nonvolatile vehicle of the pigmented material by Method 19.1. Accurately weigh sufficient material to provide approximately 10 ± 1 g of nonvolatile vehicle and separate the pigment by Method 21.1. Transfer the extracted nonvolatile vehicle and extraction solvents to a 500 ml Erlenmeyer flask and distill off most of the solvents by immersing the flask in a hot-water bath to a depth equal to the level of the contents of the flask.

SAPONIFICATION PROCEDURE

To the prepared sample in the Erlenmeyer flask add 50 ml of the KOH-glycol solution and swirl to disperse the sample. Add boiling aids, attach a condenser and reflux on a hot plate for 2 h.

After refluxing, remove the flask from the hot plate and cool to room temperature under tap water. Add 100 ml of water and again cool under tap water, then add 12 ml of HCl (sp gr 1.19). Place on the hot plate again, reflux for 5 min, and cool under tap water.

Transfer the sample quantitatively to a 1 l separatory funnel using the following wash sequence; 50 ml water, 25 ml benzene, 50 ml water, 25 ml benzene and then 50 ml water. Finally rinse the walls of the flask thoroughly with 15 ml acetone and add to the funnel. Shake, allow the layers to separate, and draw off the lower aqueous layer into a second 1 l separatory funnel. Extract the aqueous layer with a second 50 ml portion of benzene, and drain the aqueous layer into a third 1 litre funnel. Add the second benzene extract to the first. Repeat the extraction of the aqueous layer with successive 50 ml portions of benzene until a colorless extract is obtained (total number not less than 3). Discard the water layer. Combine the benzene extracts and wash with three 50 ml portions of water. Measure the pH of the third water wash. If it is less than 3.8, repeat with a fourth water wash. Discard the wash waters.

Transfer the washed benzene extract to a weighed 250 ml Erlenmeyer flask with the aid of 25 ml of benzene. Evaporate the benzene on a steam bath, with the aid of a gentle stream of air, to a volume of about 20 ml. Add 5 ml of anhydrous ethyl alcohol and evaporate to remove any water present by azeotropic distillation. Cool and weigh.

Add 100 ml of methanol and a boiling aid to the flask containing the dried benzene extract. Swirl to dissolve and slowly add 5 ml of H_2SO_4 (sp gr 1.84) while cooling under tap water. Connect the flask to the condenser and reflux on the hot plate for 10 min. Cool to room temperature under tap water.

Place about 250 ml of the Na_2SO_4 solution in a 1 l separatory funnel. Pour the contents of the flask into the funnel, and complete the transfer with 100 ml of benzene. Shake thoroughly, allow to settle, and draw off the salt layer into a 500 ml separatory funnel. Wash the salt layer twice with 25 ml benzene which is returned to the 1 l funnel. Wash the benzene layer with two successive 250 ml portions of the salt solution. The last wash should be neutral to methyl orange; if not, continue the washing with 50 ml portions of Na_2SO_4 solution to neutrality.

Finally, draw off the benzene layer into a 400 ml beaker, rinse the separatory funnel with 75 ml of neutralized ethanol and add to the beaker.

Add 10 drops of thymol blue indicator solution and titrate with the alcoholic KOH solution to a blue endpoint.

CALCULATION

It is necessary first to calculate the per cent rosin acids on the dried benzene extract basis, to apply properly the esterification correction factors, and then to convert this value to the nonvolatile sample basis.

(a) Calculation of the % Rosin Acids in Dried Benzene Extract

$$\text{Rosin Acids as \% of the dried benzene extract } Y = \frac{A \times N \times 30.24 \times 1.031}{S} - 0.74$$

where A = ml of KOH solution used for titration of the sample

N = normality of the KOH solution used

S = weight (g) of dried benzene extract

$$30.24 = \frac{\text{mol. wt. of abietic acid} \times 100}{1000}$$

1.031 = experimentally determined factor to correct for the slight esterification of rosin acids

0.74 = experimentally determined term to correct for unesterified fatty acids.

(b) Calculation of % Rosin Acids in the Nonvolatile Vehicle

$$\text{Rosin Acids as \% of the nonvolatile vehicle} = \frac{S \times Y}{W \times T}$$

where W = weight of sample

Y = % rosin acids in dried benzene extract

S = weight (g) dried benzene extract

T = nonvolatile vehicle content of sample expressed as a decimal.

Canadian General Standards Board

CGSB Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	UNSAPONIFIABLE MATTER	METHOD 62.2 August 1974

Supersedes Issue of
November 1959

Transfer all the filtrate and washings from the phthalic anhydride determination (Method 57.1) to a 500 ml flask and distill off most of the solvent on a steam or water bath. With the aid of 50 ml ethyl or isopropyl ether and then 300 ml water, quantitatively transfer to a 1 l separatory funnel A. Add another 50 ml ether, swirl gently to prevent an emulsion, and allow the two layers to separate. Draw off the lower aqueous layer into another funnel B, and extract with 50 ml ether. Draw off the aqueous layer into a third funnel C. Add the second ether extract to funnel A.

Repeat the extraction of the aqueous layer with successive 50 ml portions of ether until a colorless extract is obtained. Combine all ether extracts in funnel A and wash with three successive 40 ml portions of distilled water. Combine the water extracts with the main aqueous phase and retain for the determination of oil acids (Method 63.2).

Dry the ether solution by adding powdered anhydrous Na_2SO_4 , and filter (portionwise if necessary) through a filter paper or pledget of cotton previously wet with ether, into a clean, dry, tared 250 ml flask. Carefully wash the separatory funnel and filter funnel with small portions of ether. Distill off most of the ether on a water bath. Evaporate the last traces of ether under a gentle stream of dry nitrogen or carbon dioxide gas. Dry to constant weight in a vacuum oven at $75-80^\circ\text{C}$ ($167-176^\circ\text{F}$) and 25 mm (1 in.) of mercury. Cool in a desiccator, weigh, and calculate per cent unsaponifiable.

Determine the amount of fatty acid carried into the unsaponifiable matter. Dissolve the weighed residue in 50 ml of warm alcohol-benzene that has been previously neutralized to the phenolphthalein faint pink end point. Titrate with 0.02N NaOH to the same end point.

$$\text{Unsaponifiable matter, \%} = \frac{R - A}{W} \times 100$$

$$A = 0.282\text{BN}$$

where A = g fatty acid in extract
B = ml NaOH to titrate fatty acids
N = NaOH normality
R = g residue (see par 3 above)
W = g nonvolatile vehicle in sample.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	DETERMINATION OF OIL ACIDS	METHOD 63.2 August 1974

Supersedes Issue of
November 1959

Transfer the aqueous solution and washings from the unsaponifiable determination (Method 62.2) to a 500-1,000 ml separatory funnel A. Add 6N HCl or H₂SO₄ until just neutral to phenolphthalein and then add 20 ml excess acid. Cool to room temperature.

Add 100 ml ethyl or isopropyl ether and shake vigorously. Allow the two layers to separate, draw off the lower aqueous layer into another funnel B, and extract with 50 ml ether. Draw off the aqueous layer into a third funnel C. Add the second ether extract to the first extract. Repeat the extraction of the aqueous layer with successive 50 ml portions of ether until a colorless extract is obtained (not less than three extracts). Combine all ether extracts in funnel A and wash with successive 25 ml portions of distilled water until the water extracts are free from mineral acid. The aqueous phase may be retained for determination of the polyol.

Dry the ether solution by adding powdered anhydrous Na₂SO₄, and filter (portionwise if necessary) through a filter paper or pledget of cotton previously wet with ether into a clean, dry, tared 250 ml flask. Carefully wash the separatory funnel and filter funnel with small portions of ether. Distill off most of the ether on a water bath. Evaporate the last traces of ether under a gentle stream of dry nitrogen or carbon dioxide gas. After no more ether can be detected, place the flask in an oven at 105-110°C (220-230°F) for 10 min and then transfer to a vacuum desiccator containing concentrated sulfuric acid. Continue drying under vacuum to constant weight.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	DETECTION OF BENZENE (BENZOL)	METHOD 65.1 October 1982

Supersedes Issue of
August 1974

SCOPE

This method is for the qualitative determination of the presence of benzene in coating materials. Where the equipment is available, and in case of dispute, use gas-liquid chromatography such as Method 28.5 on the steam distillate or ASTM D3271 on the pigmented coating, using reagent grade benzene as the standard.

APPARATUS AND REAGENTS

- (a) 500 mL Engler distillation flask.
- (b) Small distillation flask — size according to volume of extracted solvent
- (c) Boiling aids — small pieces of glass tubing
- (d) Heating mantle or hot plate with controlled heat source
- (e) Separatory funnel — size according to volume of distillate
- (f) Filter funnel
- (g) 75% by mass H_2SO_4 — add 100 parts by volume 96% H_2SO_4 to 50 parts by volume distilled water, mix and cool before using.
- (h) Acid mix — add 100 parts by volume 96% H_2SO_4 to 170 parts by volume 85% H_3PO_4 , mix and cool before using.
- (i) Anhydrous sodium sulfate Na_2SO_4
- (j) HNO_3 conc.
- (k) H_2SO_4 conc.

PROCEDURE

Place approximately 150 mL of the sample, 150 mL distilled water and a few boiling aids in the distilling flask. Slowly heat the mixture at a uniform rate such that the first drop is obtained in about 30 min and not more than 1 h. Collect the fraction boiling up to 80°C . If there is no distillate to this point, benzene is presumed to be absent for the purpose of this test.

Separate the distilled solvent from the water layer, if present. Shake the solvent in a separatory funnel with twice its volume of water; separate and discard the water layer. Next shake the solvent with 1-1/2 times its volume of 75% H_2SO_4 . After cooling and separating, draw off the acid layer. Finally add 1-1/2 times its volume of acid mix, shake well and separate as before. Wash the solvent twice with a volume of water equal to the remaining solvent. If there is no solvent layer left, lower-boiling hydrocarbons are absent.

Dry the hydrocarbons over Na_2SO_4 and filter into a small distillation flask. Distill slowly, preferably through a Vigreux, Snyder or packed column if the sample is large enough. Increase the applied heat very gradually and collect the fractions boiling from 65 to 75°C and from 75 to 90°C . If there is no distillate below 90°C , benzene is considered to be absent. If there is much distillate between 75 and 90°C , the first fraction, if present, may be discarded. Otherwise both are tested for benzene according to the next paragraph.

Mix 1 mL concentrated HNO_3 and 1 mL concentrated H_2SO_4 in a test tube and cool. Add 10 drops of the isolated hydrocarbons and shake. If heat is produced, at least 30% aromatics are present. Shake the tube and examine for the odor of nitrobenzene, which is given by 5% benzene or larger amounts of toluene. Boil the contents for at least 30 s (keep mouth of tube well away from flame), allow to cool and add 10 mL water. Mix the contents and examine for odor of nitrobenzene, which should no longer be present if the sample was boiled enough. Allow the tube to stand. A yellow cloudy solution or flocculent precipitate changing to yellow needles is evidence of the presence of benzene. A white cloudy solution that separates to form a yellow liquid, perhaps with white needles, is evidence of toluene, which may obscure smaller amounts of benzene. The melting point of m-dinitrobenzene is $89^\circ\text{--}90^\circ\text{C}$.

Withdrawn/Retirée

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	HYDROCARBONS AND ESTERS ESTER CONTENT	METHOD 66.1 October 1982

Supersedes Issue of
August 1974

SCOPE

This method is for use in determining the per cent by volume of esters in lacquer thinners. It is based on the volume of solvent soluble in concentrated sulfuric and phosphoric acids after first removing water soluble alcohols. If necessary, the amount of ester in the water extract is determined by saponification.

APPARATUS AND REAGENTS

- (a) 250 mL separatory funnel
- (b) Graduated cylinders
- (c) 250 mL volumetric flask
- (d) 10 mL pipette
- (e) 250 mL alkali resistant Erlenmeyer flask
- (f) Acid mix — add 100 parts by volume 96% H_2SO_4
to 170 parts by volume 85% H_3PO_4 ,
mix and cool before using.
- (g) 0.5 mol/L KOH or NaOH
- (h) 0.5 mol/L HCl , standardized
- (j) 1% phenolphthalein in ethanol

PROCEDURE

Place 100 mL of the thinner in a separatory funnel and extract with three successive 75 mL portions of water, the water extractions being combined and set aside. Carefully measure the volume "A" of the remaining liquid. Shake this liquid with an equal volume of a mixture of 100 mL concentrated H_2SO_4 and 170 mL of 85% H_3PO_4 and discard the lower layer. Carefully measure the volume "B" of the upper layer.

The content of esters is taken as A minus B. Volume B is taken as the hydrocarbon content. If the ester content is found to be less than that required, determine the ester content (calculated to the equivalent of ethyl acetate) "D" of the water extract by the procedure outlined below. Add this value, "D" mL ethyl acetate, to the ester content determined above, A - B.

$$\text{Total ester content, \% by volume of the sample} = \frac{A - B + D}{100} \times 100$$

DETERMINATION OF ESTER "D" OF THE WATER EXTRACT

Transfer the combined water extracts to a 250 mL volumetric flask, dilute to the mark with water, and mix.

Transfer a 10.00 mL aliquot to an alkali resistant saponification flask. Carefully neutralize to phenolphthalein. Prepare a blank with 10 mL of water and treat similarly.

Add 25.00 mL of 0.5 mol/L NaOH or KOH to both sample and blank and reflux for 30-40 min.

Cool and add 25 mL water through the condenser. Disconnect the flask, add more phenolphthalein indicator if necessary, and titrate the excess alkali with standard 0.5 mol/L HCL in both sample and blank.

$$\text{Ester Content of water extracts "D"} = \frac{(V_B - V_S) \times C \times 0.088 \times 25 \text{ mL}}{0.90}$$

where V_B = Vol of std HC1 to neutralize the blank

V_S = Vol of std HC1 to neutralize the sample

C = Concentration of the standard HC1

0.088 = Milliequivalent mass of $\text{CH}_3\text{COOC}_2\text{H}_5$ (ethyl acetate, relative density, 0.90)

Withdrawn/Retirée

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	HYDROCARBONS AND ESTERS HYDROCARBONS IN LACQUER THINNERS	METHOD 66.2 October 1982

Supersedes Issue of
August 1974

SCOPE

This method is for use in determining quantitatively the per cent by volume of hydrocarbons in lacquer thinners.

APPARATUS AND REAGENTS

- (a) 250 mL separatory funnel
- (b) 50 mL pipette
- (c) 25 mL stoppered graduated cylinder

75% by mass H_2SO_4 — add 100 parts by volume of 96% H_2SO_4 to 50 parts by volume distilled H_2O , mix and cool before using.

Acid mix — add 100 parts by volume of 96% H_2SO_4 to 170 parts by volume of 85% H_3PO_4 , mix and cool before using.

PROCEDURE

Pipette 50 mL of the test thinner into the separatory funnel, and 100 mL of distilled water and shake. Allow the layers to separate and draw off the water layer. Add 100 mL of 75% H_2SO_4 and shake gently, venting the funnel to relieve pressure. Allow to cool and the layers to separate, and draw off the acid layer. Add 75 mL concentrated acid mix, shake well and separate as before. Wash the remaining solvent twice with an equal volume of water. Transfer the washed solvent to the 25 mL cylinder and multiply the measured volume by 2 to obtain the per cent hydrocarbons.

REFERENCE: Quantitative Chemical Determination of Hydrocarbons in Lacquer Thinners by H.E. Ashton, Official Digest, Vol. 33, No. 438, p. 775, July 1961.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	HYDROCARBONS AND ESTERS AROMATIC HYDROCARBONS	METHOD 66.3 October 1982

Supersedes Issue of
August 1974

Mix 20 mL of thinner in a separatory funnel with 40 mL of dimethyl sulfate. After thorough mixing by shaking, measure the volume of the upper layer and report the loss as aromatic hydrocarbons.

NOTE: Dimethyl sulfate is a hazardous chemical that should be used only under the supervision of trained personnel. It must be used in a well-ventilated fume hood and, after extraction, the dimethyl sulfate layer should be digested on a steam or water bath with dilute NaOH before it is discarded.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	ASH CONTENT OF VARNISH, TAR-BASE AND OTHER COATINGS	METHOD 69.3 October 1982

Supersedes Issue of
August 1974

SCOPE

This method is for use in determining the percentage of ash in tar-base and other coatings and varnishes containing flattening agents.

PROCEDURE

Ignite a 30-50 mL porcelain crucible or dish at 600°C, cool in a desiccator and weigh to 0.1 mg. Accurately weigh 3-5 g of the material into the crucible and evaporate most of the volatile matter on a hot plate or steam bath. Place the crucible on a triangle, heat gently with a burner until the organic matter ignites, and apply sufficient heat to keep the sample burning. When combustion is complete, heat to a black char and burn off any free carbon around the rim.

Transfer the crucible to a muffle furnace and maintain at 550-600°C until all carbonaceous matter has been consumed. Remove the dish to a desiccator, cool and weigh to 0.1 mg. Repeat the ignition and weighing until constant mass is obtained.

NOTE: If the ash produced is light and fluffy and a dish is being used, it may be necessary to cover it with a watch glass to prevent loss when the dish is being transferred.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	CHLORINATED SOLVENTS	METHOD 73.1 October 1982

Supersedes Issue of
August 1974

SCOPE

This method is for the qualitative determination of the presence of chlorinated solvents within a specified boiling range.

APPARATUS

- (a) Steam distillation apparatus
- (b) Distilling flask, 100 mL capacity
- (c) Copper wire, 0.8 to 1.0 mm in diameter
- (d) Bunsen burner

PROCEDURE

Steam distill 100 mL of the material using a receiver cooled in ice. Separate the solvent layer, dry and redistill, collecting all solvents within the specified boiling range. Wash this fraction with several times its volume of distilled water and reject the washings.

Form a small loop in the copper wire and heat in a small Bunsen flame until it no longer colors the flame. Allow the loop to cool and then dip it into the test solution. Immediately place in the outer part of the flame and when the first luminous flame disappears, examine for the green coloration due to chlorinated compounds.

At the discretion of the testing authority, additional tests, such as a sodium fusion, may be employed.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	CARBON AND INSOLUBLE MATTER	METHOD 74.1 August 1974

Supersedes Issue of
June 1972

Moisten a 1 g sample of the dry pigment with alcohol and treat with a mixture of 10 ml concentrated HCl acid, 10 ml bromine water and 10 ml water. Boil the mixture gently for 5 to 10 min.

Add 100 ml of boiling water and boil the mixture for a few minutes, filter hot through an ignited, tared Gooch crucible, and wash the residue with hot water until the washing gives no test for chloride.

Dry the residue (Method 103.2) at 105°C (221°F) and weigh. Then ignite it by gradually raising the temperature to 900°C (1650°F), and reweigh. Repeat ignition and weighing until a constant weight is obtained. Report the loss in weight due to ignition as carbon, and the residue as insoluble matter.

Withdrawn / Retirée

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	DETECTION OF RESINS QUALITATIVE TEST FOR PHENOL-FORMALDEHYDE RESINS	METHOD 75.2 October 1982

Supersedes Issue of
August 1974

Place 40 mL of reagent grade benzene* in a 50 mL glass-stoppered graduated cylinder. If the sample to be tested is a liquid vehicle, add exactly 4 drops of the sample to the benzene. If solid resin samples are to be tested, weigh out 50 mg of the resin and dissolve in the benzene. If the sample is insoluble in benzene, dissolve first in 20 mL butyl acetate and add 20 mL benzene. If the sample imparts a yellow color to the solution prepare another 40 mL as above and retain for comparison with the first solution, which is treated as follows:

Add 10 mL of 1:10 sulfuric acid. Add exactly 2 drops of a freshly prepared 20% aqueous solution of sodium nitrite, stopper and shake vigorously for at least 10 s. Allow to stand undisturbed for 5 min and examine the benzene layer. When the untreated resin solution is already yellow in color, compare the treated solution with untreated resin solution. A strong yellow color indicates phenol-formaldehyde resins. Epoxy resins give no color.

* Caution: Benzene is a highly toxic solvent and inhalation of this solvent should be avoided.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	FOUCRY (NITRIC ACID) TEST FOR EPOXY RESINS	METHOD 75.3 October 1982

Supersedes Issue of
August 1974

Powder solid resins and dissolve 0.1 g in 10 mL of concentrated H_2SO_4 , using a warm water bath (40-50°C) to effect solution if necessary. For resin solutions or varnishes, add an equivalent amount of resin to the acid; e.g., 0.2 g of a 50% solution. If the material is pigmented, extract the vehicle from about 5 g (Method 21.1 except that accurate masses are not required and two extractions will suffice). Remove the solvent by distillation and use 0.1 g of the isolated vehicle.

Add 1 mL of 63% HNO_3 to 1 mL of the H_2SO_4 solution. Shake the mixture and allow to stand 5 min, then pour it into 100 mL of 5% NaOH solution, with gentle stirring. Note the color where the more viscous, heavier acid solution strikes down into the alkaline solution. Positive tests produce a reddish color, whereas negative ones produce only a whitish cloud, although the final color of the solution obtained is the chief criterion. Positive tests are indicated by an orange-red to deep-red color.

Control tests using epoxide and nonepoxide resins should be run simultaneously to provide known positive and negative test results.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	SWANN SPOT TEST FOR EPOXY RESINS	METHOD 75.4 October 1982

Supersedes Issue of
August 1974

Use the solution of resin in H_2SO_4 prepared for Method 75.3 for this test. Add a small amount of this acid solution dropwise to 5 mL concentrated H_2SO_4 in a test tube until the intensity of color approximates that of 0.017 mol/L $\text{K}_2\text{Cr}_2\text{O}_7$ solution.

Insert a glass stirring rod, and streak a drop or two of the acid solution across a piece of filter paper suspended in a horizontal position. If bisphenol-type epoxy resins are present, a bright purple color develops in less than a minute and eventually turns blue.

Acid-washed papers should be used; Whatman 42 and 52 are particularly suitable. If soft, qualitative papers are used, the acid may attack the cellulose too rapidly and fall through the paper before color develops.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	PHOSPHORIC ACID	METHOD 77.1 October 1982

Supersedes Issue of
August 1974

By means of a weighing burette, weigh accurately 3 ± 0.5 g of the acid component into a 250 mL beaker. Add 50 mL distilled water and stir. Add a few drops dilute HCl, 35 mL magnesia mixture*, 5 g ammonium acetate, and 2-3 drops of phenolphthalein solution. Heat nearly to boiling and add 1:10 NH_4OH dropwise while constantly stirring until a turbidity forms. Stir until the precipitate becomes crystalline and then add NH_4OH until the pink color of phenolphthalein is obtained. Allow the solution to cool, add 10 mL of concentrated NH_4OH and let stand for 4 h. Filter and wash with 1:10 NH_4OH until free from chlorides. Moisten the precipitate and paper with saturated NH_4NO_3 solution.

Transfer to a tared porcelain crucible and ignite, first at a low temperature to burn off the paper and finally for 1 h at 1000°C . Cool and weigh.

$$\% \text{ phosphoric acid} = \frac{\text{mass of } \text{Mg}_2\text{P}_2\text{O}_7 \times 0.8805 \times 100}{\text{mass of sample}}$$

* Magnesia Mixture: 55 g $\text{MgCl}_2 \cdot 6\text{H}_2\text{O}$
105 g NH_4Cl
5 mL conc. HCl
make up to 1L with distilled water

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	QUALITATIVE TEST FOR KETONES	METHOD 79.1 October 1982

Supersedes Issue of
August 1974

Extract 50 mL of the thinner in a separatory funnel with two successive 25 mL portions of water. Combine the water extracts and test for ketones as follows:

To 5 mL of the liquid in a test tube add two small crystals of sodium nitro-prusside; shake to dissolve, and make just alkaline with 10% NaOH. In the presence of ketones the liquid assumes an orange tint, which fades to clear yellow in 15 to 20 min.

Make a portion of the solution distinctly acid with acetic acid immediately after the addition of the alkali; a purplish-red or blue color will develop in the presence of ketones.

REFERENCE: Allen's Organic Analysis
Vol. 1, p. 119 (Legal's Test)

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	DETECTION OF ANILINE	METHOD 81.1 October 1982

Supersedes Issue of
August 1974

SCOPE

This method is for the qualitative determination of aniline in coating materials. It will detect 0.1% aniline.

APPARATUS

- (a) Steam distillation apparatus with 500 mL flask
- (b) 250 mL separatory funnel
- (c) 100 mL beaker
- (d) Ethyl ether
- (e) Mineral spirits
- (f) 1:4 HCl
- (g) 96% H₂SO₄
- (h) Powdered MnO₂

PROCEDURE

Place about 50 g of the material in the flask, add 50 mL mineral spirits and mix. Add 50 mL water and steam distill until about 150 mL distillate is obtained. Transfer both layers to the separatory funnel, add 10 mL 1:4 HCl and shake well. Allow the layers to separate and draw off the aqueous phase, discarding the solvent. Wash the water layer first with 20 mL and then with 10 mL ether. Transfer the water layer to a beaker and evaporate (Caution — ether vapor) to 4 – 6 mL but not to dryness. Add 5 drops H₂SO₄ and 0.02 – 0.03 g MnO₂. A blank may be run by adding the same amounts of H₂SO₄ and MnO₂ to 5 mL 1:4 HCl.

RESULTS

Aniline yields a green-blue to blue color within a few minutes after the addition of the manganese dioxide.

REFERENCE: Detection of Aniline in Stencil Inks, National Research Council of Canada, Report No. MP-192F by H.E. Ashton and G.A. O'Doherty, 3 November 1958.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	VINYL RESIN ANALYSIS SEPARATION AND IDENTIFICATION OF VINYL RESIN (QUALITATIVE)	METHOD 82.1 October 1982

Supersedes Issue of
August 1974

Concentrate the vehicle, obtained by means of Method 21.1 using extraction mixture C, then pour it out onto a glass plate. Allow the film to dry, then remove it from the plate and cut or shred it into small pieces.

Place the shredded film into a paper thimble and, using a soxhlet extractor, extract for 3 h with ethyl ether to remove the plasticizer. Discard the ether solution and dry the paper thimble and contents.

Replace the thimble in the soxhlet apparatus and extract for 3 h with methyl ethyl ketone to remove the vinyl resin.

Concentrate the resin solution obtained and identify as to type by means of infrared analysis. Excellent results may be obtained by making a film upon a sodium chloride plate.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	VINYL RESIN ANALYSIS DETERMINATION OF POLYVINYL CHLORIDE	METHOD 82.3 October 1982

Supersedes Issue of
August 1974

SCOPE

This method gives a suitable procedure for the determination of polyvinyl chloride in resins.

PRINCIPLE

The resin is decomposed with Na_2O_2 to form NaCl . In HNO_3 solution the chlorine is precipitated as AgCl with an excess of AgNO_3 . The excess AgNO_3 is titrated with NH_4SCN using $\text{Fe}(\text{NO}_3)_3$ indicator. The amount of AgNO_3 required to precipitate the chlorine is a measure of the polyvinyl chloride content of the resin.

MATERIALS REQUIRED

Peroxide sulfur bomb assembly, Parr Instrument Company, electric or flame ignition.

PROCEDURE

1. Ignition

- Electric Method* — Weigh accurately on an analytical balance 0.20 — 0.25 g of resin and transfer to a clean dry Parr bomb cup. Add 0.3 g of finely powdered sucrose and one dipper full (15 g) of Na_2O_2 , thoroughly mix the contents with a stainless steel rod and brush any particles of the mixture adhering to the rod into the bomb. Sprinkle on the surface of the mixture a little finely powdered sucrose. Then according to the instructions accompanying the bomb, wire, close and place it inside the water jacket. Ignite bomb by closing the switch, then allow at least 5 min for combustion and cooling before removing bomb from water jacket.
- Flame Method* — To a clean dry Parr bomb, add Na_2O_2 to a depth of 6 mm. Weigh accurately on an analytical balance 0.40 — 0.42 g of resin and transfer to the bomb. Add approximately 0.5 g reagent grade benzoic acid and a standard scoopful of powdered Na_2O_2 . Seal the bomb and ignite. Do not shake the bomb before igniting. After combustion, cool the bomb in tap water and then rinse with reagent water.

2. Solution and Titration

Open the bomb and remove cup, placing it in a clean, empty 600 mL beaker. Add reagent water slowly until the cup is completely covered. After effervescence has subsided rinse the underside of the cover with hot reagent water adding the rinse water to the beaker. Boil the contents of the beaker to ensure complete solution of the melt. Remove and rinse the cup, catching the washings in the beaker. Acidify the solution with concentrated HNO_3 , adding a few mL in excess, then add 50 mL 0.1600 mol/L AgNO_3 .

To coagulate the precipitate, heat the suspension nearly to boiling, while stirring continuously, for 2 to 3 min. Filter off precipitate of AgCl and wash with 1:20 HNO₃ solution until filtrate contains all of the excess AgNO₃. Titrate filtrate with 0.1600 NH₄SCN to pink end-point using 10 mL of 5% Fe(NO₃)₃ indicator solution.

$$\% \text{ vinyl chloride (by mass)} = \frac{(V_1 C_1 - V_2 C_2) 6.25}{M}$$

where V_1 = Volume AgNO₃ (mL)

V_2 = Volume NH₄SCN (mL)

C_1 = Concentration of AgNO₃

C_2 = Concentration of NH₄SCN

M = Mass of sample (g)

NOTE: The factor 6.25 is derived by converting the molecular mass of vinyl chloride (62.5) to its equivalent mass (in this instance 62.5), dividing by 1000 to convert to milliequivalents and finally multiplying by 100 to convert to per cent by mass.

REFERENCE: Test for Total Chlorine in Vinyl Chloride Polymers and Copolymers: ASTM D 1303.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	VINYL RESIN ANALYSIS DETERMINATION OF VINYL ALCOHOL	METHOD 82.4 October 1982

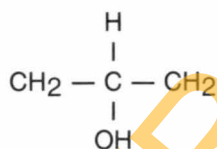
Supersedes Issue of
August 1974

SCOPE

This procedure describes the determination of the hydroxyl value of hydrolyzed vinyl resins by acetylation with acetic anhydride pyridine reagent.

LIMITATIONS

This method gives a suitable procedure for unpigmented vinyl resins. The recommended reaction conditions apply to vinyl resins containing the group:



The samples must be neutral to phenolphthalein and contain no other alcohols or water. This method is not suitable for resins containing carboxyl groups.

REAGENTS

1. Acetic anhydride-pyridine reagent: Mix 105 mL acetic anhydride with 1 L pyridine. The reagent shall be prepared weekly and kept in a dark bottle. It should not be used if the color is darker than a pale yellow.
2. Indicator Solution: Phenolphthalein 1% in Pyridine-Water 1:1.
3. Pyridine-water solution: Add 8 mL distilled water to 92 mL pyridine.
4. Pyridine: Freshly distilled pyridine should be used throughout.
5. Standard 0.5 mol/L KOH: Add 10 g KOH to 1 L of ethyl or methyl alcohol and distill. Using this distillate prepare a 0.5 mol/L KOH solution and standardize against reagent grade benzoic acid dried at 105°C.

APPARATUS

- (a) Flasks, 500 mL flat bottom with standard-taper 24/40 joint
- (b) Condensers, West, 400 mm with standard-taper 24/40 joint
- (c) Hot plates, with variable resistance for temperature control
- (d) Burette, 100 mL total capacity, range of graduated portion 50 mL in 0.1 mL graduations.
- (e) Drying tubes, straight, for top of condenser.

PROCEDURE

Weigh 2-3 g resin and transfer to the 500 mL glass Erlenmeyer flask containing exactly 25.0 mL acetic anhydride pyridine reagent. Wash sample into flask with up to 35 mL pyridine. Attach flask and drying tube containing CaCl_2 to condenser and reflux gently 1 to 1-1/2 h (NOTE 1). Add 20 mL pyridine-water solution and reflux again for 15 min. Allow flask to cool somewhat, then rinse the condenser with 25 mL pyridine. Remove the condenser and rinse the joint of the condenser and the flask with pyridine, collecting the rinsings in the flask. Cool the flask and contents to about 2°C before titration so that at the end of the titration the solution temperature is not higher than 5°C. Add 10 drops phenolphthalein indicator solution and titrate with the 0.5 mol/L KOH solution to the first permanent faint pink end-point. Perform a blank determination in parallel by the same procedure, omitting only the addition of sample.

NOTE 1: If solution turns dark during reflux period, it may be advisable to begin again, but do not boil the solution; instead, heat just below the boiling point for approximately 5 h.

CALCULATION

$$\% \text{ vinyl alcohol (by mass)} = \frac{C(V_2 - V_1) \times 4.41}{M}$$

where V_1 = KOH used for the sample (mL)

V_2 = KOH used for the blank (mL)

C = KOH concentration

M = Mass of sample (g)

NOTE: The factor 4.41 is derived by converting the molecular mass of vinyl alcohol (44.1) to its equivalent mass (in this instance 44.1), dividing by 1000 to convert to milliequivalents and multiplying by 100 to convert to per cent by mass.

REFERENCES

1. Chemical Analysis of Poly (Vinyl Butyral), ASTM D 1396.
2. Test for Hydroxyl Groups by Acetic Anhydride Acetylation, ASTM E 222.
3. Testing Urethane Foam Isocyanate Raw Materials, ASTM D 1638
4. Carbide and Carbon Works Laboratory Manual, Oct. 1953, Method 22-213-3.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	VINYL RESIN ANALYSIS BUTYRALDEHYDE CONTENT	METHOD 82.5 October 1982

Supersedes Issue of
August 1974

SCOPE

This analysis is suitable for unpigmented vinyl resins.

PROCEDURE

Accurately weigh a sample of the unpigmented material, containing approximately 0.5 g of butyral resin, and transfer it to a 500 mL Erlenmeyer flask. Add 75 mL of butanol and agitate the flask until solution is complete. Add 50.0 mL of 0.5 mol/L hydroxylamine hydrochloride and suitable boiling aids, and reflux the mixture for 2 h.

After cooling, rinse the condenser down with 50 mL of a 1:1 mixture of methanol and water. Adjust the temperature of the solution to within $\pm 1^\circ\text{C}$ of room temperature. Titrate the sample solution with 0.5 mol/L NaOH to a pH endpoint of exactly 3.5.

Run a blank at the same time and under the same conditions as the sample, adjust it to the same temperature, and titrate to a pH value of exactly 3.5.

CALCULATION

$$\% \text{ butyraldehyde (by mass)} = \frac{7.21 C (V_1 - V_2)}{M}$$

where V_1 = NaOH required for sample (ml)

V_2 = NaOH required for blank (ml)

C = Concentration of NaOH

M = Mass of sample (g)

NOTE: The factor 7.21 is derived by converting the molecular mass of butyraldehyde (72.1) to its equivalent mass (in this instance 72.1), dividing by 1000 to convert to milliequivalents and finally multiplying by 100 to convert to per cent by mass.

REFERENCE: Chemical Analysis of Poly (Vinyl Butyral), ASTM D 1396.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	DETECTION OF BUTANOL	METHOD 83.1 October 1982

Supersedes Issue of
August 1974

Determine the refractive index on the fraction of the distillate from the resin component that distills (Method 28.4) between 117 – 119°C using an Abbé Refractometer as described in ASTM D 542 or other suitable instrument.

REFERENCE: Tests for Index of Refraction of Transparent Organic Plastics, ASTM D542.

Withdrawn/Retirée

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	METHYL ALCOHOL CONTENT METHOD FOR DETERMINING METHYL ALCOHOL CONTENT	METHOD 84.1 October 1982

Supersedes Issue of
August 1974

REAGENTS

- Potassium Permanganate Solution — Dissolve 3 g KMnO_4 and 15 mL H_3PO_4 in 100 mL water. Renew solution every four weeks.
- Oxalic-Sulfuric Acid Solution — Dissolve 5 g oxalic acid in 100 mL of 1:1 H_2SO_4 .
- Modified Schiff Reagent — Dissolve 0.2 g Basic Fuchsin in about 120 mL hot water. Cool and add 2 g NaHSO_3 previously dissolved in 20 mL water. Add 2.0 mL concentrated HCl and dilute to 200 mL. Keep in a cool place at least 24 h before use. Renew reagent every four weeks.
- Standard Methyl Alcohol Solution — Dilute 15 mL anhydrous CH_3OH to 100 mL with 95% $\text{C}_2\text{H}_5\text{OH}$ (methanol free). Dilute 25 mL of this solution to 100 mL with distilled water. The resulting solution is the Standard.

PROCEDURE

Transfer 25 mL of sample to a distilling flask and dilute with 100 mL water. Distill nearly 100 mL into a 250 mL separatory funnel. Add 50 mL saturated NaCl solution to the distillate and sufficient solid NaCl to saturate the whole. Extract twice with 50 mL petroleum ether. Transfer the aqueous layer to a 500 mL distilling flask. Wash the petroleum ether layers with 50 mL saturated salt solution and add the washings to the distilling flask. Distill the combined aqueous layers into a 100 mL graduated flask until about 75 mL of distillate is collected. Make up the mark with distilled water, stopper and mix well.

Dilute 5 mL of the distillate obtained above and 5 mL of the Standard, each to 100 mL with distilled water. Transfer 5 mL each of the diluted distillate and the diluted Standard to clean dry test tubes. Add 2 mL of the KMnO_4 solution to each of the test tubes, allow to stand 10 min with occasional shaking without inverting the test tubes, and then add 2 mL oxalic-sulfuric acid solution to each. Mix again without inverting. When completely decolorized, add 5 mL modified Schiff reagent, mix by inverting the tube three times and allow to stand 1 h at room temperature. The depth of color produced in the sample shall be not greater than that produced in the Standard.

All measurements must be exact and all solutions made to volume at the same temperature.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	MATTER INSOLUBLE IN CARBON DISULFIDE	METHOD 85.1 October 1982

Supersedes Issue of
August 1974

Weigh accurately about 2 g of the sample into a 150 mL beaker. Evaporate the volatile solvent on a steam bath, cool, add 50 mL of carbon disulfide* and agitate until solids are broken up and all lumps disappear. Cover and set aside for 15 min.

Filter through a tared Gooch crucible. Wash down the sides of the beaker and the Gooch crucible with small successive portions of carbon disulfide until the filtrate is clear. Draw air through the Gooch crucible for about 10 min to remove the carbon disulfide. Dry the crucible and contents for about 20 min in an oven at 100-110°C, cool and weigh.

Calculate the percentage of matter insoluble in carbon disulfide as follows:

$$\% \text{ of insoluble matter} = \frac{M_1 \times 100}{M_2}$$

where M_1 = Mass of residue

M_2 = Mass of sample

* Carbon disulfide is a highly toxic solvent and inhalation and skin absorption if this solvent should be avoided.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	REACTIVITY (COMPATIBILITY WITH EXPLOSIVES) TEST	METHOD 87.1 October 1982

Supersedes Issue of
August 1974

Warning — The Reactivity Test shall be conducted only in properly equipped laboratories licensed to test explosives.

APPARATUS

- (a) A constant temperature heating bath, electrically controllable to within 0.1 °C of the specified temperature, with suitable devices to prevent overheating. The usual bath has 12 to 18 stations to accommodate the heating tubes. Drawings of acceptable equipment may be obtained from Canadian Arsenals Limited, 5 Montée des Arsenaux, Ville de Le Gardeur, Québec J5Z 2P4.
- (b) Thermometers
 - (i) To measure the bath temperature, with 0.1 °C graduations.
 - (ii) To measure the cabinet temperature, with 0.1 °C graduations.
- (c) Sets of vacuum stability heating tubes and manometers (Figure 1).
- (d) A cabinet to enclose the bath, for safety, and to maintain a uniform temperature of approximately 30 °C in the region of the manometers.
- (e) Vacuum pump, balance, drying oven and other standard chemical laboratory equipment.

CALIBRATION (Refer to Figure 1)

Vacuum stability tubes and manometers are calibrated in sets. A set consists of a vacuum stability tube and a manometer that have been carefully ground to fit together, and both are numbered identically. Heating tubes and manometers shall not be interchanged, as this would invalidate the calibration.

Clean and dry a set of the apparatus and fill the heating tube with mercury, at room temperature, to the level at which the ground glass joint of the manometer makes contact with the mercury, taking care to exclude air bubbles. Connect the manometer to the heating tube and mark the point to which the mercury rises in the capillary (about 10 cm). Carefully remove any mercury outside the joint, then disconnect the two parts, and weigh (in g) (M_1) the mercury in the tube. Capacity of heating tube (V_T) = $M_1 \times$ Specific Volume of Mercury.

Transfer 7.0 mL of mercury to the cup at the lower end of the manometer and while holding the manometer in an upright vertical position mark the point to which the mercury rises in the capillary. Empty out the mercury and measure (in mm) the length of the capillary between the two marks.

Transfer approximately 10 g of mercury, accurately weighed M_2 , to the cup at the lower end of the manometer. Manipulate the manometer so that when it is horizontal the mercury forms a continuous section in the longest arm of the manometer. Measure (in mm) the length of the mercury column, at three different parts of the capillary. Calculate the average (d) of the three measured lengths of the mercury column.

$$\text{Volume factor of manometer (C)} = \frac{M_2 \times \text{Specific Volume of Mercury}}{d}$$

PREPARATION OF SAMPLES

Prepare the materials for use as required, mixing components in the case of two-package materials, or thinning with the proper solvent, if necessary. Spread a thin film of the material on chemically-clean and dry glass plates and leave to cure or dry fully, under the conditions specified by the manufacturer, or as per normal use. Dry scrapings from these plates in a vacuum desiccator at room temperature for at least 24 h. Grind, mill, or screen the scrapings further so that the material passes a 12-mesh* sieve.

PREPARATION OF EXPLOSIVE MATERIALS

Prepare the explosives used according to the approved method for analytical purposes for each specific explosive, and in addition pass through a 12-mesh* sieve.

PROCEDURE

Weigh separately the specified amounts of prepared sample and explosive material. Unless otherwise specified, use 2.5 g of explosive and 2.5 g of material. Mix and transfer the two to a clean heating tube, in such a manner that the mixture of sample and explosive material in the heating tube is intimate and uniform. The following methods have been used:

- (a) Careful layering in the heating tube.
- (b) Premixing in a beaker and careful transferring of the mix to the heating tube.
- (c) Mixing in the heating tube by agitation or by stirring with a slender wooden rod.

Similarly, for blanks, weigh the specified amounts of sample and of explosive material, and transfer them to separate heating tubes.

Ensure that the ground-glass joints of the heating tubes are clean. Adhering sample of explosive material may be removed by a fine brush. Coat the ground-glass joint of the manometer with a light coating of high-vacuum silicone grease, and join the heating tube to its manometer with a twisting motion to achieve an airtight connection.

While holding the assembly in an upright vertical position, pour 7 mL of mercury into the cup of the manometer and connect a vacuum line to the cup mouth. Tilt the assembly until the mercury is clear of the manometer capillary opening and evacuate the apparatus, gently tapping the side of the heating tube to release air entrapped by the sample.

When the pressure has been reduced to 100.6 KPa (755 mm) below ambient return the manometer to an upright vertical position, discontinue the evacuation and admit air to the apparatus slowly, to control the rate of rise of mercury in the manometer. Disconnect the vacuum line.

Place the heating tube of the evacuated apparatus in the heating bath, being careful to retain the mercury in the manometer and not to loosen the connection between the heating tube and the manometer; 1-1/2 h later mark the level of the mercury in the capillary, and record the barometric pressure of the room. After the specified number of hours of heating time, beginning when the mercury level was marked initially, mark the new level of mercury in the capillary, and again record the barometric pressure of the room.

* 1.40 mm (Std. No. 14), CGSB 8-GP-1

Remove the apparatus from the heating bath, retaining it in an upright vertical position, and measure the distance between the marks.

CALCULATIONS OF REACTIVITY

The volume of gas produced in each apparatus is calculated as follows:

$$\begin{aligned} \text{mL of gas evolved} &= \left[\frac{273 (V_T - V_S) (B_2 - H_2)}{760 (273 + T_B)} + \frac{273 CL (B_2 - H_2)}{760 (273 + T_M)} \right. \\ &\quad \left. + \frac{273 C (H_1 - H_2) (B_2 - H_2)}{760 (273 + T_M)} \right] - \left[\frac{273 (V_T - V_S) (B_1 - H_1)}{760 (273 + T_B)} + \frac{273 CL (B_1 - H_1)}{760 (273 + T_M)} \right] \\ &= (H_1 - H_2 - B_1 + B_2) \times \frac{273}{760} \left[\frac{(V_T - V_S)}{273 T_B} + \frac{CL}{273 + T_M} \right] + \frac{273 C (H_1 - H_2) (B_2 - H_2)}{760 (273 + T_M)} \end{aligned}$$

where H_1 = Initial height of the mercury column in the manometer from the surface of the mercury in the cup, corrected to 0°C

H_2 = Final height of the mercury column in the manometer from the surface of the mercury in the cup, corrected to 0°C

B_1 = Barometric pressure of the room, corrected to 0°C, at the beginning of the test

B_2 = Barometric pressure of the room, corrected to 0°C, at the end of the test

V_T = Capacity of the heating tube, previously determined

V_S = Volume of test material in the heating tube

C = Volume factor of manometer capillary, previously determined

L = Previously measured length of manometer capillary, less 755 mm

T_B = Temperature of the heating bath

T_M = Temperature in cabinet, in vicinity of the manometers

In practice, the following approximations are usually applied:

- H_1 and H_2 are not measured directly, but instead the distances between initial and final mercury levels (H) is used. Average error, -0.5%.
- H_1 , H_2 , (H) and B_1 and B_2 are not corrected for temperature. Average error, +0.5%.
- V_T and V_S are not corrected for bath temperature. Average error, -0.1%.
- V_S is arbitrarily chosen as 3.00 mL. Average error, -2%.
- The increase in manometer volume due to H is ignored. Average error, -2.5%.

The equation is thus reduced to:

$$\begin{aligned} \text{Vol. of gas evolved} &= \frac{273}{760} \left[\frac{V_T - 3}{273 + T_B} + \frac{CL}{273 + T_M} \right] \times [H + B_2 - B_1] \\ &= k [H + B_2 - B_1] \end{aligned}$$

where k is a constant, valid for a particular manometer/tube set, at a particular test temperature.

The volume of reactivity gas is calculated as follows:

Reactivity, mL of gas = $X - (Y + Z)$

where X = mL of gas produced by the mixture of explosive material and sample

Y = mL of gas produced by the explosive material blank

Z = mL of gas produced by the sample blank

NOTE: For this test, since Y and Z are small, it is unnecessary to recalculate the tube factor to allow for the smaller sample volume, V_S .

CLEANING OF APPARATUS

After removing the assembly from the heating bath, allow it to cool in an upright position, then connect it to the vacuum line, evacuate it, tilt it so the mercury is clear of the capillary opening, then re-admit air into the apparatus. Disconnect the vacuum line, empty out the mercury, and disassemble the tube and manometer.

Empty the heating tube, remove residual traces of sample and explosive material, clean the lubricant from the joint with toluene, followed by acetone, then dry it. Fill the tube to the brim with cold chromic-sulfuric acid mixture and allow it to stand for 24 h. Pour out the acid and rinse the tube with tap water, then with distilled water and finally with acetone, and dry it with a jet of dry air.

Similarly clean the lubricant from the joint of the manometer and dry it, then siphon chromic acid mixture through the manometer. Rinse it with tap water, then distilled water and finally with acetone, and dry it with a jet of dry air.

Store the heating tubes and manometers in a clean, dry place.

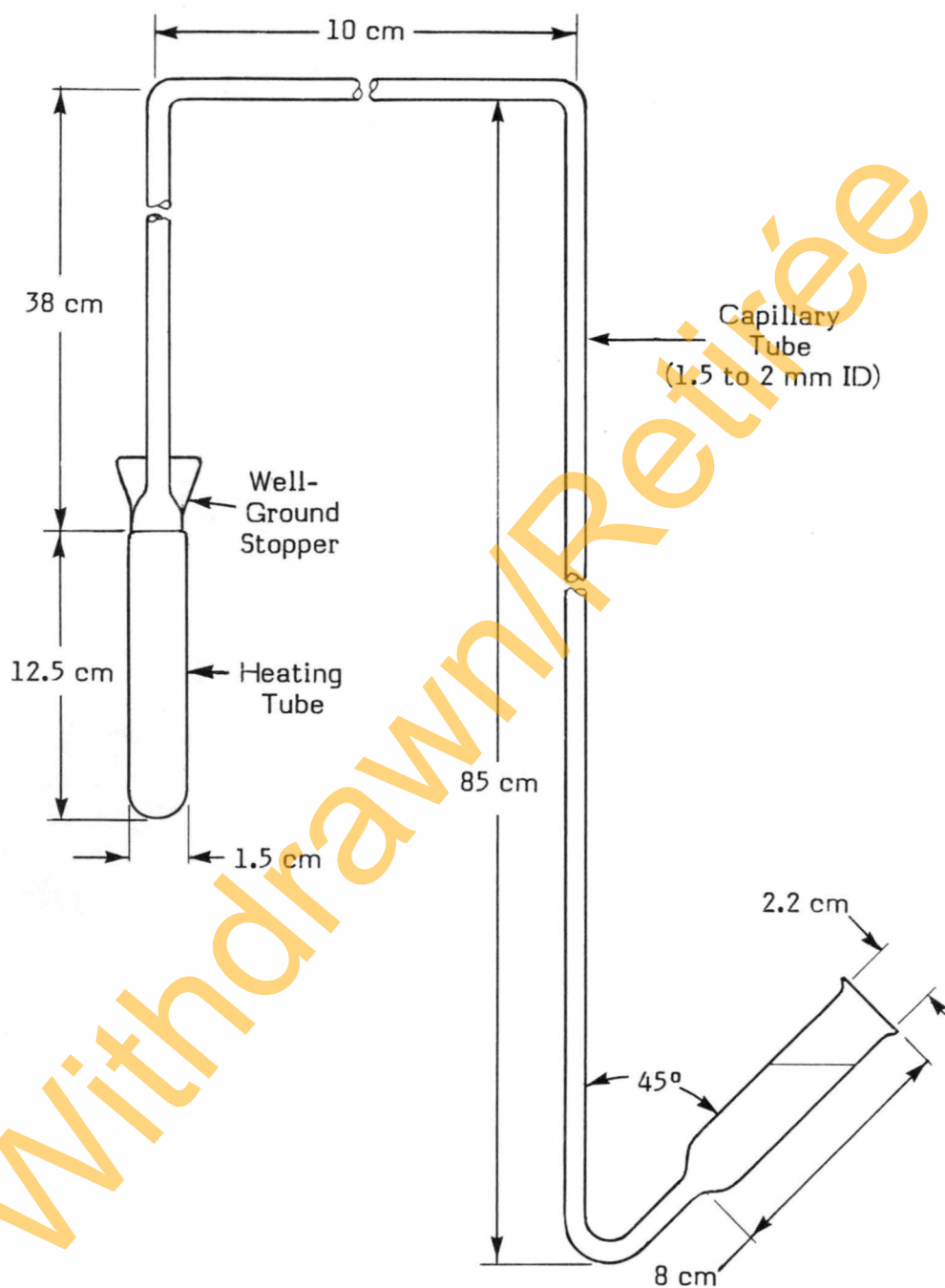


FIGURE 1
Vacuum Stability Measuring
Apparatus

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	REACTIVITY PRESSURE BUILD-UP TEST	METHOD 87.2 August 1974

SCOPE

This method is used to determine gassing potential of paints pigmented with metallic powders such as aluminum and zinc.

- (a) Balance graduated 0.1g
- (b) ORF Modified Lantz Apparatus (Figure 1), Including Springs and Clips
- (c) Purified mercury
- (d) Water bath adjustable to $49.0 \pm 0.1^\circ\text{C}$

CALIBRATION OF APPARATUS

Clean and dry each test unit and weigh to the nearest 0.1 g. Then fill each unit (including the lower and upper section but not the manometer) with water making certain there are no air bubbles. Place the assembled water filled units in a water bath maintained at $49.0 \pm 0.1^\circ\text{C}$. After about 2 h when the water in the unit has reached $49.0 \pm 0.1^\circ\text{C}$ cap each upper section with the stopper making certain there is no water in the manometer above the mercury reservoir. Remove the test units from the water bath, wipe off water from the surface and weigh to the nearest 0.1 g. From the difference in weight calculate the volume of the units using the density value (0.9885) g/ml of water at 49°C .

Then empty the units, dry them and add mercury to the mercury reservoir in the upper section of each test unit to a height near the top of the capillary tube that extends into the bottom section. Weigh each unit with the mercury to the nearest 0.1 g and determine the volume this mercury occupies at 49°C (Density of Hg at 49°C = 13.4754) g/ml. Subtract this volume from the total volume to obtain a net volume of each unit at 49°C .

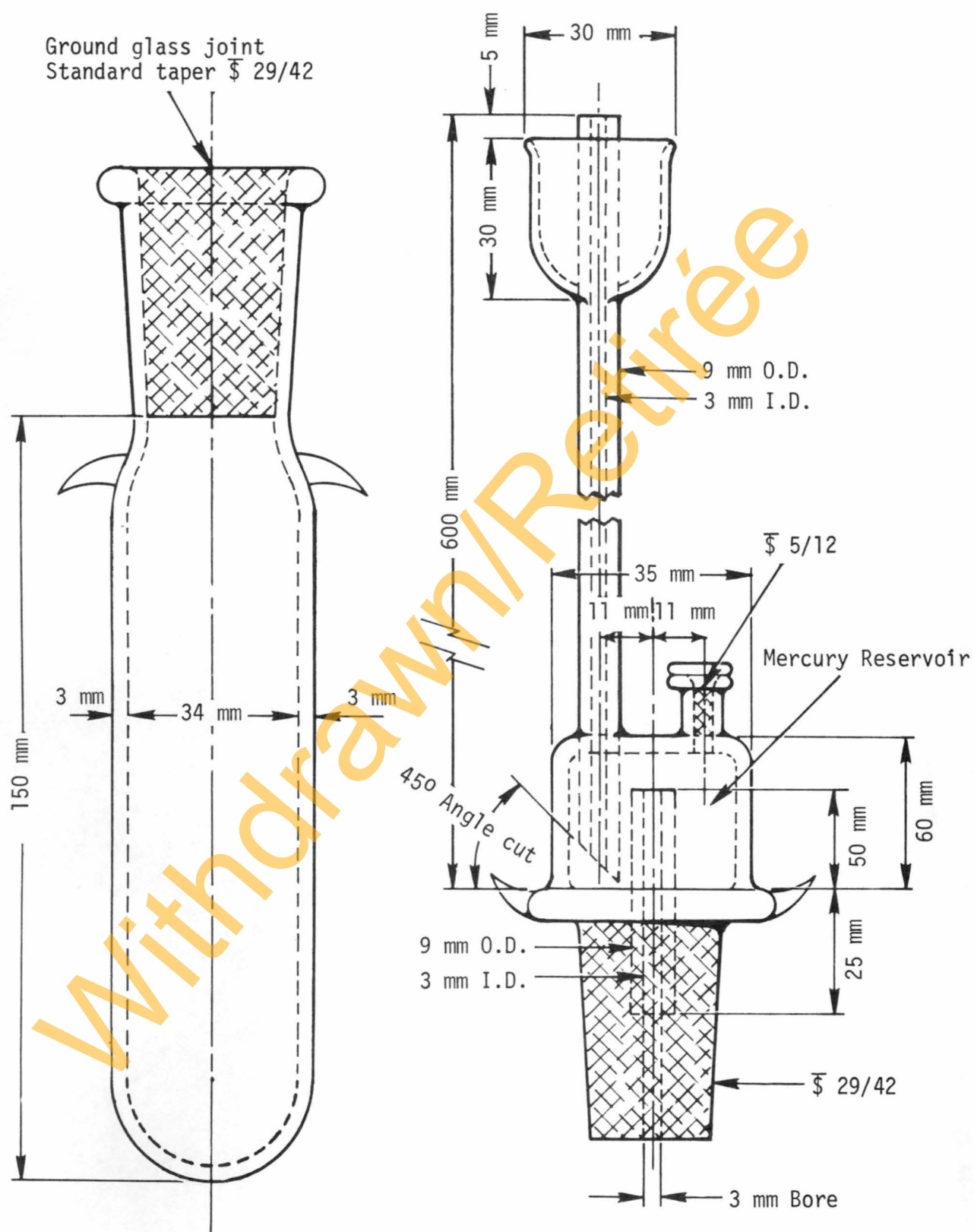
PROCEDURE

Determine (Method 2.1) the density of the sample under test at 49°C . Calculate the weight of sample required which on being placed in the test unit will leave a working volume (net volume-sample volume) of 100.0 ml at 49°C . Dry the lower section of the test unit at 105°C , cool it to room temperature in a desiccator and place the calculated weight of sample in the test unit. Apply silicone grease on all ground glass joints. Assemble the apparatus, leaving the ground glass stopper off the upper section. Attach the springs to the glass books, and place the apparatus in a water bath maintained at a temperature of $49.0 \pm 0.1^\circ\text{C}$ and allow the apparatus 2 h to reach equilibrium with the water bath. Cap with the ground glass stopper, the upper section of the apparatus and attach a spring clip to hold it down. After 30 min read the height (mm) of the mercury in the manometer using either an accurate ruler or a cathetometer and record that height of the mercury as the value for initial gas expansion on warm-up. Also record the barometric pressure at the same time. Run the test for 7 days, taking daily readings of the mercury level. Plot the mercury level against time. Any deviation from a smooth curve indicates a leak. If the pressure gets dangerously high, record this level, remove the clip and the stopper to release pressure then restopper, replace the clip and again read height of mercury and record the difference between these two levels and continue daily readings. At the end of 7 d measure accurately the height of mercury in the manometer and record the barometric pressure. Calculate the pressure developed in mm of Hg at the end of 7 d by subtracting the value for initial gas expansion on warm-up from the height of mercury level at the end of 7 d. Correct for barometric pressure change. Where the pressure build-up required releasing prior to completion of the test, add the pressure developed at that stage to the pressure subsequently developed.

REFERENCES

- Ontario Research Foundation Report "Measurement of Gas Formation by Metal Pigmented Dispersions."
- Gas Evolution in Zinc Dust Paint by W.J. Lantz in Paint and Varnish Production, March 1961.
- The gas test apparatus is available from:

O.H. Johns Glass Co. Ltd.
219 Broadview Avenue
Toronto, Ontario



Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	VEHICLE COMPOSITION	METHOD 88.1 October 1982

Supersedes Issue of
August 1974

CELLULOSE NITRATE

Extract the vehicle from the pigment (Method 21.1). Retain and combine the extracts and washings and place in a 250 mL S.T. Florence flask. Concentrate the vehicle to about 30% solids by distilling off solvent on the water bath. If any precipitation occurs, redissolve by adding a few milliliters of acetone. Determine the per cent by mass of nonvolatile vehicle (V) in the isolated vehicle (Method 17.1).

Weigh a 50 mL Erlenmeyer flask with glass or cork stopper (A). Pour in approximately 5 g of the isolated vehicle, stopper tightly and reweigh (B). Add 2 mL acetone, restopper, and when the vehicle has dissolved, record the mass of the mixture (C). Arrange a wide-mouth 500 mL flask containing 200 mL of boiling distilled water on a heater or hot plate just inside the window of a hood, in such a manner that lowering the window to within 75 or 100 mm of the flask causes the steam or vapors from the boiling water to be drawn away sharply. Pour the diluted vehicle sample dropwise into the boiling water, avoiding condensation of moisture on the small flask. Immediately after pouring, restopper and reweigh the small flask (D).

Wash down the sides of the large flask with water and swirl to collect the precipitated resin into one portion as much as possible. Continue boiling for a total of 10 min. After a few minutes cooling, filter through rapid hardened, lint free filter paper of high wet strength. Transfer all the sample to the filter paper and wash with water. Open the filter paper and place on absorbent paper. Pick up the sample with the fingers and blot the filter paper with the bulk of the sample so as to pick up any stray pieces. Press the sample repeatedly between folds of dry filter paper until the paper shows no dampness. Transfer the sample immediately to a 250 mL flask having a 24-40 ground joint, and add 100 mL of a 6:1 benzene-ethanol mixture. Reflux 3 h and allow to cool. Filter through a fritted-glass crucible of coarse porosity previously prepared with a thick mat of asbestos, dried and weighed. Transfer and wash the precipitate with benzene*. Collect the filtrate in a clean, dry suction flask and hold for the determination of phthalic anhydride. Dry the crucible containing the cellulose nitrate in an oven at $60 \pm 2^\circ\text{C}$ until free from solvent, cool in a desiccator and weigh.

Calculations — Calculate the per cent cellulose nitrate in the nonvolatile vehicle using the following equation:

$$\% \text{ cellulose nitrate} = \frac{\text{mass of precipitate} \times 10\,000}{\text{mass of sample} \times V}$$

where

$$\text{mass of sample} = \frac{(C-D) \times (B-A)}{(C-A)}$$

and

- A = Mass of empty 50 mL flask (stoppered)
- B = Mass of 50 mL flask plus isolated vehicle only
- C = Mass of 50 mL flask plus isolated vehicle plus acetone (before pouring)
- D = Mass of 50 mL flask plus residual vehicle (after pouring)
- V = Mass per cent of nonvolatile vehicle in total isolated vehicle.

* Caution: Benzene is highly toxic solvent and inhalation of this solvent should be avoided.

PHTHALIC ANHYDRIDE

Refilter the filtrate from the cellulose nitrate determination through fine filter paper into a 500 mL S.T. Erlenmeyer flask. Determine the phthalic anhydride according to ASTM D 563. Calculate the per cent phthalic anhydride according to Section 5 of ASTM D 563 and divide by the per cent non-volatile vehicle (V) in the isolated vehicle to obtain the per cent phthalic anhydride of the non-volatile vehicle.

REFERENCE: Test for Phthalic Anhydride Content of Alkyd Resins and Resin Solutions, ASTM D563.

Withdrawn/Retirée

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	FUNGICIDE CONTENT DITHIZONE METHOD FOR DETERMINATION OF TOTAL MERCURY IN CLEARS AND PAINTS	METHOD 89.1 October 1982

Supersedes Issue of
August 1974

OUTLINE OF METHOD

Ether saturated with HCl gas is used to convert the organic mercury compound to mercuric chloride by evaporation on a steam bath. The mercuric chloride is titrated with standard dithizone solution to form mercury dithizonate, an orange-yellow colored complex.

The analyst is cautioned that the dithizone method is not specific for mercury. With varying pH, other elements may also be complexed by this procedure. As each has a characteristic color from violet through red, yellow and brown, close attention should be paid to the color of the complex obtained. Significant variation from the characteristic yellow-orange of mercury dithizone should be cause to employ another analytical technique.

REAGENTS

(a) Dithizone Solutions

(i) Concentrate — Solution A

Weigh on an analytical balance 500 ± 5 mg of reagent grade diphenylthiocarbazone in a 400 mL beaker. Crush any large aggregates of the powder and add 50 mL reagent grade chloroform. Dissolve by stirring and dilute to 250 mL with additional chloroform. Store in an amber, glass-stoppered bottle at 0 to + 5°C.

(ii) Titrant — Solution B

Pipette 50 mL of a filtered portion of the concentrate into a 1 L volumetric flask. Dilute to the mark with additional chloroform and shake vigorously to assure uniformity of the solution. Transfer to an amber, glass-stoppered bottle and store at 0 to 5°C when not in use.

Dithizone solutions can be kept indefinitely under the above conditions. Solution B shall have been standardized within 48 h of use.

(b) Mercuric Chloride Solutions

(i) Concentrate — Solution A

Weigh on an analytical balance exactly 270.8 mg of reagent grade HgCl_2 in 100 mL beaker. Add 1.0 mL concentrated hydrochloric acid and 10 mL distilled water and stir until completely dissolved. Transfer the resultant solution quantitatively to a 1 L volumetric flask and dilute to the mark with distilled water. It may not be used for standardization purposes 48 h after the time of preparation.

(ii) Standard — Solution B

Pipette exactly 25.00 mL of the well-shaken concentrate into a 500 mL volumetric flask and dilute to the mark with distilled water. Shake thoroughly, transfer to an amber glass-stoppered bottle and prevent exposure to direct sunlight. This solution, properly prepared, contains 0.01 mg of Hg per mL. It may not be used for standardization purposes 48 h after the time of preparation because of its tendency to form mercurous chloride.

- (c) HCl Ether Reagent — Add 2% absolute alcohol to the desired quantity of ether and saturate with dry HCl gas. Only freshly charged ether should be used to obtain complete extraction of the mercury from the sample to be analysed.
- (d) Standardization — Pipette exactly 25.00 mL of standard mercuric chloride solution into a glass-stoppered 100 mL graduated cylinder and add 5 mL of chloroform. Add from a burette 2.0 mL of dithizone titrant, stopper and shake. The agitated solution will take on an orange color. Proceed with the titration as directed using 1.0 mL of titrant at a time. As the titration proceeds, the emulsified mixture will become a brighter and brighter orange. The endpoint is described as that point when a 1.0 mL addition of titrant will cause the first dulling of the bright orange color in the agitated mixture. If the layers are allowed to separate now, it will be seen that the chloroform layer has changed to a brownish-orange color instead of the yellow-orange color it was after the addition of the first few milliliters of dithizone.

PROCEDURE

Weigh from a weighing bottle 100 ± 20 mg of material under test into a test tube equipped with either a glass or cork stopper. Rubber stoppers may not be used since they are attacked by chloroform. The sample size indicated is for materials containing approximately 0.10% Hg. Use a proportionately smaller or larger sample depending upon the expected concentration. Add to the unstoppered tube 20 mL of HCl saturated ether and let stand at room temperature for 30 min with occasional shaking. Add a glass bead or two to the test tube, then place it upright in a beaker containing a sufficient volume of water to half-immersed the contents. Place the beaker on a steam bath. Be sure to watch the ether solution for first signs of boiling, at which time tap the tube gently until the boiling is proceeding smoothly. This step is necessary to prevent loss of mercury by boil-over or spurring. Evaporate off most of the ether but do not evaporate to dryness as this would lead to occlusion of otherwise soluble mercury salts and hence low results. Cool the tube under the tap, add 5 mL chloroform and shake gently to dissolve. Then add 20 mL distilled water and titrate to the dull orange end point as described under "Standardization."

It will be helpful to reserve the complex obtained during the standardization step for comparison with the color of the complexed sample.

CALCULATIONS

25 mL HgCl_2 solution B contains 0.25 mg Hg.

$$\text{Factor A} = \frac{0.00025}{\text{mL Dithizone Solution B used to titrate 25 mL of Standard Hg Cl}_2 \text{ Solution B}}$$

$$\% \text{ Hg} = \frac{\text{mL Dithizone Solution B used} \times \text{Factor A} \times 100}{\text{mass of solution}}$$

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	EXAMINATION OF METAL PANELS FOR EFFECTS OF EXPOSURE TO CORROSION TESTS	METHOD 95.1 October 1982

Supersedes Issue of
August 1974

SCOPE

This method provides a general procedure for assessing painted panels that have been subjected to corrosion and water resistance tests.

PROCEDURE

Where desired, coated panels should be examined at regular intervals because changes during tests are more informative than a single assessment at the end. The period between examinations is governed by the rapidity with which changes take place. The duration of examinations should be kept to a minimum to avoid unnecessary interruption of exposures.

At the completion of the test examine the panels with normal vision and with 10 power magnification, for any effects of the exposure. After this, remove the coating from a representative portion of the panel using 31-GP-277 paint remover or specified solvent and examine the substrate for rust or other corrosion using 10 power magnification.

ASSESSMENT

The appearance of blisters or any other specified undesirable effect, visible under 10 power magnification, shall constitute a failure, except that the occurrence of not more than two small blister patches* of not more than 160 mm² in area each, that do not increase in area during the course of the test, shall not constitute a failure. Corrosion or rust, except around the edges or within the specified width along score lines, shall constitute a failure.

* If these blister patches occur on more than one panel, this is an indication of faulty panel preparation and the test should be repeated.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	PREPARATION OF CEMENT TEST PANELS	METHOD 96.1 October 1982

Supersedes Issue of
August 1974

Prepare a cement-mortar mix consisting of the following materials in parts by mass:

Normal Portland Cement	2
Standard Ottawa Sand (20-30 mesh)	5
Distilled Water	1 ± 0.1

Thoroughly mix the cement with the sand in a mixing box and then add the water, mixing well to form a workable plastic mix.

Molds shall be of nonabsorbent, nonadherent material and of the required size. Metal molds shall be given a thin coat of petrolatum. Wooden molds shall be treated with oil or paraffin wax before use.

Fill each mold with mortar mix and tamp with a smooth nonabsorbent tamper having a cross section of 15 X 40 mm and a convenient length. Tamping shall be done in 15 mm intervals starting in the center and in columns parallel to the side so as to cover progressively the entire area, and then similarly in columns at right angles to the first side. Repeat tamping in both directions once more. Tamping pressure should be just sufficient to insure uniform filling of the mold. The complete operation for a 150 X 150 mm panel should be carried out in about 2 min. No more material should be made than can be placed within 20 min.

On completion of the tamping, the top of the surface of the mortar should extend slightly above the mold. Smooth the surface off by drawing the flat side of a steel trowel once across the mold with the leading edge slightly raised. Then cut the mortar off flush with the top of the mold as follows: move a straight-edged piece of nonabsorbent wood of suitable size from side to side in a sawing motion while gradually drawing it over the length of the mold. Any mortar so removed from the mold should not be used again.

Finish the panels to obtain a stucco or sand finish by smoothing the surface with a wood float or by brushing lightly with a paint brush several times.

Moist cure the panels in their mold for 24 h at $23 \pm 2^{\circ}\text{C}$, covering them with moist burlap. After 24 h remove the panels from their molds, continuing the moist cure for an additional 48 h. Then air dry the panels (Method 103.1) for 72 h before use; they may be kept indefinitely under these conditions.

Panels used in the same tests should be relatively the same age for reproducibility.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	PREPARATION OF MORTAR TEST PANELS FOR OUTDOOR EXPOSURE TESTS	METHOD 96.2 October 1982

Supersedes Issue of
August 1974

Prepare a cement-mortar mix consisting of the following ingredients in parts by mass:

Portland Cement	1 part
Standard Sand (Ottawa, Illinois)	3 parts
Distilled Water	0.46 ± 0.05 parts
Air-entraining Agent	sufficient to entrain $15 \pm 3\%$ air by volume

NOTE: See below for list of applicable material standards.

Mix the cement with sand. Add the air-entraining agent to the water, in accordance with the manufacturer's instructions, and mix thoroughly. Combine all the ingredients to form a mortar and mix vigorously not less than 3 min to ensure proper entrainment of air.

Prepare molds having inside dimensions of 300 X 600 mm and 25 mm deep. If metal molds are used, they shall be suitably protected against corrosion. Wooden molds shall be treated with paraffin wax to make them nonabsorbent. The molds shall be given a thin coat of petrolatum or mineral oil to act as a mold-release agent.

Fill each mold with the mortar mix and tamp with a smooth nonabsorbent tamper having an end cross section of 15 X 40 mm and of convenient length. Tamping shall be done at 15 mm intervals in columns parallel to the length of the mold, progressively covering the entire area. Tamping pressure shall be just sufficient to ensure uniform filling of the molds. The tamping operation shall be carried out in approximately 2 min.

On completion of the tamping, the surface of the mortar should extend slightly above the mold. The surface of the mortar is then smoothed off by drawing a varnished screed, 25 X 100 mm and 450 mm long, across the mold lengthwise in a sawing motion with the 25 mm side of the screed downward.

Complete the tamping and screeding on each mold before proceeding with the next mold.

Allow the mortar panels to harden 24 h in their molds at room temperature. Moist cure the mortar panels 48 h, while still in their molds, in a fog curing-room operated at $21 \pm 3^\circ\text{C}$ and a relative humidity of not less than 90%. Alternatively the panels may be moist-cured by immersing them 48 h in water at $21 \pm 3^\circ\text{C}$.

Remove the panels from their molds and store at room temperature. Prior to use the panels shall be conditioned 72 h under standard conditions (Method 103.1).

Noticeable laitance (a loose powdery deposit) occurring on the screeded face of the panel shall be removed with a stiff-bristle brush, and the surface washed off with clean water and then dried.

NOTE: Portland Cement — CSA A5, Type (a) Normal
— ASTM C 150, Type 1

Standard Sand — 850 μm (No. 20)* sieve,
— 600 μm (No. 30)* sieve
— described in ASTM C 190

* See CGSB 8-GP-1: Sieves, Testing, Woven Wire

Air-Entraining Agent — ASTM C 226

— Any acceptable commercial product, such as:

1. Darex, AEA — W.R. Grace & Co. of Canada Ltd., Dewey and Almy Division, La Salle, Quebec.
2. NVR, AEA — Sternson Ltd., Brantford, Ontario
3. MB-VR, AEA — Master Builders Co. Ltd., Toronto, Ontario

Withdrawn/Retirée

Canadian General Standards Board

CGSB Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments PREPARATION OF WOODEN PANELS GENERAL CONDITIONS	CGSB 1-GP-71 METHOD 97.1 August 1974
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Supersedes Issue of
February 1972

Species	lb/ft ³ *	kg/m ³	Rings/in. (25 mm)
Western Red Cedar (<i>Thuja plicata</i> Donn)	20 - 30	32 - 48	10 min
White Pine (<i>Pinus strobus</i> L.)	23 - 27	39 - 43	10 "
Ponderosa Pine (<i>Pinus ponderosa</i> Laws)	27 - 29	43 - 46	15 "
Douglas Fir (<i>Pseudotsuga menziesii</i>)	30 - 34	48 - 54	10 "
Yellow Birch (<i>Betula alleghaniensis</i>)	40 - 44	64 - 70	10 - 22
White Oak (<i>Quercus alba</i> L.)	43 - 48	69 - 77	10 - 25

It is suggested that the ring count be recorded as part of the test data.

The wood shall be heartwood having flat grain, defined as that in which the annual growth rings intersect the planed surface at an angle of 30° or less.

Panels for accelerated weathering shall be 6 x 2-3/4 x 3/8 in. (150 x 70 x 10 mm). Panels for outdoor exposure shall measure not less than 3/4 x 6 x 12 in. (20 x 150 x 300 mm). Beveled outdoor panels may have a thickness of 3/16 in. (5 mm) at the upper edge and 1/2 in. (13 mm) at the lower edge.

The faces and edges, especially the end grain, shall be smoothly sanded and thoroughly clean before being coated. The edges of the face of each panel shall be rounded.

Before application of any specified material, the ends of the panels intended for exposure tests are first dipped in a sealer made by reducing 1-GP-99 varnish to about 0.2 stoke (A-2 Gardner-Holdt Tube) and allowed to dry 24 h.

Coatings shall be applied under proper conditions of viscosity and control to produce films of uniform thickness over the entire panel. The films shall be smooth and free from streaks and other irregularities or imperfections. Care shall be taken to avoid settling and embedding of dust particles during panel preparation and drying.

Panels shall be air dried according to Method 103.1. If more than one coat or one material are to be applied, the drying interval before the next application shall be as follows:

Type of Finish	Drying Interval (h)
Primers - Oil	48
- Oleoresinous and Alkyd	18
Exterior Oil Paints	48
Exterior Stains	48
Oleoresinous and Alkyd Flats	18
Enamels, Gloss and Semigloss	18
Aluminum Pigment Finishes	18
Pigmented Sealers	18
Lacquers	1
Paint; Flat, Exterior, Latex Type	2

* Under standard conditions.

Panels for accelerated weathering shall be coated on the back and edges with 1-GP-93 aluminum paint. Panels for outdoor exposure may be treated similarly on the back, or both face and back may be coated with the system under test as desired.

Withdrawn/Retirée

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	BRUSH APPLICATION PREPARATION OF WOODEN PANELS	METHOD 97.2 October 1982

Supersedes Issue of
August 1974

Apply the material to the specified panels according to the conditions and drying times given in Method 97.1 and at the following spreading rates, unless otherwise specified:

Type of Finish	First Coat Spreading Rate m ² /L	Second Coat Spreading Rate m ² /L
Exterior Enamels	14.5-16.5	14.5-16.5
Exterior Emulsion Finishes	11.5-15.5	11.5-15.5
Exterior Oil Paints, Solid Colors	16.5-19.5	16.5-19.5
Exterior Oil Paints, Whites and Tints	15.5-17.5	15.5-17.5
Exterior Stains	12.5-14.5	21.5-23.5
Aluminum Pigment Finishes	17.5-20.5	17.5-20.5
Exterior Oil Primers	10.5-12.5	---
Alkyd and Oleoresinous Primers	12.5-14.5	---
Alkyd and Oleoresinous Varnishes	14.5-16.5	15.5-17.5

Place a convenient amount of well-mixed material in a small container and weigh together with the paint brush. Transfer the material to the panel and brush uniformly over the entire face until the calculated amount has been applied.

Calculate the amount to be applied from the formula:

$$\text{Mass of material (g)} = \frac{A \times D}{SR} \times 1000$$

where A = Area (m²)

D = Density of the material (g/mL)

SR = Spreading rate (m²/L)

Then coat the edges of the panel. After the specified drying interval, apply subsequent coats in the same manner unless otherwise specified.

Paint brushes shall conform to CGSB 22-GP-1. Use a 25 mm brush for applying paint to a 75 × 150 mm test panel, and a 50 or 75 mm brush for larger panels.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	PREPARATION OF WOODEN PANELS SPRAY APPLICATION	METHOD 97.3 October 1982

Supersedes Issue of
August 1974

Apply the material to the specified panels according to the conditions and drying times given in Method 97.1 and to give the dry-film thickness specified in Method 98.2.

The spray equipment may be manual or automatic. Before spraying, strain the material as directed in Method 98.1. Determine film thickness by including steel panels among the wood panels being coated, taking care to spray all panels in the same manner. Spray the edges of the panels at the same time as the face. Apply subsequent coats in the same manner, using fresh steel panels, unless otherwise specified.

After drying for the appropriate interval, measure the dry-film thickness (Method 128.1) on the steel panels and record as the probable film thickness on the wood panels. If the films on the steel panels do not fall within the thickness limits, reject the wood panels and repeat the panel preparation until the correct film thickness is obtained.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments COATING OF METAL AND GLASS PANELS FOR TEST PURPOSES GENERAL PROCEDURES FOR APPLYING PAINTS FOR THE PREPARATION OF TEST PANELS AND FILMS	CGSB 1-GP-71 METHOD 98.1 October 1982
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Supersedes Issue of
August 1974

Steel, aluminum, tin-plate and glass panels are selected and prepared as follows:

Panel	Procedure
Steel	Method 100.1
Aluminum	Method 99.1 or 99.2
Tin-plate	Method 101.1
Glass	Method 102.1

Apply coatings to the type of panel specified, by one of the following methods:

Dip coating	
Drawblade	— manual
	— automatic
Spraying	— manual
	— automatic
Flow-coating	

Brushing shall not be used for the preparation of test panels by this method.

Before spraying, strain the material* through a suitable device with openings not greater than 0.25 mm; e.g., standard 60 X 48 cotton cheesecloth, or 250 µm (No. 60) standard stainless steel testing sieve (CGSB 8-GP-1).

Apply the material under test under proper conditions of viscosity and control to produce films of uniform thickness and appearance over the entire panel within the specified tolerance. The films shall be smooth and free from orange peel, pinholes, streaks or other irregularities or imperfections. Take care to avoid settling and embedding of dust particles during panel preparation and drying.

Air dry panels under the general conditions described in Method 103.1, or bake under the general conditions described in Method 103.2, as specified. Details of the preparation of baked panels are given in Method 98.5

Protect the backs and edges of the panels prepared for corrosion tests, aqueous immersions and weathering tests with the material under test or other suitable coating, the edges being dipped to produce a narrow bead.

* Do not strain material containing coarse aggregate as required by the applicable standard before testing.

Measure the film thickness by the appropriate procedure (Method 128.1) and record. Reject all panels on which the required film thickness is not obtained and panels on which the thickness varies by more than $\pm 10\%$ of the nominal value.

REMARKS: Dip-coating is suitable for the preparation of panels which are very uniform in thickness, on one panel or within a set of panels.

Drawblade application, either manually or preferably with a mechanically driven device is very suitable for preparing uniform films on glass or tin-plate. When free films are required, draw-downs can first be made on tin-foil or photographic paper which is kept flat by a vacuum plate. Fixed clearance blades are normally used but where a specified thickness cannot be obtained with them an adjustable blade may be used. Adjustments to the latter type require great care and should be checked at both ends of the gate by means of a micrometer.

Additional information may be obtained from ASTM D 823, Methods of Producing Films of Uniform Thickness of Paint, Varnish, Lacquer and Related Products on Test Panels. This publication describes various procedures for dipcoating, spraying and drawing.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	COATING OF METAL AND GLASS PANELS FOR TEST PURPOSES	METHOD 98.2
	PANELS WITH ONE COAT OF MATERIAL	August 1974

Supersedes Issue of
August 1970

Apply one coat of the material to the specified panels, prepared as directed in Method 98.1, to give the following dry-film thickness, unless otherwise specified:

TYPE OF FINISH	CGSB STANDARD	DRY FILM THICKNESS	
		Mils*	µm**
Exterior Oil Paints	1-GP-28, Type 1	1.8 ± 0.15	46 ± 4
	1-GP-41	1.8 ± 0.15	46 ± 4
	1-GP-109	1.8 ± 0.15	46 ± 4
Alkyd House Paint	1-GP-28, Type 2	1.2 ± 0.15	30 ± 4
Ferrous Metal Primers	1-GP-14	1.8 ± 0.15	46 ± 4
	1-GP-40	1.4 ± 0.15	36 ± 4
	1-GP-48	1.4 ± 0.15	36 ± 4
	1-GP-81	1.4 ± 0.15	36 ± 4
	1-GP-105	1.4 ± 0.15	36 ± 4
	1-GP-140	1.4 ± 0.15	36 ± 4
	1-GP-166, Types 1, 2 & 3	1.4 ± 0.15	36 ± 4
Nonferrous Metal Primers	1-GP-132	0.35 ± 0.05	9 ± 1
	1-GP-158	0.35 ± 0.05	9 ± 1
	1-GP-178	1.5 ± 0.2	38 ± 5
Wood Primers	1-GP-55	1.8 ± 0.15	46 ± 4
	1-GP-84	1.4 ± 0.15	36 ± 4
	1-GP-125	1.4 ± 0.15	36 ± 4
	1-GP-189	1.4 ± 0.15	36 ± 4
Primer Sealers and Undercoaters	1-GP-38	1.4 ± 0.15	36 ± 4
	1-GP-68	1.4 ± 0.15	36 ± 4
Enamels and Paints, Flat	1-GP-47	1.4 ± 0.15	36 ± 4
	1-GP-114	1.4 ± 0.15	36 ± 4
	1-GP-118	1.4 ± 0.15	36 ± 4
	1-GP-135	1.4 ± 0.15	36 ± 4
	1-GP-148	1.4 ± 0.15	36 ± 4
Enamels, Gloss and Semigloss, Interior and Exterior	1-GP-29 and 1-GP-52	1.2 ± 0.15	30 ± 4
	1-GP-57 and 1-GP-59	1.2 ± 0.15	30 ± 4
	1-GP-60 and 1-GP-61	1.2 ± 0.15	30 ± 4
	1-GP-66 and 1-GP-73	1.2 ± 0.15	30 ± 4
	1-GP-76 and 1-GP-88	1.2 ± 0.15	30 ± 4
	1-GP-98 and 1-GP-101 ...	1.2 ± 0.15	30 ± 4
	1-GP-104 and 1-GP-116 ..	1.2 ± 0.15	30 ± 4
	1-GP-117 and 1-GP-167 ..	1.2 ± 0.15	30 ± 4
	1-GP-191 and 1-GP-194 ..	1.2 ± 0.15	30 ± 4
Vinyl Coatings	1-GP-121	0.3 ± 0.05	8 ± 1
	1-GP-122	1.1 ± 0.1	28 ± 3
	1-GP-123	1.4 ± 0.15	36 ± 4
	1-GP-182	1.1 ± 0.1	28 ± 3
Epoxy Coatings	1-GP-146	1.5 ± 0.2	38 ± 5
	1-GP-153	5.0 ± 0.5	127 ± 13
	1-GP-165, Type 1	1.4 ± 0.15	36 ± 4
	1-GP-165, Type 2	0.7 ± 0.1	18 ± 3
	1-GP-183	2.5 ± 0.15	64 ± 4
	1-GP-184	8.0 ± 0.5	203 ± 13

* Mil = 0.001 inch
** µm = micrometers

TYPE OF FINISH	CGSB STANDARD	DRY FILM THICKNESS	
		Mils*	µm**
Polyurethane Coatings	1-GP-175	1.0 ± 0.1	25 ± 3
	1-GP-176	1.2 ± 0.15	30 ± 4
	1-GP-177	1.2 ± 0.15	30 ± 4
	1-GP-180	1.2 ± 0.15	30 ± 4
Pigmented Emulsion Finishes	1-GP-100	1.0 ± 0.1	25 ± 3
	1-GP-119	1.0 ± 0.1	25 ± 3
	1-GP-138	1.0 ± 0.1	25 ± 3
	1-GP-154	1.0 ± 0.1	25 ± 3
Aluminum Pigmented Finishes	1-GP-69	0.9 ± 0.1	23 ± 3
	1-GP-93	0.9 ± 0.1	23 ± 3
	1-GP-141	1.0 ± 0.1	25 ± 3
	1-GP-143	1.0 ± 0.1	25 ± 3
Oleoresinous and Alkyd Varnishes	1-GP-19	0.85 ± 0.1	22 ± 3
	1-GP-36	0.85 ± 0.1	22 ± 3
	1-GP-99	0.85 ± 0.1	22 ± 3
Lacquers, Clear and Pigmented	1-GP-111, Hot Spray	1.0 ± 0.1	25 ± 3
	1-GP-111, Cold Spray ...	0.6 ± 0.1	15 ± 3
	1-GP-112	0.6 ± 0.1	15 ± 3
	1-GP-129	0.6 ± 0.1	15 ± 3
	1-GP-134	0.6 ± 0.1	15 ± 3
	1-GP-155	0.6 ± 0.1	15 ± 3
	1-GP-156	0.4 ± 0.05	10 ± 2
	1-GP-158	0.35 ± 0.05	9 ± 2
	1-GP-159	0.6 ± 0.1	15 ± 3
	1-GP-160	0.6 ± 0.1	15 ± 3
Stains, Spirit Varnishes, Unpigmented Sealers	1-GP-16	0.4 ± 0.05	10 ± 2
	1-GP-43	0.4 ± 0.05	10 ± 2
	1-GP-102	0.4 ± 0.05	10 ± 2
	1-GP-126	0.4 ± 0.05	10 ± 2
	1-GP-128	0.4 ± 0.05	10 ± 2
	1-GP-131	1.0 ± 0.1	25 ± 3
	1-GP-142	0.4 ± 0.05	10 ± 2
	1-GP-145	0.4 ± 0.05	10 ± 2
Bituminous Finishes	1-GP-108	1.1 ± 0.1	28 ± 3
	1-GP-127	1.8 ± 0.2	46 ± 5
Traffic Paints	1-GP-74	1.4 ± 0.15	36 ± 4
	1-GP-149	1.4 ± 0.15	36 ± 4
Miscellaneous Coatings			
Inorganic Zinc Coating	1-GP-171	3.0 ± 0.5	76 ± 13
Zinc Rich Organic Coating	1-GP-181	3.0 ± 0.5	76 ± 13

* Mil = 0.001 inch

** µm = micrometers

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	COATING OF METAL AND GLASS PANELS FOR TEST PURPOSES PANELS WITH TWO COATS OF THE SAME MATERIAL	METHOD 98.3 October 1982

Supersedes Issue of
August 1974

Apply one coat of the material to the specified panels prepared by the procedures listed in Method 98.1, and in the film thickness specified in Method 98.2

When the first coat of the material has dried for the time interval listed below, apply a second coat to produce an additional film of the thickness specified in Method 98.2.

TYPE OF FINISH	CGSB STANDARD	DRYING INTERVAL (h) BEFORE RECOATING
Exterior oil Paints	1-GP-28	18
	1-GP-109	48
Enamels and Paints, Flat	1-GP-47	18
	1-GP-118	18
	1-GP-135	18
	1-GP-202	18
	1-GP-52	18
Enamels, Gloss and Semi-Gloss, Interior and Exterior	1-GP-57 and 1-GP-59	18
	1-GP-60 and 1-GP-61	18
	1-GP-66 and 1-GP-73	18
	1-GP-88, Type 1	18
	1-GP-98, Type 1 and 1-GP-101	18
	1-GP-104 and 1-GP-116	18
Vinyl Coatings	1-GP-123	1
	1-GP-182	1
	1-GP-199	24
Epoxy Topcoats	1-GP-146	6
	1-GP-153	18
	1-GP-183	24
	1-GP-184	24
	1-GP-193	24
Polyurethane Coatings	1-GP-175	6
	1-GP-176	18
	1-GP-177	6
	1-GP-180	6
Pigmented Emulsion	1-GP-100	2
	1-GP-138	2
	1-GP-154	4
Aluminum Pigmented Finishes	1-GP-69	18
	1-GP-93	18

TYPE OF FINISH	CGSB STANDARD	DRYING INTERVAL (h) BEFORE RECOATING
Oleoresinous and Alkyd Varnishes	1-GP-36	18
	1-GP-99	18
Lacquers, Clear and Pigmented	1-GP-111	1
	1-GP-129	1
	1-GP-134	1
	1-GP-155	1
	1-GP-156	1
	1-GP-159	1
	1-GP-160	1
Stains, Spirit Varnishes, Unpigmented Sealers	1-GP-16	1
	1-GP-128	1
	1-GP-145, Type 1	18
	Type 2	18
Bituminous Finishes	1-GP-204	18
	1-GP-108	18
	1-GP-127	18

Withdrawn/Retirée

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	COATING OF METAL AND GLASS PANELS FOR TEST PURPOSES PRIMED PANELS	METHOD 98.4 August 1974

Supersedes Issue of
March 1971

Select and clean the specified panels as in Method 98.1 and apply the specified primer or sealer in the film thickness specified in Method 98.2.

Dry the primer or sealer film under standard conditions (Method 103.1) for the following time interval, unless otherwise specified.

PRIMER	CGSB STANDARD	DRYING INTERVAL (h)
Ferrous Metal Primers	1-GP-14	48
	1-GP-40	18
	1-GP-48	18
	1-GP-81, Type 1	6
	1-GP-105	1
	1-GP-140	18
	1-GP-166, Type 1	48
	Type 2	24
	Type 3	18
Nonferrous Metal Primers	1-GP-132	3/4
	1-GP-158	1
	1-GP-178	18
Wood Primers	1-GP-55	48
	1-GP-84	18
	1-GP-125	18
	1-GP-189	18
Primer Sealers and Undercoaters	1-GP-38	18
	1-GP-68	18
Vinyl Primers	1-GP-121	1/2
	1-GP-122	1
Epoxy Primers	1-GP-165, Type 1	24
	Type 2	24
Pigmented Emulsion Primers	1-GP-119	2
Unpigmented Sealers	1-GP-102	18
	1-GP-126	24

At the end of the appropriate drying interval apply the specified topcoat in the film thickness specified in Method 98.2.

Allow the topcoated panels to dry and condition (Method 103.1) for the specified time, after which they are ready for the intended tests.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	COATING OF METAL AND GLASS PANELS FOR TEST PURPOSES PREPARATION OF BAKED PANELS	METHOD 98.5 August 1974

Supersedes Issue of
December 1959

Prepare panels as in Methods 98.2, 98.3 or 98.4, as specified, except that the coatings shall be baked. Air dry coatings for 30 min before the baking, which shall be for the specified time at the specified temperature.

When more than one coat is applied, bake each preliminary coat 5 min at 121°C (250°F) to set up the film. Then bake the complete system for the specified time at the specified temperature.

Withdrawn / Retirée

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	PREPARATION OF ALUMINUM PANELS PLAIN PANELS	METHOD 99.1 October 1982

Supersedes Issue of
August 1974

Unless otherwise specified, use 24 ST Alclad aluminum panels*, 75 × 150 mm by 0.5 ± 0.1 mm thick (No. 24 to No. 26 U.S. Standard Plate Gauge). The panels shall be free from scratches, bends or any other defects. Remove surface dirt or grease by wiping with tissue or clean rags, then clean the panels in accordance with ASTM D 609, Method B or C.

REFERENCE: Preparation of Steel Panels for Testing Paint, Varnish, Lacquer, and Related Products, ASTM D609.

Withdrawn/Retirée

* Alclad aluminum panels that meet U.S. Federal Specifications QQ-A 362, Alclad 2024 Aluminum Alloy Plate and Sheet, are considered suitable.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	PREPARATION OF ALUMINUM PANELS	METHOD 99.2
	CHROMIC ACID ANODIZED ALUMINUM PANELS	August 1974

Supersedes Issue of
December 1968

The clean panels (Method 99.1) shall be treated electrochemically as in CGSB 31-GP-102, Films, Oxides, Electrochemically Produced on Aluminum and Aluminum Alloys, using the chromic acid method*.

The panels shall be packaged with white tissue paper interleaving, wrapped in a suitable water-resistant packaging material and then in kraft paper, or placed in a cardboard box (which will permit labelling). The packages should be stored unopened until used, but may be opened and resealed**.

The panels as received shall be clean and ready for use, and adequate precautions shall be taken in handling to avoid contamination such as fingerprinting. If any panels are soiled they should be discarded. If holes are needed to facilitate handling, they should be drilled before anodizing.

* Panels may be anodized in suitable equipment, or anodized aluminum panels may be obtained commercially from manufacturers or suppliers of aluminum sheeting. Aluminum-clad aluminum alloy conforming to U.S. Federal Specification QQ-A-362, anodized in accordance with Specification MIL-A-8625, Type I (Chromic Acid Type), have been found suitable for this purpose and are available from: The Metaspec Company, P.O. Box 28125, San Antonio, Texas, U.S.A.

** Anodized aluminum panels are believed to be stable and not to undergo change during storage. However, it is recommended that fresh panels be used for referee purposes.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	PREPARATION OF STEEL PANELS SOLVENT CLEANED, UNABRADED	METHOD 100.1 October 1982

Supersedes Issue of
August 1974

Steel test panels shall be 70 × 150 mm unless otherwise specified, and shall meet the requirements of ASTM D 609, except that the thickness of the panels shall be 0.8 ± 0.05 mm (No. 21 to No. 23 U.S. Standard Plate Gauge).

The panels shall be packaged for shipment by the supplier in accordance with ASTM D 609.

The panels shall be solvent cleaned, prior to using, in accordance with the procedure described in ASTM D 609, using either Method B, Vapor Degreasing or Method C, Solvent Spray Cleaning.

REFERENCE: Preparation of Steel Panels for Testing Paint, Varnish, Lacquer, and Related Products, ASTM D 609.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	PREPARATION OF STEEL PANELS SAND OR GRIT BLASTED	METHOD 100.2 October 1982

Supersedes Issue of
August 1974

Prepare the test panels from new, rust-free, SAE 1010 hot-rolled steel measuring 1.5 to 1.6 mm in thickness and, at least 100 X 150 mm in size. Prior to blast cleaning, thoroughly degrease the panels according to ASTM D 609, Method B, C or D.

Blast clean the panels with either clean dry silica sand or clean dry alumina grit to a uniform "white metal" appearance. Alternatively blast-cleaned panels may be obtained commercially.*

The surface roughness characteristics of the blasted steel surfaces shall meet the following requirements:

- (1) The center line average (CLA)** shall be in the range 5.5 to 7 μm as measured on a Tally-Surf No. 4 Instrument*** or equivalent. The travel length of the instrument shall be not less than 2.5 mm.
- (2) The surface profile peak to valley shall not exceed 40 μm .

Measurements are to be made at 5 different points on each test panel and the average reported.

Clean the panels to remove blast dust immediately after the blast cleaning operation, and unless the panels are to be used immediately, wrap them in rust inhibitive paper such as paper impregnated with dicyclohexylammonium nitrite, or its equal and seal in a waterproof bag or envelope. Commercially prepared panels, as received, shall be clean and ready for use and shall be packaged in accordance with ASTM D 609. The packaged panels shall be unwrapped only immediately prior to use. Care shall be taken during handling of the panels to avoid such contamination of the test surface as fingerprints.

REFERENCE: Preparation of Steel Panels for Testing Paint, Varnish, Lacquer, and Related Products, ASTM D 609.

* Commercially prepared panels are available from:
Imco Laboratories Inc.
1800 Broadway
Buffalo, N.Y. 14212

** Center Line Average (CLA) used in British Standards is equivalent to Arithmetical Average (AA) used in U.S. Standards.

*** The Tally Surf No. 4 Instrument is available from:
Rank Precision Industries (Canada) Ltd.
Unit 34-1111 Finch Avenue, West
Downsview, Ontario, Canada

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	PREPARATION OF STEEL PANELS PHOSPHATED PANELS	METHOD 100.3 October 1982

Supersedes Issue of
August 1974

Use steel test panels conforming to ASTM A 366, which have been chemically treated* to produce a uniform zinc phosphate coating of not less than 0.16 mg/cm^2 and not more than 0.32 mg/cm^2 and which are $100 \times 150 \text{ mm}$ (unless otherwise specified), and $0.9 \pm 0.05 \text{ mm}$ (No. 20 to No. 21 U.S. Standard Plate Gauge) in thickness.

The panels as received shall be free from scratches, bends and other visible defects, and shall be clean and ready for use. Retain the panels in their original packaging until they are used. Take adequate precaution in handling the panels to avoid contamination such as finger printing. Panels that become soiled shall be discarded.

REFERENCE: Specifications for Steel, Carbon, Cold-Rolled Sheet, Commercial Quality, ASTM A 366.

Withdrawn/Retired

* The zinc phosphate coating shall comply with Coating: Conversion, Zinc Phosphate, for Paint Base, 31-GP-105.

** Coating mass — When authorized by the purchaser, a minimum coating mass of 13.5 mg/dm^2 will be acceptable when the coating is applied by fully mechanized spray equipment as used in automotive component production. A list of suppliers of phosphated steel panels will be supplied by CGSB upon request.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	PREPARATION OF TIN-PLATED PANELS ABRADED AND UNABRADED PANELS	METHOD 101.1 October 1982

Supersedes Issue of
August 1974

PANEL DESCRIPTION

Cut tin-plate panels from flow-brightened electro-tin-plate (primes) that has a coating mass of tin of 113 g per base box and a coating thickness on each side of 0.4 μm .

The steel sheet shall be between 235 to 255 μm * in thickness. The steel shall be stabilized aluminum-killed steel with a temper that will permit uniform bending around a 12.7 mm mandrel without kinking. Unless otherwise specified, panels shall be 75 × 150 mm with the longer dimension parallel to the rolling lines in the sheet.

PANEL PREPARATION

(1) Unabraded Panels

Clean the panels by one of the procedures described under Methods B or C of ASTM D 609. It is important that after cleaning with solvent the panels be rubbed vigorously with a clean lintless cloth to assist in obtaining the specified no-water-break condition.

(2) Abraded Panels

Wipe the panels with one of the solvent mixtures described in ASTM D 609 and then dry with a clean, dry, lintless cloth.

Abrade the panels, lengthwise, with even light strokes along the entire length of the panel using 30-GP-12 No. 400 silicon carbide paper. Continue abrading until the abraded surface meets the following 60° gloss requirements:

- Along the abrasion lines-the gloss reading shall be between 60 and 85 units with the range of 6 measurements not greater than 15 units.
- Across the abrasion lines-the gloss reading shall be between 20 and 45 units with the range of 6 measurements not greater than 10 units.

Carry out gloss measurements in accordance with ASTM Method D 523 except adjust the gloss meter to read 25 units on a black Carrara glass primary standard. A practical abrading test has shown that approximately 12 complete, back and forth strokes, produced the required gloss readings.

* Equivalent to 32-33 gauge (U.S. Standard Plate Gauge)

Clean the abraded panels by one of the procedures described under Methods B or C of ASTM D 609, rub the panel vigorously with a clean, lintless cloth and check for no-water-break. If that condition is not obtained, clean the panels with a 2-GP-9M Type B scouring powder (which contains a mild abrasive and detergent), or similar scouring powder, rinse thoroughly with distilled water, wipe the panels dry and check for no-water-break. If necessary, repeat the scouring powder cleaning until the no-water-break condition is obtained.

Handle the panels by the edges only to avoid contaminating the test surface with finger marks

REFERENCE: Preparation of Steel Panels for Testing Paint, Varnish, Lacquer, and Related Products, ASTM D 609.
Standard Test Method for Specular Gloss, ASTM D 523.

Withdrawn/Retirée

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	PREPARATION OF GLASS PANELS	METHOD 102.1 October 1982

Supersedes Issue of
August 1974

Prepare plate-glass panels of suitable size as follows:

Remove all paint, oil and grease from the panels by soaking in lacquer thinner and rubbing with a soft bristle brush. Avoid scraping the surface with a spatula, sandpaper, or other instrument or treatment that might scratch or etch the glass surface.

Clean the panels thoroughly by any desired means until they show no water-breaks in a vertical position. Rinse thoroughly with denatured alcohol or isopropanol and allow to air dry in a chamber free from dust.

Glass panels may be stored for an indefinite period of time before use provided they are protected by being wrapped in clean cloth or paper.

Withdrawn/Retiré

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	DRYING CONDITIONS	METHOD 103.1
	AIR DRYING	May 1979

Supersedes Issue of
August 1974

Conduct all air drying in a well-ventilated room or chamber, free from direct drafts, dust, products of combustion, laboratory fumes and with no direct sunlight on the panels.

Unless otherwise specified, use a temperature of $23 \pm 2^{\circ}\text{C}$ and a relative humidity of $50 \pm 5\%$.

Withdrawn/Retirée

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	DRYING CONDITIONS	METHOD 103.2
	OVEN DRYING	May 1979

Supersedes Issue of
August 1974

Unless otherwise specified, all oven drying or baking tests shall be made in an oven capable of maintaining the specified within $\pm 2^{\circ}\text{C}$. When a full load of coated panels is placed in the oven, it shall recover the specified temperature within 5 min and shall remain well-ventilated throughout the test.

Withdrawn/Retirée

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	DRYING CONDITIONS LOW-TEMPERATURE CONDITIONING IN AIR	METHOD 103.3 May 1979

Supersedes Issue of
August 1974

Use a low-temperature cabinet that has controls sensitive enough to meet the requirements of the specified test methods. Where the sensitivity is not specified use a range of $\pm 2^{\circ}\text{C}$.

Protect samples from direct contact with the lining of the cold chamber. A suitable device for this purpose is a grating of 25 mm x 40 mm varnished pieces of hardwood, secured at 25 mm intervals to 50 mm x 50 mm supports which in turn are in contact with the metal base of the cabinet. This wooden support will place the sample approximately 75 mm from the base of the cabinet and will allow free circulation of air around the sample.

Withdrawn/Retiré

Canadian General Standards Board

CGSB Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	ABRASION RESISTANCE	METHOD 104.1 August 1974

Supersedes Issue of
June 1972

SCOPE

This method is intended for determining the abrasion resistance of coatings by the falling abrasive method.

APPARATUS AND MATERIALS

- (a) Abrasion Tester, as defined in ASTM D 968 but modified at the top of the guide tube by means of a disk so as to control the rate of flow of the abrasive*.
- (b) Silicon Carbide, No. 16 grade, which has approximately the following sieve analysis:

8-GP-1 Sieve Designation	% Material (on each sieve)	
	Passed	Retained
2.36 mm (No. 8)	100 min	
2.00 mm (No. 10)	99.5 min	0.5 max
1.40 mm (No. 14)	80 min	10 min
1.18 mm (No. 16)	--	75 min
850 μ m (No. 20)	--	100 min

Fresh abrasive shall be allowed to fall through the tube once before it is used on a test sample. After the abrasive has been used several times, it shall be resieved to remove fines caused by shattering of the abrasive.

- (c) Plate Glass Panels, at least 6 x 6 in. (15 x 15 cm).

PROCEDURE

Apply the material (Method 98.2 or 98.3) to a clean glass panel (Method 102.1) to provide a film not less than 3 x 5 in. (75 x 125 mm) in area. Allow the material to dry 7 d (Method 103.1).

Subject it to the abrasion test performed according to ASTM D 968 except that No. 16 silicon carbide is used as the abradant and the rate of flow is 10 ± 1 g/s. It is important that the center of abrasion and the abraded area be as specified in the method. If patterns other than those described are obtained, the tube is not correctly aligned.

Pour the abrasive into the funnel at as constant a rate as possible, with the least disruption of flow until a 5/32 in. (4 mm) diameter area of the material is removed. As the end point is approached, small increments of silicon carbide may be used. Measure the weight of abrasive required to expose this area. Make at least 3 determinations on each panel and report the mean.

* A metal washer with a hole diameter of about 8.5 mm has been found to produce the specified rate of flow.

Canadian General Standards Board

CGSB Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	ACID RESISTANCE PAINT FILMS ON STEEL PANELS	METHOD 105.1 June 1980

Supersedes Issue of
May 1979

Coat (Method 98.2) steel panels selected and prepared as specified in Method 100.1 with the sample to give a dry film $25 \pm 3 \mu\text{m}$ thick and allow to dry under standard conditions (Method 103.1) for 24 h. Apply pools of 1:3 sulfuric, 1:2 nitric and 1:1 hydrochloric acids, cover with watch glasses and allow to remain in contact for 6 h at standard temperature. At the end of that time remove the liquid; wash the surface under a gentle stream of water, dry for 2 h and examine for any change in appearance. Remove the paint by solvent and examine the panel for corrosion.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	ACID RESISTANCE ENAMEL FILMS ON GLASS PANELS	METHOD 105.2 May 1979

Supersedes Issue of
August 1974

Apply the material to glass panels (Method 102.1) approximately 15 cm x 15 cm by means of an applicator (Method 98.2) to give a film at least 10 cm x 10 cm, and dry for 48 h unless otherwise specified. Dry under standard conditions (Method 103.1).

Fill a 60 mm diameter watch glass having a smooth edge with a 5% by mass sulfuric acid solution (10 mL sulfuric acid sp gr 1.84 and 335 mL distilled water). Place the coated glass panel over the watch glass to form a tight seal. Invert the panel and glass and allow the solution to remain in contact with the film for the specified time under standard conditions. Remove the watch glass by gently prying or under vacuum. Rinse the panel with distilled water and allow the film to dry 2 h. Examine the film for softening and loss of adhesion, disregarding the line of contact of the watch glass.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	ALKALI RESISTANCE AIR-DRIED FILMS	METHOD 106.1 May 1979

Supersedes Issue of
August 1974

Apply the material to glass panels (Method 102.1) approximately 15 cm x 15 cm by means of an applicator (Method 98.2) to give a film at least 10 cm wide, and allow to dry for the specified length of time under standard conditions (Method 103.1).

Fill a 60 mm diameter watch glass having a smooth edge with NaOH solution of the specified concentration, and place the panel over the watch glass to form a tight seal. Invert the panel and glass and allow the solution to remain in contact with the film at $23 \pm 2^{\circ}\text{C}$.

At the end of the specified time remove the watch glass by gently prying or under vacuum. Rinse the panel with distilled water, allow the film to dry 30 min, and examine it disregarding the line of contact of the watch glass.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	ALKALI RESISTANCE BAKED FILMS	METHOD 106.2 May 1979

Supersedes Issue of
August 1974

Apply the material to glass panels (Method 102.1) approximately 15 cm x 15 cm by means of an applicator (Method 98.2) to give a dry film at least 10 cm x 10 cm and allow to dry 18 h under standard conditions (Method 103.1). Bake the film for the specified time and specified temperature, remove it from the oven and allow to cool to room temperature.

Fill a 60 mm diameter watch glass having a smooth edge with NaOH solution of the specified concentration, and place the panel over the watch glass to form a tight seal. Invert the panel and glass and allow the solution to remain in contact with the film at $23 \pm 2^{\circ}\text{C}$.

At the end of the specified time remove the watch glass by gently prying or under vacuum. Rinse the panel with distilled water and examine. Allow the film to dry for the specified time, and re-examine, disregarding the line of contact of the watch glass.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	ALKALI RESISTANCE EMULSION PAINTS	Method 106.3 May 1978

Supersedes issue of
August 1974

Apply (Method 98.2) two coats of material to the smooth side of a laminated fiberboard panel such as beaver-board. Allow a 2 h drying interval between coats. Dry the panel 7 d (Method 103.1) after application of the final coat.

Fill a smooth-edged watch glass approximately 65 mm diameter, with NaOH solution of the specified concentration. Place the coated test panel over the watch glass to form a tight seal. Invert the panel, holding the watch glass tightly against the panel.

Allow the NaOH solution to remain in contact with the film for the specified time at $23 \pm 2^{\circ}\text{C}$. At the end of this time remove the watch glass by gentle prying, rinse the panel with distilled water and examine the film immediately.

Allow the panel to dry 3 h and again examine the treated area. Disregard the line of contact of the watch glass in the examinations.

Withdrawn

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	GASOLINE RESISTANCE	METHOD 107.1
	AIR-DRIED FILMS	May 1979

Supersedes Issue of
August 1974

Apply (Method 98.2) one coat of the material to clean steel panels (Method 100.1). Unless otherwise specified, allow the coated panels to dry for 7 d under standard conditions (Method 103.1). At the end of this drying period immerse the panels to half their length in a covered glass beaker containing hydrocarbon test fluid, consisting of 70 parts by volume of reagent grade iso-octane and 30 parts by volume of reagent grade toluene, at a temperature of $23 \pm 2^{\circ}\text{C}$. At the end of the specified immersion, remove the panels and examine them immediately. Allow the panels to dry for 2 h under standard conditions and re-examine them.

Withdrawn/Retired

Canadian General Standards Board

CGSB Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	GASOLINE RESISTANCE BAKED FILMS	METHOD 107.2 August 1974

Supersedes Method 107.2
October 1973 and
Method 107.3
October 1958

Apply (Method 98.2) one coat of the material to clean steel panels (Method 100.1). Air dry for the specified time and then bake at the specified temperature for the specified time. Condition under standard conditions (Method 103.1) for 24 h. Immerse the panels to half their length in a covered glass beaker containing hydrocarbon test fluid, consisting of 70 parts by volume of reagent grade iso-octane and 30 parts by volume of reagent grade toluene at a temperature of $23 \pm 2^{\circ}\text{C}$ ($73 \pm 3.5^{\circ}\text{F}$). At the end of the specified immersion, remove the panels and examine them immediately. Allow the panels to dry for 2 h under standard conditions and re-examine them. Where required, subject the finish to the knife test (Method 135.1) to determine softening or loss of adhesion.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	GASOLINE RESISTANCE AERONAUTICAL PRIMER	METHOD 107.4 August 1974

Supersedes Issue of
December 1968

Apply (Method 98.2) one coat of the primer to clean anodized aluminum panels (Method 99.2) to give a dry-film thickness of 0.35 ± 0.05 mil (9 ± 1 μ m) and allow the primer to dry under standard conditions (Method 103.1) for 48 h. Immerse the panels to half their length in hydrocarbon test fluid, consisting of 70 parts by volume of reagent grade iso-octane and 30 parts by volume of reagent grade toluene contained in a covered glass beaker at a temperature of $23 \pm 2^{\circ}\text{C}$ ($73 \pm 3.5^{\circ}\text{F}$). At the end of the specified immersion period, remove the panels and examine them immediately. Where required, subject the finish to the knife test (Method 135.1) to determine softening or loss of adhesion.

After a recovery period of 24 h under standard conditions examine the panels again and then bend them 180° over a $1/2$ in. (12.7 mm) mandrel in not less than 1 s and not more than 1.5 s. Examine the film in the bend area under 10-power magnification.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	GASOLINE RESISTANCE FINISHES ON PRIMED ALUMINUM	METHOD 107.5 August 1974

Supersedes Issue of
December 1968

Apply (Method 98.2) one coat of 1-GP-121 vinyl pretreatment coating by spray to clean anodized aluminum panels (Method 99.2) to give a dry-film thickness of 0.30 ± 0.05 mil ($8 \pm 1 \mu\text{m}$) and allow to dry for not less than 30 min and not more than 2 h under standard conditions (Method 103.1). Apply (Method 98.2) the specified primer by spray to produce an additional dry film of 0.35 ± 0.05 mil ($9 \pm 1 \mu\text{m}$) and allow to dry not less than 30 min and not more than 2 h under standard conditions. Apply the specified topcoats as follows:

Apply enamels in one coat to give an additional dry film 1.2 ± 0.15 mils ($30 \pm 4 \mu\text{m}$) thick. Apply lacquers in two coats, each coat 0.6 ± 0.1 mil ($15 \pm 3 \mu\text{m}$) dry film thickness with 45 min drying between coats to give a final lacquer thickness of 1.2 ± 0.15 mils ($30 \pm 4 \mu\text{m}$). Allow the materials to dry 7 d prior to immersion.

Immerse the panels to half their length in hydrocarbon test fluid, consisting of 70 parts by volume of reagent grade iso-octane and 30 parts by volume of reagent grade toluene contained in a covered glass beaker at a temperature of $23 \pm 2^\circ\text{C}$ ($73 \pm 3.5^\circ\text{F}$). Remove the panels at the end of the specified immersion period and examine immediately and again after a 2 h recovery period. After a 24 h recovery period under standard conditions, examine the panels again and where specified, subject the finish to the knife test (Method 135.1), flexibility test (Method 119.5) or low-temperature flexibility test (Method 119.4).

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	GASOLINE RESISTANCE PRIMERS ON PRETREATED ALUMINUM	METHOD 107.6 August 1974

Supersedes Issue of
December 1968

Apply (Method 98.2) one coat of 1-GP-121 vinyl pretreatment coating by spray to clean anodized aluminum panels (Method 99.2) to give a dry-film thickness of 0.30 ± 0.05 mil (8 ± 1 μ m) and allow to dry for not less than 30 min and not more than 2 h under standard conditions (Method 103.1). Apply (Method 98.2) the primer under test by spray to produce an additional dry film of 0.35 ± 0.05 mil (9 ± 1 μ m) and allow the primer to dry 48 h under standard conditions.

Immerse the panels to half their length in hydrocarbon test fluid, consisting of 70 parts by volume of reagent grade iso-octane and 30 parts by volume of reagent grade toluene contained in a covered glass beaker at a temperature of $23 \pm 2^\circ\text{C}$ ($73 \pm 3.5^\circ\text{F}$). At the end of the specified immersion period, remove the panels and examine immediately. After a 24 h recovery period, under standard conditions, examine the panels again and subject them to the knife test (Method 135.1). Bend the panels 180° over a $1/2$ in. (12.7 mm) mandrel in not less than 1 s and not more than 1.5 s. Examine the film in the bend area under 10-power magnification.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	SOLVENT RESISTANCE MINERAL SPIRITS	METHOD 108.1 May 1979

Supersedes Issue of
August 1974

Apply (Method 98.2) a coat of the material to steel panels (Method 100.1) and allow to dry 7 d (Method 103.1). Immerse the panels to half their length in 1-GP-4 mineral spirits contained in a covered glass beaker at a temperature of $23 \pm 2^{\circ}\text{C}$.

At the end of the specified immersion period, remove the panels and examine immediately. Allow the panels to dry for 2 h under standard conditions and examine again.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	SOLVENT RESISTANCE RESISTANCE OF LACQUERS TO DE-ICING FLUID	Method 108.3 May 1979

Supersedes Issue of August 1974
Amended September 1980
Re-edited September 1982

Apply one coat of 1-GP-121M vinyl pretreatment coating by spray (Method 98.2) to clean anodized aluminum panels (Method 99.2) to give a dry film thickness of $8 \pm 2 \mu\text{m}$ and allow to dry under standard conditions (Method 103.1) for not less than 30 min and not more than 2 h. Apply a coat of 1-GP-158M primer by spray to produce an additional dry film of $8 \pm 2 \mu\text{m}$ and allow to dry under standard conditions for not less than 30 min and not more than 2 h. Apply the lacquer under test in two coats, each $15 \pm 5 \mu\text{m}$ dry film thickness, with 45 min between coats, to give a final lacquer thickness of $30 \pm 5 \mu\text{m}$. Air dry the panels under standard conditions for 2 h, then force-dry them (Method 103.2) at $75 \pm 2^\circ\text{C}$ for 1 h. Condition the panels for 30 min and then immerse them to half their length in 3-GP-856M de-icing-defrosting fluid contained in a covered glass beaker at a temperature of $23 \pm 2^\circ\text{C}$. After 4 h remove the panels and examine them immediately. Compare the fluid used for the test with fresh material for color leached from the film.

Withdrawn

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	RESISTANCE TO OIL	Method 109.1 May 1978

Supersedes issue of
August 1974

Apply (Method 98.2) a film of the material to a clean steel panel (ASTM D 609, Method B or C) and allow to dry 7 d under standard conditions (Method 103.1). After this conditioning immerse the panel to half its length in 3-GP-304 lubricating oil, engine, heavy duty at 50°C for the specified time. Remove it and wash with detergent solution, wipe with a clean lintless tissue, and immediately examine for blistering, wrinkling, lifting, softening, dulling, discoloration or other defects. The test panel may be compared with a similar panel that has been stored under standard conditions.

Unless otherwise specified the detergent solution shall contain 1% reagent grade sodium carbonate and 2% nonionic detergent of the polyoxyethylene iso-octyl phenol type containing 9-10 ethylene oxide units per molecule.*

* Such as Igepal CO-630, Triton X-100 and Renex 690

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	OIL RESISTANCE LACQUERS ON PRIMED ALUMINUM	Method 109.2 May 1979

Supersedes Issue of August 1974
Amended September 1980
Re-edited September 1982

Apply one coat of 1-GP-121M vinyl pretreatment coating by spray (Method 98.2) to clean anodized aluminum panels (Method 99.2) to give a dry film thickness of $8 \pm 2 \mu\text{m}$ and allow to dry under standard conditions (Method 103.1) for not less than 30 min and not more than 2 h. Apply a coat of 1-GP-158M primer by spray to produce an additional dry film of $8 \pm 2 \mu\text{m}$ and allow to dry under standard conditions for not less than 30 min and not more than 2 h. Apply the lacquer under test in two coats, each $15 \pm 3 \mu\text{m}$ dry film thickness with 45 min drying between coats, to give a final lacquer thickness of $30 \pm 5 \mu\text{m}$. Air dry the panels under standard conditions for 2 h, then force-dry them (Method 103.2) at $75 \pm 2^\circ\text{C}$ for 1 h. Condition the panels for 30 min and then immerse them to half their length in synthetic oil composed of 95% di-2 ethylhexyl sebacate (dioctyl sebacate) and 5% tricresyl phosphate (tritolyl phosphate) contained in a covered glass beaker at a temperature of $120 \pm 2^\circ\text{C}$. At the end of 2 h, remove the panels and wash immediately with 1-GP-4M mineral spirits followed by petroleum ether. Examine the lacquer films immediately and again after 24 h under standard conditions. Compare the oil used for the test with fresh material for color leached from the film.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	WATER RESISTANCE GENERAL METHOD	Method 110.1 May 1978

Supersedes issue of
August 1974

SCOPE

This method is for use in determining the water resistance of paints, varnishes, enamels, lacquers and related coatings.

If the resistance is to be tested at more than one temperature, two separate panels shall be used for each temperature.

PREPARATION OF PANELS

Apply (Method 98.1) the material to at least two unabraded tin-plate panels (Method 101.1).

Unless otherwise specified, apply the material to yield a dry-film thickness in accordance with Method 98.2. Measure the dry-film thickness in accordance with Method 128.1. Trim off unwanted areas of those panels coated with a drawblade. Dip all coated panel edges with the material under test or a compatible water-resistant, quick-drying material.

CURING OF FINISHES

Before testing, cure finishes according to the following schedule, unless otherwise specified:

Air-drying oil, oleoresinous and alkyd paints, enamels, varnishes and sealers; air-dry 48 h (Method 103.1).

Lacquer-type finishes; air-dry 24 h (Method 103.1), bake 2 h (Method 103.2) at $60 \pm 2^\circ\text{C}$ and condition 30 min (Method 103.1).

Heat-resistant enamels; air-dry 2 h (Method 103.1), bake 2 h (Method 103.2) at $105 \pm 2^\circ\text{C}$ and condition 30 min (Method 103.1).

Baking finishes; air-dry 30 min (Method 103.1), bake (Method 103.2) for not more than 30 min at the specified temperature.

TESTING OF FINISHES

Immerse the test panels to half their length in distilled water contained in a covered glass beaker at the specified temperature. At the end of the specified immersion period, remove the panels and examine immediately for evidence of failure to meet the specified requirements. Condition the panels for 2 h (Method 103.1) and again examine. When required, assess blistering in accordance with Method 95.1.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	WATER RESISTANCE PRIMERS ON ANODIZED ALUMINUM	METHOD 110.8 May 1979

Supersedes Issue of
August 1974

Apply one coat of the primer under test (Method 98.2) to clean anodized aluminum panels (Method 99.2) to give a dry-film thickness of $8 \pm 2 \mu\text{m}$ and allow to dry for 48 h under standard conditions, (Method 103.1). Immerse the panels to half their length in distilled water contained in a covered glass beaker at $23 \pm 2^\circ\text{C}$. At the end of the specified immersion period, remove the panels, examine immediately, and assess blistering by Method 95.1.

After the specified recovery period under standard conditions, examine the panels again and subject them to the knife test (Method 135.1).

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	WATER RESISTANCE PRIMERS ON PRETREATED ALUMINUM	METHOD 110.9 October 1982

Supersedes Issue of
August 1974

Apply by spray one coat of 1-GP-121 vinyl pretreatment coating (Method 98.2) to clean anodized aluminum panels (Method 99.2) to give a dry-film thickness of $8 \pm 2 \mu\text{m}$ and allow to dry for not less than 30 min and not more than 2 h under standard conditions (Method 103.1). Apply the primer under test to produce an additional dry film of $8 \pm 2 \mu\text{m}$ and allow to dry for not less than 30 min and not more than 2 h under standard conditions. Apply the specified topcoats as follows:

Apply enamels in one coat to give an additional dry film $30 \pm 5 \mu\text{m}$ thick. Apply lacquers in two coats, each $15 \pm 3 \mu\text{m}$ dry-film thickness with 45 min drying between coats to give a final lacquer film thickness of $30 \pm 5 \mu\text{m}$. Allow the final topcoats of both enamel and lacquer to dry 7 d under standard conditions, prior to immersion.

Immerse the panels to half their length in distilled water contained in a covered glass beaker at $23 \pm 2^\circ\text{C}$. At the end of the specified immersion period, remove the panels, examine immediately and, where specified, subject them to the tape test (Method 137.3) and examine. After a 2 h recovery period under standard conditions, examine the panels again and, where specified, subject them to the knife test (Method 135.1).

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	WATER RESISTANCE FINISHES ON PRIMED ALUMINUM	METHOD 110.10 October 1982

Supersedes Issue of
August 1974

Apply by spray (Method 98.2) one coat of 1-GP-121 vinyl pretreatment coating to clean anodized aluminum panels (Method 99.2) to give a dry-film thickness of $8 \pm 2 \mu\text{m}$ and allow to dry for not less than 30 min and not more than 2 h under standard conditions (Method 103.1). Apply the specified primer to produce an additional dry film of $8 \pm 2 \mu\text{m}$ and allow to dry under standard conditions for not less than 30 min and not more than 2 h. Apply the finish coats under test as follows:

Apply one coat of the enamel under test to give an additional dry film $30 \pm 5 \mu\text{m}$ thick. Apply two coats of the lacquer under test, each coat to have a dry film thickness of $15 \pm 3 \mu\text{m}$ and a final dry lacquer film thickness of $30 \pm 5 \mu\text{m}$. Allow 45 min drying between coats. Allow the final topcoats of both enamel and lacquer to dry 7 d (Method 103.1) prior to immersion.

Immerse the panels to half their length in distilled water contained in a covered glass breaker at $23 \pm 2^\circ\text{C}$. At the end of the specified immersion period, remove the panels, examine and where specified, immediately subject them to the tape test (Method 137.3) and examine. After a 24 h recovery period under standard conditions examine the panels again and, where specified, subject them to the knife test (Method 135.1).

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	WATER RESISTANCE SHOWER RESISTANCE	METHOD 110.11 May 1979

Supersedes Issue of
August 1974

Apply (Method 98.1) standard white undercoat (Method 150.3) (tinted, when contrast is needed, with 10 g raw sienna color-in-oil and 15 g dark chrome green color-in-oil per litre of the undercoater) to clean plate glass panels (Method 102.1) at least 75 mm x 150 mm to obtain a dry film $50 \pm 5 \mu\text{m}$ thick.* Allow the panels to dry (Method 103.1) not less than 7 d; they may be stored indefinitely if protected from contamination.

Apply the latex paint to be tested to the primed panels to give an additional $45 \pm 5 \mu\text{m}$ of dry film. If a film applicator* is used, the runners shall travel on uncoated glass along the edges of the panel. Cure the test panels for the specified time in a horizontal position under standard conditions, and then expose them to continuous water spray in an accelerated weathering machine (Method 122.2) for the specified time.

As an alternative to the use of an accelerated weathering machine (Method 122.2), the test panels may be suspended 50 mm from a nozzle, or an arrangement of a sufficient number of nozzles, to spray the entire area of the panel. The nozzles shall produce a fine spray similar to that produced by the No. 50 nozzles used in the Atlas Weather-Ometer. The pressure at the nozzle shall be 70 - 85 kPa and the temperature of the water $15 \pm 5^\circ\text{C}$.

Examine the panels immediately after exposure.

*A satisfactory device for obtaining the required test film is the Dow Film Caster, which has a $178 \mu\text{m}$ clearance 13 cm wide for the undercoat application, and a $253 \mu\text{m}$ clearance 14 cm wide for the emulsion finish.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	WATER RESISTANCE BOILING-WATER RESISTANCE	METHOD 110.12 May 1979

Supersedes Issue of
August 1974

Prepare the panels as directed in the 1-GP Paint standard and allow to dry for 7 d (Method 103.1). Place the panel in a level horizontal position and quickly pour 25 mL boiling water onto it from a height of 75 mm in an environment at $23 \pm 2^{\circ}\text{C}$ and free from drafts.

Allow the panel to cool for 30 min under standard conditions. Dry the film with a pad of soft cloth and examine.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	HEAT RESISTANCE ENAMEL	METHOD 112.2 May 1979

Supersedes Issue of
August 1974

Apply (Method 98.2) one coat of the material to clean steel panels (Method 100.1) and unless otherwise specified allow the coated panels to dry 24 h under standard conditions (Method 103.1). To assess the flow properties of the enamel on a vertical surface, draw two parallel scratch lines, 25 mm apart and through the enamel to the substrate, horizontally across the short axis of each panel. Then suspend the panel vertically in an oven, with the scratch lines horizontal and bake (Method 103.2) for the specified time at the specified temperature.

Remove the panels, cool, and compare with a similar panel that has not been heated but has been stored under standard conditions.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	BAKING RESISTANCE LACQUERS	METHOD 112.3 October 1982

Supersedes Issue of
August 1974

Apply one coat of 1-GP-121 vinyl pretreatment coating by spray (Method 98.2) to two clean anodized aluminum panels (Method 99.2) to give a dry-film thickness of $8 \pm 2 \mu\text{m}$ and allow to dry for not less than 30 min and not more than 2 h under standard conditions (Method 103.1). Apply the specified primer to produce an additional dry film thickness of $8 \pm 2 \mu\text{m}$ and allow to dry for not less than 30 min and not more than 2 h under standard conditions. Apply the material under test in two coats, each $15 \pm 3 \mu\text{m}$ dry-film thickness with 45 min drying between coats, to give a final lacquer thickness of $30 \pm 5 \mu\text{m}$.

After 30 min drying under standard conditions, heat one panel (Method 103.2) for 48 h at $60 \pm 2^\circ\text{C}$, condition 2 h and compare with the unheated panel.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	BAKING RESISTANCE ENAMELS	METHOD 112.4 October 1982

Supersedes Issue of
August 1974

Apply one coat of 1-GP-121 vinyl pretreatment coating by spray (Method 98.2) to two clean anodized aluminum panels (Method 99.2) to give a dry-film thickness of $8 \pm 2 \mu\text{m}$ and allow to dry for not less than 30 min and not more than 2 h under standard conditions (Method 103.1). Apply the specified primer to produce an additional dry film thickness of $8 \pm 2 \mu\text{m}$ and allow to dry under standard conditions for not less than 30 min and not more than 2 h. Apply the material under test in one coat to give an additional dry-film thickness of $30 \pm 5 \mu\text{m}$. After 30 min drying under standard conditions heat one panel (Method 103.2) for the specified time at the specified temperature. Condition the panel for 24 h and compare with the panel that has been kept under standard conditions.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	HEAT RESISTANCE	METHOD 112.5 May 1979

Supersedes Issue of
August 1974

Apply (Method 98.2) one coat of the material to clean steel panels (Method 100.1) or other specified metal panels and unless otherwise specified allow the coated panels to dry 48 h under standard conditions (Method 103.1). To assess the flow properties of the enamel on a vertical surface draw three parallel scratch lines 25 mm apart and through the material to the substrate, horizontally across the short axis of each panel. Suspend the panels vertically in an oven, with the scratch lines horizontal and heat (Method 103.2) for the specified time at the specified temperature. Before removing the panels from the oven, press the blade of a spatula against the film to determine if it has become tacky or soft.

Remove the panels from the oven, place under standard conditions for 30 min and compare with a similar panel that has not been heated but has been stored under standard conditions. When required, examine the film for embrittlement and loss of adhesion by the knife test (Method 135.1).

Withdrawn/Retired

Canadian General Standards Board

CGSB Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	HEAT RESISTANCE STRIPPABLE COATINGS ON STEEL	METHOD 112.6 October 1982

Supersedes Issue of
August 1974

Apply by spray (Method 136.3*) one coat of the material to a dry film thickness of $350 \pm 50 \mu\text{m}$ to clean steel panels (Method 100.1). After coating, dry the panels 24 h under standard conditions (Method 103.1) and then oven dry them (Method 103.2) for 24 h at $60 \pm 2^\circ\text{C}$.

Place a 75×150 mm finished panel in a ventilated circulating oven (method 103.2) at $70 \pm 2^\circ\text{C}$ for 168 h. Inspect the film daily for evidence of plasticizer separation as indicated by exudation of oily matter. At the end of the heating period remove the panel from the oven and cool to $23 \pm 2^\circ\text{C}$. Strip the film manually from the panel and examine for tears and breaks. Also examine the steel surface.

Trim a 75×150 mm finished panel with a sharp cutting edge so that the coating is the same size as the panel, care being taken not to lift the film. Place the panel in a ventilated circulating oven (Method 103.2) at $175 \pm 2^\circ\text{C}$ for 3 h. At the end of this time remove the panel from the oven and examine the film for separation or degradation. Strip the film from the panel, and examine the back of the film and steel surface. Removal of the film for examination of the contacting surfaces may be assisted by inserting a spatula under the film and prying before the panel has cooled thoroughly.

* Except that other air caps and fluid tips may be used.

Canadian General Standards Board

CGSB Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	CORROSION SALT WATER RESISTANCE VINYL PRIMER AND ANTIFOULING PAINTS	Method 113.1 May 1979

Supersedes Issue of August 1974
Amended September 1980
Re-edited September 1982

Apply by spray (Method 98.2) one coat of 1-GP-121M vinyl pretreatment coating to clean steel panels (Method 100.1) and allow to dry not less than 30 min and not more than 2 h under standard conditions (Method 103.1). When testing vinyl primer, apply (Method 98.3) in two coats, each $28 \pm 3 \mu\text{m}$ dry-film thickness with 45 min drying between coats, to give a final primer thickness of $55 \pm 5 \mu\text{m}$. Protect the edges of the panel with a bead of primer and also coat the back of the panel with the primer.

For testing vinyl antifouling paint, prepare the panels as described above except use two coats of Type 2, 1-GP-122M Vinyl Zinc Chromate reference formula primer, in place of the primer under test. After application of the second coat of 1-GP-122M primer allow to dry under standard conditions for 1 h. Apply one coat of the antifouling paint under test to produce an additional dry film thickness of $35 \pm 5 \mu\text{m}$ thick.

Allow the final coat of primer or anti-fouling paint to dry (Method 103.1) for 24 h. Immerse the panels at $23 \pm 2^\circ\text{C}$ to half their length in synthetic sea water (as per method 113.2) contained in a covered glass beaker equipped with a fritted glass dispersion tube resting on the bottom of the beaker. Bubble air through the aqueous salt solution at a rate of $0.03 \text{ m}^3/\text{h}$. Maintain the salt solution at a constant level by adding reagent water at appropriate intervals. At the end of the specified immersion period, remove the panels, rinse with reagent water and examine. Assess blistering and rusting according to Method 95.1. Condition the panel 2 h under standard conditions and examine again.

Canadian General Standards Board

CGSB Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	CORROSION RESISTANCE TO SYNTHETIC SEA WATER	METHOD 113.2 May 1979

Supersedes Issue of
August 1974

Prepare the panels according to the specified method. Immerse the prepared panels to the depth specified and at the specified temperature for the specified time in freshly prepared synthetic sea water in a suitable glass container. The composition of the synthetic sea water shall be:

Synthetic Sea Water

Magnesium chloride hexahydrate, $\text{MgCl}_2 \cdot 6\text{H}_2\text{O}$	11.0 g
Calcium chloride, anhydrous, CaCl_2	1.2 g
Sodium sulfate, anhydrous, Na_2SO_4	4.0 g
Sodium chloride, NaCl	25.0 g

Dissolve the above salts in sufficient distilled water to bring the salt solution to a volume of one litre. Bring the salt solution to a pH of 8.0 to 8.2 with the addition of a 5% aqueous solution of sodium carbonate (5 g sodium carbonate per 100 mL of solution).

After the specified immersion time remove the panels from the synthetic sea water, rinse gently with distilled water and examine in accordance with Method 95.1.

Withdrawn / Retirée

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	CORROSION HUMIDITY CABINET TEST	METHOD 113.5 August 1974

Supersedes Issue of
February 1973

SCOPE

This method* is for use in determining the protective properties of coatings in a moisture-saturated atmosphere with continuous condensation on the test specimens.

APPARATUS

General - The equipment for the Humidity Cabinet test shall be constructed and arranged to provide continuous controlled operation producing a moisture-saturated atmosphere with continuous condensation on the test specimens and continuous flow of air.

Test Room - The humidity cabinet shall be located in a room at a temperature of $24 \pm 6^{\circ}\text{C}$ ($75 \pm 10^{\circ}\text{F}$), and shall be situated so as to avoid exposure to air contaminated with foreign components such as hydrogen sulfide, sulfur dioxide, acids and other fumes.

Humidity Cabinet Construction - The cabinet shall conform to the drawings in Figures 1 and 2. Further reference may be made to ASTM D 1748.

Cabinet Cover - The top of the exposure chamber shall consist of a seasoned, water-proofed, wooden frame suitably grooved to provide a seal for the top edges of the exposure chamber (Figure 1). Two thicknesses of glass-fiber cloth shall be tautly secured to the frame. The cloth is intended to prevent dripping of the condensed moisture onto the test specimens. The top may be hinged or made in sections to facilitate entry into the cabinet.

Heating Elements - Two 500 watt immersion heating elements shall be provided to heat the distilled water. One of the elements shall be provided with manual control and shall be operated continuously. The other, provided with manual and automatic thermostatic control devices shall be of sufficient size and sensitivity to maintain an adequate water temperature so that the specified air temperature in the panel exposure area will result. The heating elements and thermostatic control devices shall be located as indicated in Figure 1.

Temperature Indicating Devices - Suitable partial-immersion thermometers or other temperature-indicating devices with subdivisions of 0.5°C (1°F) and a scale error of not more than 0.5°C (1°F) shall be provided for indicating the air temperatures of the exposure area during operation.

Air Supply - The air supply shall be capable of delivering sufficient air to maintain a constant flow of oil-free air through the cabinet as specified herein. Any oil or foreign matter present in the air shall be removed by passing the air through a tower packed lightly with asbestos or glass wool. The air line connection from the tower to the humidity cabinet shall be clean and as short as possible in order to avoid small particles of dirt, scale and other foreign matter.

Air-Metering Device - A suitable air-metering device shall be provided to indicate the air flow in linear feet (m) or cubic feet (m^3) per hour.

Water Supply - Either distilled water or demineralized water containing not more than 5 ppm total dissolved solids shall be used in the test cabinet and shall be obtained from an adequate source to maintain the constant water level as indicated in Figure 3.

Maintenance - When required, clean the tower for conditioning the air supply.

Clean the cabinet and replace the water at least once every 60 d to remove any contamination that may be introduced from the test panels.

* Another method for continuous condensation testing is ASTM D 2247 which includes the Cleveland Condensing Humidity Cabinet as one of the two types of cabinets specified.

Operation - Maintain a temperature throughout the panel exposure area of $49 \pm 1^{\circ}\text{C}$ ($120 \pm 2^{\circ}\text{F}$) during the operation by adjusting the thermostatic control as required.

Pass clean, filtered air at room temperature through the cabinet by means of the air disperser at the rate of 8 ± 1 linear ft (2.4 ± 0.3 linear m) per h or 43.5 ± 6 ft³ (1.23 ± 0.17 m³).

When starting up the cabinet, operate it for at least 48 h prior to any exposure of test panels; during this period inspect it for compliance with required operating conditions.

Keep a daily record of operating conditions.

Exposure - Suspend panels vertically from the rotating stage by means of glass, nylon or vinyl plastic hooks. Metal shall not be used. Distance between panels shall be not less than 1 in. (25 mm).

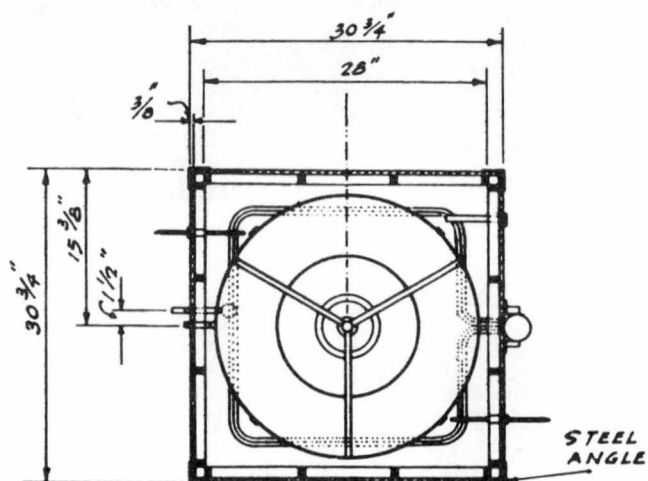
Expose at least two panels for each material tested.

Examine the panels (Method 95.1) at the specified intervals, for blistering, rusting and any other effects required to be observed. The total area of the panel is included in the assessment. When panels are removed from the cabinet for examination before completion of the test, make the examination immediately and replace the panels within a short space of time. On completion of the test, and after the final examination of the painted surface, remove the paint completely from the test surface by means of paint remover and solvent rinsing, and examine the surface visually and microscopically for rust and corrosion.

TOLERANCES:

MORE THAN 5" : $\pm \frac{3}{8}$
1" TO 5" : $\pm \frac{1}{16}$
LESS THAN 1" : $\pm \frac{1}{64}$

MATERIALS: THE MATERIALS OF CONSTRUCTION MAY BE EITHER COPPER OR BRASS EXCEPT WHERE SPECIFICALLY INDICATED ON THE DRAWINGS.



SECTION "B.B."

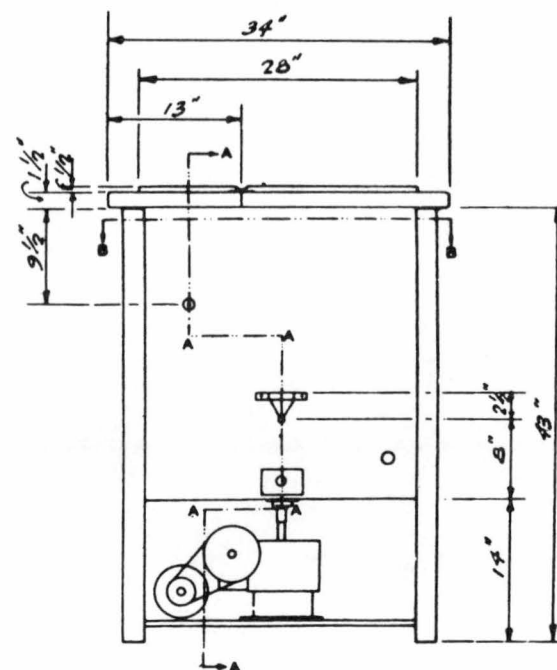
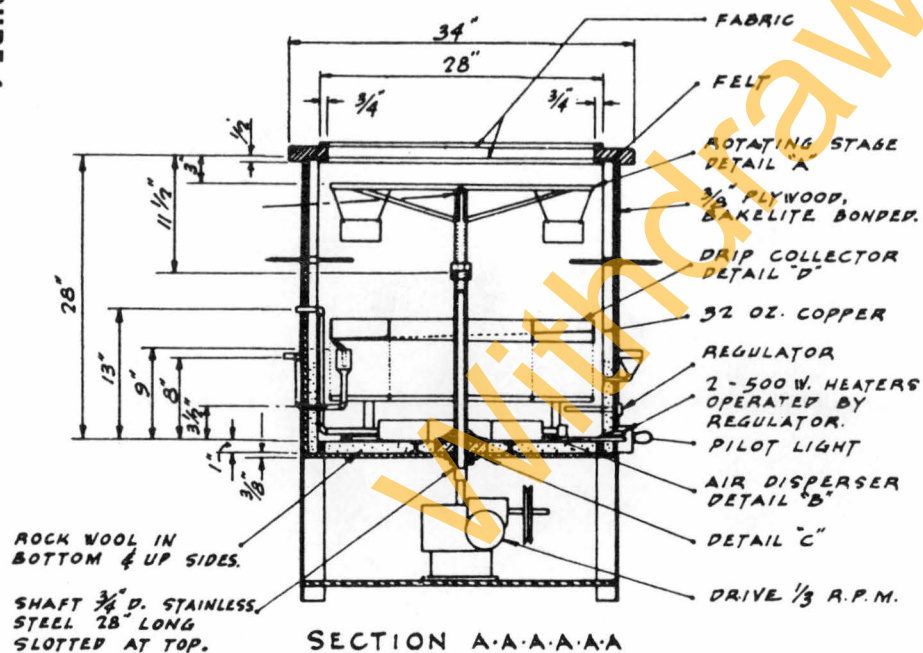


FIGURE 1
DIAGRAM OF HUMIDITY CABINETT

ADDITIONAL EQUIPMENT

THE FOLLOWING ARE SUGGESTED
AS DESIGNS FOR ACCESSORY
EQUIPMENT.

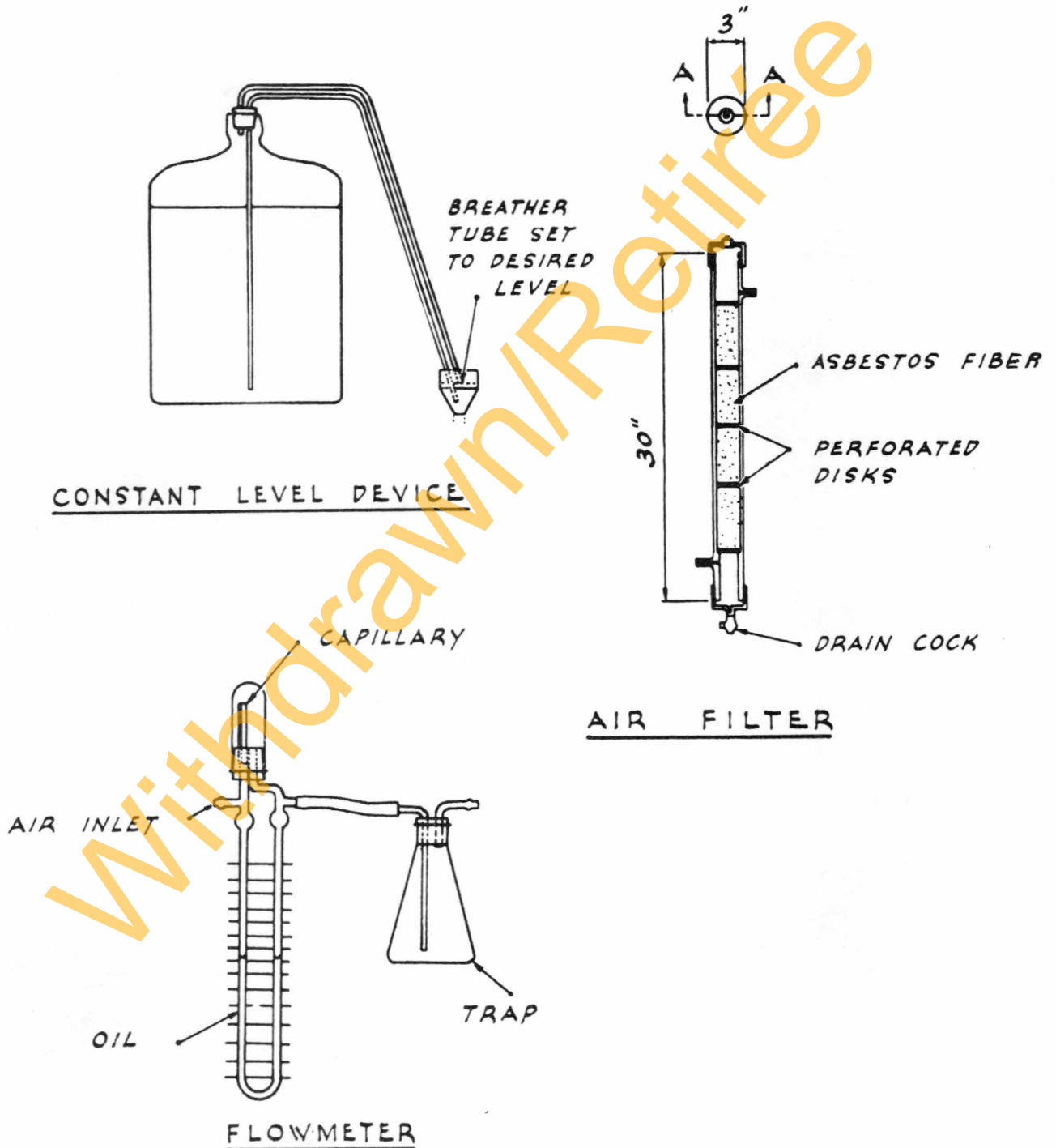
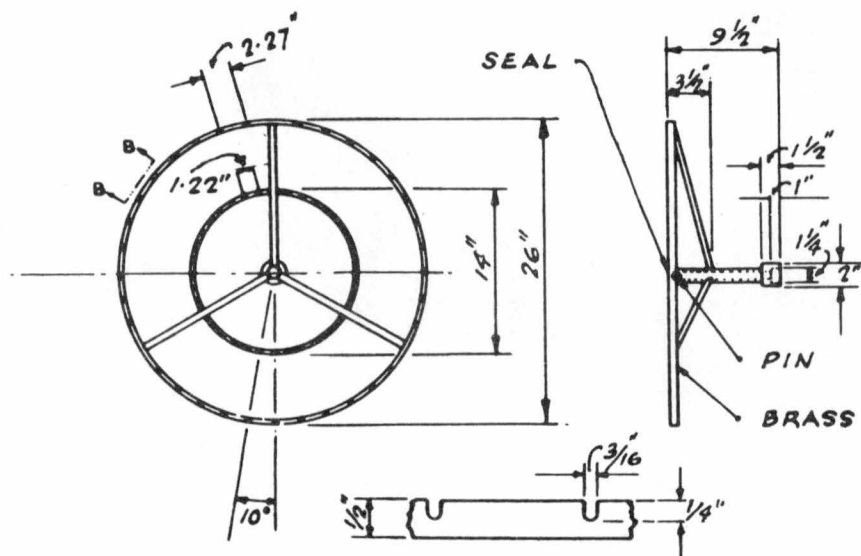


FIGURE 3

DETAILS OF ACCESSORY EQUIPMENT FOR USE WITH HUMIDITY CABINET

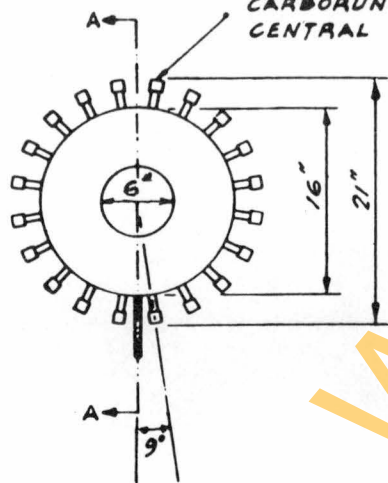
FIGURE 2

DETAILS OF HUMIDITY CABINET



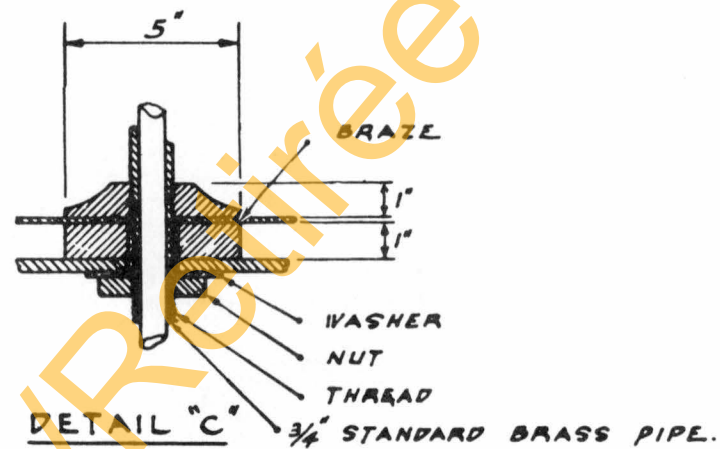
SECTION B-B ENLARGED
ROTATING STAGE DETAIL "A"

AIR DISPENSER NO. 20870
CARBORUNDUM AS MFRD. BY
CENTRAL SCIENTIFIC, 20 REQD.

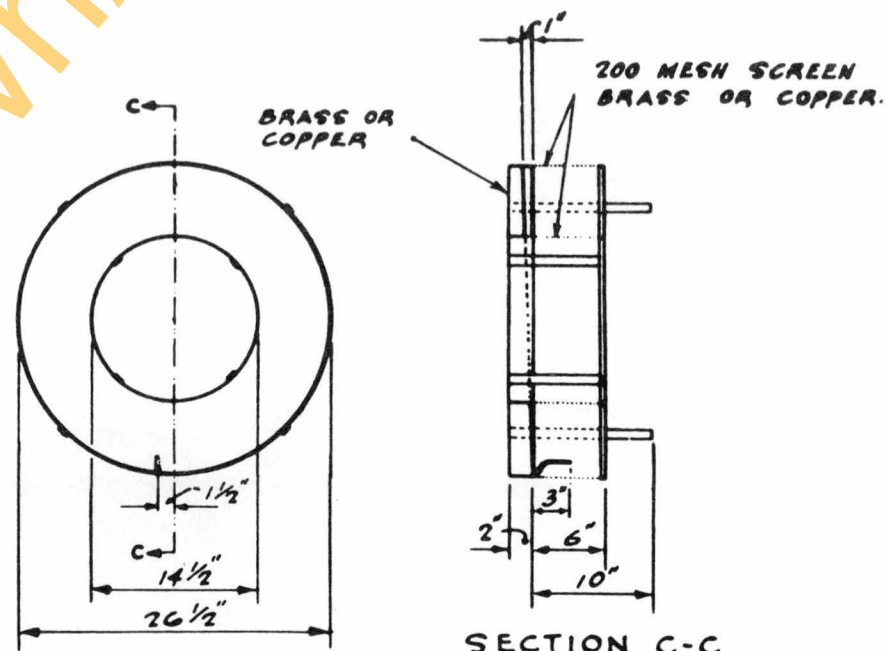


AIR DISPERSER DETAIL "B"

SECTION A-A



DETAIL "C" 3/4 STANDARD BRASS PIPE.



DRIP COLLECTOR DETAIL "D"

SECTION C-C

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	CORROSION HUMIDITY CABINET TEST, ONE COAT OF MATERIAL APPLIED TO STEEL PANELS	METHOD 113.6 May 1979

Supersedes Issue of
August 1974

Apply (Method 98.2) one coat of the material under test to clean steel panels (Method 100.1). Protect the backs and edges of the panel with the material under test or other suitable material.

Unless otherwise specified, cure the panels 7 d and then expose them for the specified time to the humidity cabinet test according to Method 113.5.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	CORROSION HUMIDITY CABINET TEST, TWO COATS OF MATERIAL APPLIED TO STEEL PANELS	METHOD 113.8 May 1979

Supersedes Issue of
August 1974

Apply (Method 98.3) two coats of the material under test to clean steel panels (Method 100.1). Unless otherwise specified, the total dry film thickness of the two coat system shall be $90 \pm 5 \mu\text{m}$ thick. Protect the backs and edges of the panel with the material under test or other suitable material.

Unless otherwise specified, cure the panels 7 d and then expose them for the specified time to the humidity cabinet test according to Method 113.5.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	CLEANSABILITY PAINT FILMS ON UNPRIMED PANELS	METHOD 114.1 May 1979

Supersedes Issue of
August 1974

Apply (Method 98.3) a coat of the material under test to the surface of a glass panel (Method 102.1) not less than 15 cm x 15 cm and allow to dry 24 h under standard conditions (Method 103.1). Apply a second coat and allow to age an additional 14 d under standard conditions. Affix a pad of one thickness of velvet cloth (short nap) to the square face of a block of wood 25 mm x 25 mm x 12 mm and dip in graphite of a fineness that will pass a 45 μ m sieve (No. 325)*. Make marks on the painted panels by placing a 100 g mass on top of the block and drawing the block back and forth across the panel twice for a distance of 10 cm by means of threads attached to opposite sides of the block, in such a manner that the pulling force is parallel to the face of the panel.

Wash the marks with a soft cloth, and a solution of 0.25% oxyethylated alkyl phenol nonionic detergent and 0.12% sodium tripolyphosphate** with a pH value of 9.3 to 9.5. Note the ease of removal of the graphite and compare the appearance of the soiled and the unsoiled areas.

* See CGSB 8-GP-1 Sieves, Testing, Woven Wire

**The sodium tripolyphosphate may be any commercial product containing not more than 3% orthophosphate. (The detergent is the same as that used in Method 125.1).

Canadian General Standards Board

CGSB Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	CLEANSABILITY PAINT FILMS ON PRIMED PANELS	METHOD 114.2 August 1974

Supersedes Issue of
October 1958

Apply (Method 98.4) a uniform coating of 1-GP-84 primer on the surface of a glass panel (Method 102.1) not less than 6 x 6 in. (15 x 15 cm) and allow it to dry under standard conditions (Method 103.1). Apply two coats of the paint under test, allowing a drying interval between coats as specified in Method 98.3. Allow the system to age 14 d under standard conditions and test for cleansing as described in Method 114.1.

Withdrawn / Retirée

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	CLEANSABILITY ASPHALT STAIN TEST	METHOD 114.3 May 1979

Supersedes Issue of
August 1974

SCOPE

This method is for determining the resistance of an applied coating to staining by a 10% solution of asphalt. The resistance to staining appears to be related to the porosity of the applied coating, porous coatings showing the greatest staining. The porosity of the coating in turn is related to its dirt retention and cleansability properties. Porous coatings exhibit the greatest dirt retention and are the most difficult to clean.

APPARATUS AND MATERIALS

- Glass Panels** — 15 cm x 23 cm (use white Carrara glass for testing white coatings)
- Asphalt staining solution** — A solution containing 10% by mass asphalt, meeting 16-GP-3b (Penetration Grade 85-100) and 90% by mass, mineral spirits meeting 1-GP-4.
- Blade film applicators
- Wet film thickness gauge (ASTM D 1212)
- Suitable reflectometer as described in ASTM E 97
- Drying oven (Method 103.2)
- Paint brush — 50 mm meeting 22-GP-1
- Mineral spirits 1-GP-4
- Wash bottle

PROCEDURE

Apply (Method 98.1), a 75 μ m wet film, unless otherwise specified, of the coating under test, to clean glass panels using a 75 mm wide draw-blade. Allow the coating to dry for the interval specified in Method 98.3, unless otherwise specified. Apply a second coat of the material at the same thickness and in the same manner and allow the final coating to dry under standard conditions (Method 103.1) for 7 d. Measure the daylight 45°, 0° luminous directional reflectance as described in ASTM E 97.

Apply a coat of the 10% asphalt staining solution to one-half of the applied coating under test with the 50 mm paint brush. Allow the asphalt to remain for 15 min, then, holding the panel vertically over a suitable receptacle with the asphalt coated area closest to the receptacle, wash the asphalt coated area with a stream of mineral spirits from the wash bottle. Continue the washing until the mineral spirits wash becomes colorless indicating no further asphalt is being removed from the coating. Force dry the washed panel in an oven operating at $60 \pm 2^\circ\text{C}$ for 1 h. Remove the test panel from the oven, cool for 0.5 h. Measure the reflectance of the stained area as described in ASTM E 97.

Calculate the difference in reflectance between the coating before and after staining.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	HARDNESS SWORD ROCKER HARDNESS	METHOD 116.1 August 1974

Supersedes Issue of
January 1963

SCOPE

This method is intended to measure film properties such as surface hardness*, cure and smoothness.

CALIBRATION OF THE SWORD ROCKER

To calibrate the rocker place a clean uncoated plate-glass panel (Method 102.1) on the appropriate base and level by any suitable procedure. Place the rocker on the levelled plate glass, and adjust the left-hand level to about 40° with the horizontal and the right-hand level to about 20°. Set the weight on the screw in the middle.

Set the rocker in motion so that the bubble in the left-hand tube slightly overlaps the mark. The count is started when this bubble just fails to reach the mark. The count is stopped when the bubble in the right-hand tube just fails to reach the mark in that tube, signifying the end of the first oscillation. The number of oscillations multiplied by two gives the hardness value. The rocker is to be adjusted to give a hardness value of 100 on glass. Minor adjustments may be made by means of the weight on the vertical screw. Lowering the weight increases the number of swings. Major adjustments may be made by changing the angles of the levels. Changing the angle of the right-hand level has a greater effect than an equal change in the left-hand level.

PROCEDURE

Apply the test material by drawblade (Method 98.2) onto a plate-glass panel (Method 102.1) to give a dried film of uniform thickness and not less than 5 x 10 cm in area.

After 48 h drying (Method 103.1), determine the hardness by means of the Sward Hardness Rocker under standard conditions of temperature and relative humidity, and in accordance with the following procedure:

Place the coated panel on the base, which is rechecked for levelness before starting the test. Start the rocker in motion, and record the number of oscillations and the appropriate hardness value as outlined above.

Determine the hardness in triplicate, using a different area of the panel for each test.

SPECIAL PRECAUTIONS

- Make sure the paint is free from surface irregularities, particularly dust.
- Clean the rocker with a soft clean cloth before each test.
- Place a plastic cover over the rocker while the test is being made to avoid errors due to drafts.

* For determination of intrinsic film hardness, use ASTM D 1474, Tests for Knoop Indentation Hardness of Paint, Varnish and Lacquer Coatings.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	SCRATCH RESISTANCE	METHOD 116.2 August 1974

Supersedes Issue of
February 1973

Coat (Method 98.2), preferably by dipping, tin-plate panels (Method 101.1) approximately 3 by 6 in. (75 x 150 mm) with the material under test. Prepare at least six panels. Allow the coatings to dry 24 h under standard conditions (Method 103.1) and then force dry them 1 h at 105°C (221°F) (Method 103.2). Condition the panels under standard conditions 24 h before testing.

The scratch tester* shall be a mechanically driven instrument consisting essentially of a horizontal sliding platform to which the test panel is clamped. The platform is driven by a constant-speed motor at a rate of 30 to 40 mm/s. The tester is equipped with a tungsten carbide needle having a 1 mm hemispherical tip. When viewed under 20 power magnification, the hemispherical tip shall be of regular profile and shall show no greater surface roughness than that shown by a 1/16 in. (1.6 mm) Rockwell Hardness steel ball. The needle is fixed in a holder at the end of a counterpoised arm that is kept horizontal by adjusting the length of needle projecting from the holder. The apparatus is adjusted so that a scratch of approximately 60 mm is obtained. Directly above the needle is a holder for weights. The needle shall not be permitted to drop suddenly. The scratches shall be straight and free from waviness or other irregularities due to the incorrect operation of the machine.

Firmly affix the panels to the moving platform of the tester and adjust the needle so as to make contact with the test surface exactly at right angles. Apply loads and operate the machine to produce scratches along the length of the panel.

Using the specified load make at least 10 scratches and under 10 power magnification measure the length of breakthrough to the metal of each of the scratches to determine whether they pass or fail. A failure is defined as a continuous breakthrough to the metal for at least 75% of the length of the path or a continuous series of breakthroughs for 75% of the length of the scratch. The material is considered to pass when at least 50% of the scratch lines do not fail as defined.

* Similar to the apparatus described in Method 14 of British Specification DEF/1053 and in British Standard 3900, Methods of Test for Paints, Part E2, Scratch Test.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	SCRATCH RESISTANCE	METHOD 116.5
	AIR-DRIED FILMS	May 1979

Supersedes Issue of
August 1974

Apply (Method 98.2), preferably by dipping, one coat of the material under test to clean tin-plate panels (Method 101.1), approximately 75 mm x 150 mm.

Prepare at least six panels. Allow the coating to dry under standard conditions (Method 103.1), for 7 d.

Determine the scratch resistance on the air-dried finish by Method 116.2.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	SCRATCH RESISTANCE	METHOD 116.7
	BAKED FILMS	May 1979

Supersedes Issue of
August 1974

Apply (Method 98.5), preferably by dipping, one coat of the material under test, to clean, tin-plate panels (Method 101.1), approximately 75 mm x 150 mm. Allow the coated panels to air dry under standard conditions (Method 103.1) for 30 min and then bake them (Method 103.2) for the specified time at the specified temperature. At the end of the baking period, remove the panels from the oven and keep them under standard conditions for 24 h.

Determine the scratch resistance on the baked finish by Method 116.2.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	SCRATCH RESISTANCE FORCE-DRIED FILMS	METHOD 116.8 May 1979

Supersedes Issue of
August 1974

Apply (Method 98.3), preferably by dipping, two coats of the material under test to clean tin-plate panels (Method 101.1) approximately 75 mm x 150 mm. Unless otherwise specified, the total dry film thickness of the two coat system shall be $30 \pm 3 \mu\text{m}$. Prepare at least six panels. Allow the panels to dry under standard conditions (Method 103.1) for 30 min after application of the second coat of the material under test and subsequently force dry the panels in an oven (Method 103.2) 24 h at $60 \pm 2^\circ\text{C}$. At the end of this time remove the panels from the oven and condition them under standard conditions for 24 h.

Determine the scratch resistance on the force-dried finish by Method 116.2.

Canadian General Standards Board

CGSB Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	FLAME RESISTANCE	METHOD 118.4 May 1979

Supersedes Issue of
August 1974

The apparatus, which may be obtained commercially*, is as described and illustrated in Figure 1.

Apply the material (Method 98.2 or 98.3) to clean 30 cm x 30 cm steel, panels (Method 100.1) with a thickness of 0.8 ± 0.05 mm. After application of the final coat, dry the panels 24 h (Method 103.1) and force dry them 24 h (Method 103.2) at 60°C. At the end of this time place the panels under standard conditions for 30 min, and test them at any time after this preparation.

Insert a clean bare steel panel, similar to those used for the preparation of the painted panels, into the grooves of the apparatus. Place the burner 25 mm from the surface of the panel and connect it to air and gas supply through the manometers. Light the burner and adjust the flow of fuel and air so that a temperature of 500 to 550°C is produced in 20 s on the panel at the point of contact of flame, but on the opposite side of the panel. This temperature may be determined by an optical pyrometer or temperature-indicating crayons or paints. Steel at this temperature has a dark cherry red (dull red) color, which fact forms a useful guide. Maintain the flow of fuel and air evenly by means of the manometers for the duration of the test thereafter.

When the temperature has been adjusted, remove the blank panel and insert a piece of asbestos-cement board in front of the flame. Quickly put the test panel in place with the coated side facing away from the flame, and remove the asbestos board. Allow the flame to impinge on the back of the test panel for the specified time; observe the face for flashing or burning of the exposed area and for charring, blistering, peeling or other defects outside this area. Material that becomes detached from the panel is observed for flammability or glow. At the end of the required time, shut off the flame and examine the charred area for after-glow.

Panels prepared with standard reference paints may be used for comparison purposes.

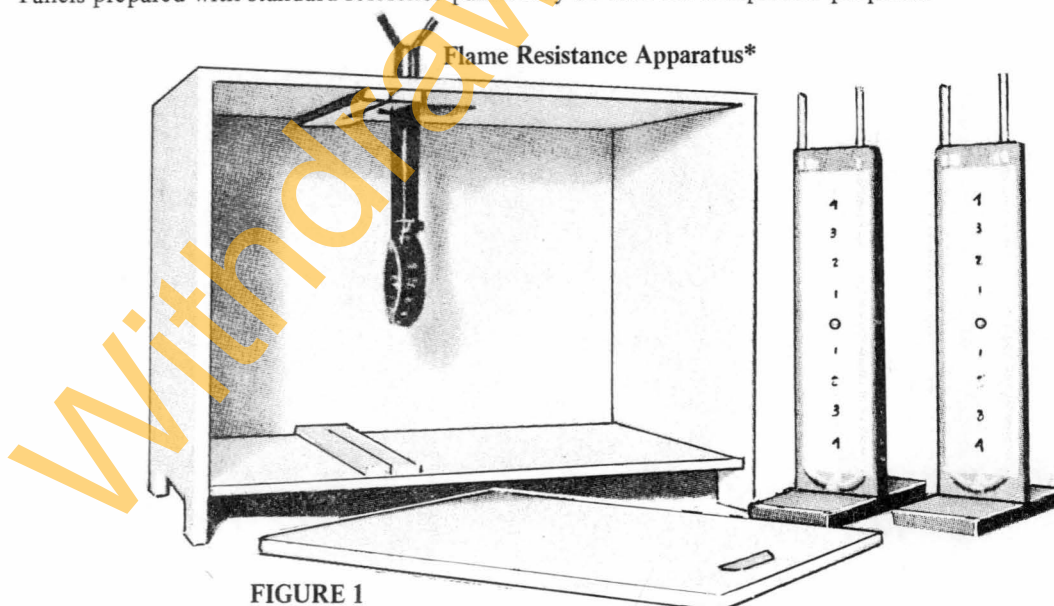


FIGURE 1

This apparatus consists of an open-fronted oven, approximately 45 cm x 30 cm x 30 cm, constructed of fireproof insulating board. Two runners are provided to hold the 30 cm x 30 cm panel vertical, and a circular gas burner, adjustable in relation to the panel, is fitted to the lid. The equipment includes baffle plate and two water manometers.

* Manufactured By:

Research Equipment Limited
64 Wellington Road
Hampton Hill, Middlesex, England

Distributed in Canada by:

Bowers Machine Co. Ltd.
2221 Benny Ave., Montreal, P.Q.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	FLAME RESISTANCE BAKED FILMS	METHOD 118.5 May 1979

Supersedes Issue of
August 1974

Apply the material (Method 98.2) to a clean 30 cm x 30 cm steel panel (Method 100.1) with a thickness of 0.8 ± 0.05 mm. Allow the film to dry 48 h under standard conditions (Method 103.1) and then bake 1 h (Method 103.2) at $120 \pm 2^{\circ}\text{C}$. At the end of this time place the panel under standard conditions for 30 min and then test the film in accordance with Method 118.4.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	FLAME RESISTANCE	METHOD 118.6
	FREE FILM	May 1979

Supersedes Issue of
August 1974

Adjust the blue flame of a Bunsen burner in a draft-free location so that it is approximately 15 cm high and the inner cone is approximately 7 cm high. Place a specimen 25 mm x 150 mm and 950 ± 65 μm thick, obtained by stripping a panel prepared according to the specification, vertically in the flame so that the lower end of the strip is approximately 4 cm above the inner cone.

Hold the specimen in the flame for 10 s and remove. Note the duration of burning or glowing.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	FLAME RESISTANCE TWO FOOT TUNNEL METHOD	Method 118.7 June 1983

SCOPE

This method determines the fire performance characteristics of coatings on a steel substrate.

APPARATUS

The test apparatus is as described and illustrated in ASTM D 3806, paragraph 4 "APPARATUS" and "Figure 1 Flame Tunnel", with the following exceptions: a) the asbestos millboard backing panel described in paragraph 4.5 shall be omitted, b) paragraph 4.8 shall not apply, and c) the thermocouple referenced in paragraph 4.6 shall be installed so that its tip is located on the hot side of the test panel at the flame/panel interface.*

PREPARATION OF TEST PANELS

Test panels shall be steel, AISI 1010/1020, 600 x 95 x 3 mm, solvent cleaned according to Method 100.1.

Apply (Methods 98.2 or 98.3) the material under test to the steel panels. After application of the final coat, dry the panels 24 h (Method 103.1) and force dry 24 h (Method 103.1) at 60°C. At the end of this time place the panels under standard conditions for 30 min, and test at any time thereafter.

A complete test shall consist of a minimum of three panels.

DEFINITIONS

Combustion - any chemical process that produces light and heat either as glow or flames (as ASTM E 176)

Burning - combustion of the coating film

Flaming - sustained combustion of the off-gases

Flashing - brief sporadic combustion of the off-gases

- * ASTM D 3806-79 Standard Test Method of Small Scale Evaluation of Fire - Retardant Paints (2-ft Tunnel Method). The apparatus distributed by Custom Scientific Instruments, Whippany, N.J., USA, and Monsanto Co., Functional Products, Special Chemicals Division, St. Louis, Mo., USA have been found satisfactory for this purpose.

PROCEDURE

Temperature Conditioning of Apparatus

The apparatus shall be temperature conditioned prior to testing the coated panels. Place a blank (uncoated) clean steel panel in the apparatus and cover it with the backing plate. Adjust the propane gas pressure to 1.3 ± 0.1 kPa and the flow rate to 0.7 ± 0.05 L/min**. This pressure and flow rate must be used throughout the test. Ignite the flame. The temperature of the flame contacting the panel should be approximately 925°C. After a minimum period of 15 min extinguish the flame and remove the blank panel. Testing of the coated panels must begin within one minute of extinguishing the flame.

Testing of Coated Panels. Place the first test panel in the apparatus coated side down. Initiate gas flow and ensure pressure and flow rate are correct. Ignite the flame and allow it to impinge on the test coating for the specified time. During this time observe and record the following:

- a. flashing or flammings - extent and duration,
- b. burning - time of ignition and duration, and
- c. any dripping of the coating from the test panel.

Immediately upon extinguishing the flame observe for and record the duration of any after-glow. Immediately remove the test panel from the apparatus and check the extent of any softening or liquification of the coating. Set the panel aside for later observation.

Repeat this procedure for the remaining panels.

The flame shall not remain extinguished for a period of more than 1 min between the exposure of subsequent test panels.*** After all panels have been tested, measure and record the extent of any blistering, the length of any charred area, the length of any permanent discoloration and the length of any non-adhered area (Method 135.1).

** These conditions are specified for propane providing 95.4 MJ/m³. For any other gas supply, adjust flow rate to provide 1130 J/s.

*** Should the time delay between test panels be expected to exceed 1 min the test apparatus may be maintained at operating temperature by placing a blank (uncoated) panel in the apparatus and re-igniting the flame.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	FLEXIBILITY FORCE-DRIED FILMS	METHOD 119.1 May 1979

Supersedes Issue of
August 1974

Apply (Method 98.2) one coat of the material under test to clean abraded tin-plate panels (Method 101.1). Use a minimum of three panels for the test so that the results are representative. Allow the coated panels to air dry under standard conditions (Method 103.1) for 18 h and subsequently force dry them in an oven (Method 103.2) for 1 h at $105 \pm 2^{\circ}\text{C}$. After removal from the oven, condition the panels under standard conditions for 24 h unless otherwise specified.

Bend the panels, under standard conditions, through 180° over the specified mandrel in not less than 1 s and not more than 1.5 s keeping the coated side uppermost. Examine the bent area under 10-power magnification.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	FLEXIBILITY LOW-TEMPERATURE	METHOD 119.4 May 1979

Supersedes Issue of
August 1974

Unless otherwise specified apply (Method 98.2) one coat of the material under test to clean abraded tin-plate panels (Method 101.1). Use a minimum of three panels for the test so that the results are representative. Allow the coated panels to dry under standard conditions (Method 103.1) for 7 d. Where required, expose the film to the specified tests before subjecting it to the flexibility test.

After drying and if specified, after testing, cool the panels, the mandrel apparatus and a pair of cotton gloves for 2 h in a refrigerator at $0 \pm 2^{\circ}\text{C}$. Bend the panels in the low-temperature environment through 180° over the specified mandrel with the coated side uppermost, using the cooled gloves on the hands. Take all necessary precautions to maintain the panels at the specified temperature during the test. Perform each bend in not less than 1 s and not more than 1.5 s. Examine the bent area under 10-power magnification.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	FLEXIBILITY AIR-DRIED FILMS	METHOD 119.5 May 1979

Supersedes Issue of
August 1974

Apply (Method 98.2) one coat of the material under test to clean abraded tin-plate panels (Method 101.1). Use a minimum of three panels for the test so that the results are representative. Allow the coated panels to dry under standard conditions (Method 103.1) for 7 d.

Bend the panels, under standard conditions, through 180° over the specified mandrel in not less than 1 s and not more than 1.5 s keeping the coated side uppermost. Examine the bent area under 10-power magnification.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	FLEXIBILITY LACQUER FILMS	METHOD 119.9 May 1979

Supersedes Issue of
August 1974

Apply (Method 98.2) the lacquer under test to clean abraded tin-plate panels (Method 101.1). Use a minimum of three panels for the test so that the results are representative. Allow the coated panels to dry under standard conditions (Method 103.1) for 24 h and subsequently force dry them in an oven (Method 103.2) for 24 h at $60 \pm 2^\circ\text{C}$. After removal from the oven, condition the panels under standard conditions for 24 h.

Bend the panels, under standard conditions, through 180° over the specified mandrel in not less than 1 s and not more than 1.5 s keeping the coated side uppermost. Examine the bent area under 10 power magnification.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	FLEXIBILITY PRIMERS ON PRETREATED ALUMINUM	METHOD 119.12 May 1979

Supersedes Issue of
August 1974

Apply by spray (Method 98.2) one coat of 1-GP-121 vinyl pretreatment coating to clean anodized aluminum panels (Method 99.2). Use a minimum of three panels for the test so that the results are representative. Allow the coating to dry for not less than 30 min and not more than 2 h. Apply (Method 98.2) one coat of the primer under test to produce an additional dry film $8 \pm 2 \mu\text{m}$ thick and allow to dry for 30 min. Bake the panels in an oven (Method 103.2) 48 h at $105 \pm 2^\circ\text{C}$. After removal from the oven, condition the panels under standard conditions (Method 103.1) for 30 min.

Bend the panels, under standard conditions, through 180° over the specified mandrel in not less than 1 s and not more than 1.5 s keeping the coated side uppermost. Examine the bent area under 10-power magnification.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	FLEXIBILITY BAKED FILMS	METHOD 119.13 August 1974

Supersedes Issue of
February 1973

Apply (Method 98.2), one coat of the material under test to clean abraded tin-plate panels (Method 101.1). Use a minimum of three panels for the test so that the results are representative. Allow the coated panels to air dry under standard conditions (Method 103.1) for 18 h and subsequently force dry them in an oven (Method 103.2) for 1 h at $105 \pm 2^{\circ}\text{C}$ ($221 \pm 3.5^{\circ}\text{F}$). After removal from the oven, condition the panels under standard conditions for 24 h unless otherwise specified.

Bend the panels, under standard conditions, through 180° over the specified mandrel in not less than 1 s and not more than 1.5 s keeping the coated side uppermost. Examine the bent area under 10-power magnification.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	FLEXIBILITY PRIMERS ON ANODIZED ALUMINUM	METHOD 119.14 May 1979

Supersedes Issue of
August 1974

Apply (Method 98.2) one coat of the primer under test to clean anodized aluminum panels (Method 99.2). Use a minimum of three panels for the test so that the results are representative. Allow to dry under standard conditions (Method 103.1) for 30 min. Bake the panels in an oven (Method 103.2) 48 h at $105 \pm 2^{\circ}\text{C}$. After removal from the oven, condition the panels under standard conditions for 30 min.

Bend the panels, under standard conditions, through 180° over the specified mandrel in not less than 1.0 s and not more than 1.5 s keeping the coated side uppermost. Examine the bent area under 10-power magnification.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	FLEXIBILITY FINISHES ON PRIMED ALUMINUM	METHOD 119.15 May 1979

Supersedes Issue of
August 1974

Apply by spray (Method 98.2) one coat of 1-GP-121 vinyl pretreatment coating to clean, anodized aluminum panels (Method 99.2). Use a minimum of three panels for the test so that the results are representative. Allow to dry for not less than 30 min and not more than 2 h. Apply (Method 98.2) the specified primer to produce an additional dry film of $8 \pm 2 \mu\text{m}$ thick and allow to dry for not less than 30 min and not more than 2 h.

Apply (Method 98.3) two coats of the lacquer under test to the primed panels, each lacquer coat to have a dry film thickness of $15 \pm 3 \mu\text{m}$ with 45 min drying between coats and a final lacquer dry film thickness of $30 \pm 5 \mu\text{m}$. Allow the final lacquer coat to dry under standard conditions (Method 103.1) for 2 h. Bake the panels in an oven (Method 103.2) for 1 h at $80 \pm 2^\circ\text{C}$ and then condition under standard conditions for 30 min. Cool the panels, the mandrel apparatus and a pair of cotton gloves for 2 h in a refrigerator at $0^\circ\text{C} \pm 2^\circ\text{C}$.

Bend the panels in the low-temperature environment through 180° over the specified mandrel with the coated side uppermost, using the cooled gloves on the hands. Take all necessary precautions to maintain the panels at the specified temperature during the test. Perform each bend in not less than 1 s and not more than 1.5 s. Examine the bent area under 10-power magnification.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	FLEXIBILITY FLEXIBILITY OF STRIPPABLE COATING	METHOD 119.18 May 1979

Supersedes Issue of
August 1974

Remove a sufficient number of 150 mm x 25 mm strips of film to give a representative test result from panels prepared as directed in the specification, and from similar panels subjected to accelerated weathering. Place the strips, the specified mandrel and a pair of gloves* in an environment at $-40 \pm 2^{\circ}\text{C}$ for 2 h and bend the film through 180° over the mandrel in the low-temperature environment in not less than 1 s and not more than 1.5 s. Care should be taken to maintain the film strips at the specified temperature during the test.

Examine the film strips under 10-power magnification.

* Cooling the gloves will aid in maintaining the specified temperature during the test.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	FLEXIBILITY	METHOD 119.19
	AMMUNITION LACQUER	May 1979

Supersedes Issue of
August 1974

Clean and prepare gilding metal panels (90% copper, 10% zinc) 250 μm – 400 μm in thickness* as described in Method 101.1. Use a minimum of three panels for the test so that the results are representative.

Dip the panels (Method 98.1) into the lacquer under test, thinned with 1-GP-50 or 1-GP-110 thinner according to manufacturer's instructions to a consistency of 65-70 K.U. Withdraw the panels at a uniform rate to give a dry-film thickness of 12 to 18 μm . Allow the coated panels to dry under standard conditions (Method 103.1) for 48 h.

Bend the panels, under standard conditions, through 180° over the specified mandrel in not less than 1.0 s and not more than 1.5 s keeping the test surface uppermost. Examine the bent area under 10-power magnification.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	COLOR STABILITY	METHOD 120.1
	FADING BY LIGHT	August 1974

Supersedes Issue of
February 1973

SCOPE

This procedure is used to determine the color fastness to light of material when exposed to radiation from a carbon-arc fading lamp.

APPARATUS

- (a) Calibration Paper and Standard Faded Strips for Calibrating the Lamps*
- (b) Carbon Arc Fading Lamps** - A vertical carbon arc enclosed in a No. 9200 PX Pyrex clear glass globe is mounted at the center of a vertical cylindrical shell. The arc shall be operated on a direct current of 11 to 13 amp or on 15 to 17 amp of 60 cycle ac with 125 to 140 v across the arc. The voltage of the input power line shall be between 208 and 250 v and shall not fluctuate by more than ± 2 v from the nominal or average voltage for which the machine is adjusted.

A cylindrical framework between the exterior shell and the carbon arc supports the specimen holders in which the panels are held in a vertical plane normal to and at a distance of 10 ± 0.1 in. (25.4 ± 0.3 cm) from the axis of the upper electrode. No part of the test specimen shall be more than 4 in. (10 cm) above or below the horizontal plane passing through the center of the arc when it is equipped with fresh carbons. When the power supply is 60 cycle ac, one electrode shall be No. 70 solid carbon and the other shall be No. 20 cored carbon.

The temperature of the test chamber at the location of the test specimens shall be maintained at $63 \pm 3^\circ\text{C}$ ($145 \pm 5^\circ\text{F}$) when measured with a standard Black Panel Thermometer unit. Filtered air shall be blown through the chamber and shall be humidified by passing through wicks saturated with water.

* Pieces of light-sensitive calibration paper, 2-5/8 by 3-1/4 in. (67 by 83 mm), NBS No. 700B, and a booklet of Standard Faded Strips NBS No. 701B may be purchased from the National Bureau of Standards, Washington 20234, D.C., U.S.A. The booklet of Standard Faded Strips contains pieces of the Calibration paper that have been exposed for different periods to the Bureau's Master Fading Lamp. One hour of exposure in the Bureau's Master Fading Lamp is defined as a Standard Fading Hour (SFH).

** The Fade-Ometer Models; Model FDA-R with intermittent blower operation but not equipped with an atomizer unit, Model FDA-RC with intermittent blower operation and an atomizer unit, Models 18-F 18-FT and 18-FR or equivalent with continuous blower operation and manual or automatic control of humidity meet the above requirements of the specified carbon arc fading apparatus for Method A of ASTM G 25 Continuous Exposure to Light. These models are available from the Atlas Electric Devices Co., 4114 N. Ravenswood Ave., Chicago 13, Illinois, U.S.A.

CALIBRATION OF THE LAMP

Mount a piece of the light-sensitive calibration paper in a metal specimen holder (without cardboard or paper backing) and place it in the fading lamp apparatus at the time the lamp is started with a new set of carbons. Expose the paper continuously for exactly 20 h. Remove and place the paper in the dark under standard conditions (Method 103.1) for at least 2 h.

Trim off the unexposed edges and compare the fading of the exposed calibration paper with each of the Standard Faded Strips and determine which strip it is closest to. The Standard Faded Strips are calibrated into Standard Fading Hours and consequently the number of Standard Fading Hours to which 20 clock hours exposure is equivalent to, can be estimated. Establish a factor converting clock hour units to Standard Fading Hours as follows:

$$\text{Factor} = \frac{\text{Standard Fading Hours}}{\text{Clock Hours}}$$

This factor should lie between 0.9 and 1.1 otherwise the arc lamp must be adjusted until such a factor can be produced. In case of dispute run two standard strips of the calibration paper with the sample being tested.

Apply (Method 98.3) two coats of the material under test to clean tin-plate panels (Method 101.1) except that hard fiberboard panels shall be used for emulsion paints. Allow the coated panels to dry under standard conditions (Method 103.1) for 24 h. Expose the painted surface of one or more prepared panels for the required number of Standard Fading Hours to the radiation from the Carbon-Arc Fading Lamp. Remove from the Fade-Ometer and allow to condition for 1 h under standard conditions.

Retain a control panel under standard conditions for color comparison purposes. Where a visual color difference assessment is required, make the visual color comparison by Method 12.9. Where instrumental color difference measurements are required, determine color difference by Method 12.1.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	COLOR STABILITY ACCELERATED YELLOWING IN AMMONIA ATMOSPHERE	METHOD 120.2 August 1974

Supersedes Issue of
December 1961

SCOPE

This method is used to determine the accelerated yellowing of a coating exposed to an ammonia atmosphere.

APPARATUS

- A glass cabinet approximately 9 x 18 in. (23 x 46 cm) and 10 in. (25 cm) high, fitted with an air-tight cover (a commercially available aquarium is suitable).
- A rack that fits into the cabinet and will support the test panels vertically above the surface of the ammonia solution.
- Color Difference Meter (any of the meters described in ASTM D 2244) See Method 12.1.
- Glass Test Panels, not less than 6 x 6 in. (15 x 15 cm).

TEST SOLUTION

- 100 ml conc. NH_4OH Solution (28 to 30% NH_3)
- 400 ml distilled water

Mix the distilled water and concentrated ammonium hydroxide and pour the mixed test solution into the glass cabinet.

PROCEDURE

Apply (Method 98.3) two coats of the material to a minimum of two glass test panels (Method 102.1) by means of a drawblade to a wet film thickness of 3 mils (75 μm) per coat. Measure the wet film thickness by Method ASTM D 1212. Allow the panels to dry 48 h under standard conditions (Method 103.1) after application of the second coat. At the end of this period take the color readings of the coatings (Method 12.1). One h before inserting the coated test panels into the cabinet, condition the cabinet at a temperature of 21 to 24 $^{\circ}\text{C}$ (70 to 75 $^{\circ}\text{F}$) and maintain the cabinet at this temperature for the duration of the test.

Place the test panels in the rack in the cabinet, seal the cabinet to make it air-tight and allow the panels to remain for 2 h (unless specified otherwise) in the sealed cabinet.

At the end of this time, remove the panels from the cabinet, condition the panels for 1 h under standard conditions and take the color readings again (Method 12.1).

From the color readings taken before and after exposure, calculate the total color difference ΔE (Method 12.1).

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	COLOR STABILITY	METHOD 120.3
	CLEAR FILMS	May 1979

Supersedes Issue of
August 1974

To two 70 x 150 mm white cararra glass panels (Method 102.1), having a reflectance of $85 \pm 2\%$, apply (Method 98.1) a uniform coating of the material to a dry film thickness of 25 to 30 μm . Allow to dry under standard conditions (Method 103.1) for 48 h. At the end of this time expose one of the panels in a Fade-Ometer (Method 120.1) for the specified time and retain the other in diffuse light under clean, fume-free conditions (preferably in a conditioned room) at 20 to 25°C.

Where a visual color difference assessment is required, make the visual color comparison between the exposed and control panel by Method 12.9.

Where an instrumental color difference measurement is required determine color difference between the exposed and the control panel by Method 12.1.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	COLOR STABILITY ACCELERATED YELLOWING OF COATINGS EXPOSED TO THE DARK, IN A WARM, MOIST ATMOSPHERE	METHOD 120.4 August 1974

SCOPE

This method is used to determine the accelerated yellowing of a coating exposed to the dark, in a warm, moist atmosphere.

APPARATUS

- (a) Color Difference Meter (Meeting requirements in ASTM D 2244)
- (b) Desiccator 8 in. (20 cm) in diameter
- (c) Drying Oven (Method 103.2)
- (d) Potassium Sulfate, K_2SO_4
- (e) Rack or other suitable support made from non-reacting materials such as glass, ceramic or enamelled steel to hold panels vertically inside the desiccator.

PROCEDURE

Prepare and condition suitable panels as specified. Measure, in accordance with ASTM D 2244, the chromaticity co-ordinates, a_1 and b_1 and the luminous reflectance, L_1 in the Adams Color Scale of the coating under test, using a suitable color difference meter. Determine the Yellowness Index YI_0 (as defined in ASTM D 1925) of the coating, before exposure, as follows:

$$\text{Yellowness Index } YI_0 = \frac{100 (0.72a_1 + 1.79b_1)}{L_1}$$

Prepare a saturated solution of potassium sulfate in distilled water at $49 \pm 1^\circ\text{C}$ ($120 \pm 2^\circ\text{F}$), and fill the lower portion of the desiccator with this saturated solution. Add a small amount of potassium sulfate to the saturated solution. Place a minimum of two panels (unless otherwise specified) not less than one-half in. (13 mm) apart on edge in the rack or other support in the desiccator so that the panels are held vertically above the potassium sulfate solution. Cover the desiccator, leave stopcock open and place in the dark in an oven (Method 103.2) maintained at $49 \pm 1^\circ\text{C}$ ($120 \pm 2^\circ\text{F}$). After 30 min close stopcock. At the end of three d, or other time as may be specified, remove the desiccator from the oven, remove the panels from the desiccator and allow the panels to condition under standard conditions (Method 103.1) for 2 h.

Again, using the same method, measure the chromaticity co-ordinates, a_2 and b_2 and the luminous reflectance L_2 . Determine the Yellowness Index YI of the exposed coating as follows:

$$\text{Yellowness Index } YI_C = \frac{100 (0.72a_2 + 1.79b_2)}{L_2}$$

Determine the change in Yellowness Index ΔYI between the coating under test before and after exposure as follows:

*Change in Yellowness Index $\Delta YI = YI_C - YI_0$

*Note: A positive ΔYI value indicates increased yellowness
A negative ΔYI value indicates decreased yellowness or increased blueness

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	RESISTANCE TO TEMPERATURE CHANGES COLD-CHECK RESISTANCE	METHOD 121.2 May 1979

Supersedes Issue of
August 1974

SCOPE

This method is for use in determining the resistance to checking and cracking of clear lacquer films applied to wood and subjected to sudden temperature changes.

APPARATUS

- Ventilated laboratory oven capable of being maintained at $50 \pm 2^{\circ}\text{C}$ and of heating wooden test panels to this temperature within 45 min.
- A cold chamber capable of cooling warm panels to $-20 \pm 1^{\circ}\text{C}$ in not less than 30 min and not more than 45 min. The number of panels required to meet these limits is determined, the temperature being measured by imbedding a thermocouple in a panel just underneath the film. All tests should be made with this number of panels, using dummy panels where necessary, to eliminate variations in cooling rates.
- Microscope, 10-power.

PROCEDURE

Prepare at least three panels according to the specification and age 10 d (Method 103.1). Place the predetermined number of panels vertically in a rack so that air can pass between the panels. The coated sides of the panels shall not directly face the walls of the oven or cold chamber.

Place the rack for 1 h in the oven held at 50°C , in such a manner as to avoid local overheating. At the end of this time transfer the rack within 1 min to the cold chamber maintained at -20°C . After 1 h exposure, remove the panels and allow to condition 15 min before examining under the microscope. The 1 h heating period, 1 h cooling period, and 0.5 h at room temperature constitute one cycle. Repeat the test, 3 cycles per d, until failure occurs or until the specified number of cycles are run.

EVALUATION

True lacquer cold-checks show up as one or more wavy or straight lines that cross the grain and do not appear to be related to the grain structure. Any well-defined checking of this description, regardless of size, constitutes failure. Checks in the veneer or checks running parallel to the grain are not considered as failures, but any panel so affected is discarded and the test repeated on another panel. Grain cracking is regarded as due to poor panel preparation or glue-line failure; such panels are also rejected and the test repeated.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	ACCELERATED WEATHERING	METHOD 122.1
	SELECTION, EXPOSURE AND EXAMINATION OF PANELS	August 1974

Supersedes Issue of
November 1962

Prepare panels as described in Methods 122.3 to 122.19 or in the applicable specification. Determine the gloss of the panels by Method 13.4 and the color of the panels by Method 12.1 just prior to exposure. Replicate panels are to be uniform and within 2 units in gloss and $0.5 \Delta E$ in color.

Coat backs and edges of the panel with the material under test or other suitable material.

Expose at least two panels in an accelerated weathering machine operated in accordance with Method 122.2. Retain a reference panel stored under standard conditions (Method 103.1) in an area where diffuse light, or for referee purposes, where illumination of 30 ± 5 foot candles ($323 \pm 54 \text{ lx}$ or 1 lm/m^2) will fall on it for not less than 8 h each day.

Examine the panels at the end of the specified number of cycles and at intervals when required, for the effects listed below, as may be specified. Where possible and required, numerical ratings are applied as well as verbal descriptions:

<u>Test</u>	<u>Method</u>
Gloss	Determine by Method 13.4
Instrumental Color Difference	Determine by Method 12.1
Visual Color Difference	Determine by Method 12.9
Blistering	Rate by ASTM D 714 Evaluating Degree of Blistering of Paints
Chalking	Rate by ASTM D 659 Evaluating Degree of Chalking of Exterior Paints
Checking	Rate by ASTM D 660 Evaluating Degree of Checking of Exterior Paints
Cracking	Rate by ASTM D 661 Evaluating Degree of Cracking of Exterior Paints
Erosion	Rate by ASTM D 662 Evaluating Degree of Erosion of Exterior Paints
Flaking	Rate by ASTM D 772 Evaluating Degree of Flaking (Scaling) of Exterior Paints
Rusting	Rate by ASTM D 610 Evaluating Degree of Rusting on Painted Steel Surfaces
Peeling	Rate by visual inspection

Where specified, other changes not listed above are also noted and rated by the following scale:

10 = no change
9 = slight trace
8 = trace
7 = slight
6 = slight to medium

5 = medium change
4 = medium to marked
3 = marked change
2 = very marked change
1 = severe change
0 = total breakdown

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	ACCELERATED WEATHERING GENERAL PROCEDURE	METHOD 122.2 August 1974

Supersedes Issue of
February 1973

SCOPE

This method is intended to establish means for uniform operation of light and water exposure apparatus of the carbon-arc type, sometimes referred to as accelerated or artificial weathering apparatus.

APPARATUS

Apparatus commercially known as Atlas Twin-Arc Weather-Ometer shall be used. The machine shall be operated on ac with a combination commonly known as No. 70 solid carbons and No. 20 cored carbons. These carbons shall be 1/2 in. (12.7 mm) in dia., with the top carbon 12 in. (30 cm) and the bottom carbon 4 in. (10 cm) long, and shall produce what is commercially known as a Violet Arc*.

The apparatus shall include equipment for measuring and controlling the following:

- (1) current
- (2) voltage
- (3) temperature of panels
- (4) pressure and temperature of water spray
- (5) operating schedule or cycle

OPERATION

Unless otherwise specified, operate the apparatus 5 d of each week on a daily cycle consisting of 8 h light only, 10 h light and water spray, and 5-1/2 h water spray only. Test panels shall be rotated about the carbon-arc lamp at a drum speed of 1 rpm. Allow half an hour of each 24 h cycle for maintenance of the apparatus.

Operate the light within the following limits:

During the burning period maintain the voltage at 135 ± 10 v and the amperage at 16 ± 1 amp.

Replace globes after 2,000 h of use, or when pronounced discoloration or milkiness develops in the glass, whichever occurs first. Clean globes each day by washing with detergent and water. If abnormal smoke deposit is observed on a globe during the operation, inspect the globe and in case of damage, replace. Also inspect the globe seat on the gas check plate for evidence of corrosion or warpage. Where present either reface the globe seat on a lathe or replace the gas check plate.

ASTM D 749 Method of Calibrating a Light Source Used for Accelerating the Deterioration of Rubber, may be used for checking the uniformity of operation of the light source.

The temperature of the spray water where it enters the apparatus shall be $16 \pm 6^\circ\text{C}$ ($60 \pm 10^\circ\text{F}$) and the pH 6.0 to 8.0. The water shall strike the test panels in the form of a uniform fine spray produced by No. 50 nozzles with a pressure of 12 to 18 psi (83 to 124 kPa) at the nozzle. Water pressure shall not be controlled by using the valve on the water-spray pipe in the weather-ometer chamber. Spray water shall not be recirculated.

The spray water shall be treated in a demineralizer. When freshly regenerated, the total dissolved solids of the spray water shall not be greater than 1 ppm and CO_2 and SiO_2 shall be effectively removed by the use of a strong base resin in the demineralizer. The demineralizer shall be operated in the range 0 - 5 ppm and when the total dissolved solids of the demineralized water reach 5 ppm the resins shall be regenerated. At suitable intervals the base resin should be regenerated with warm 49°C (120°F) NaOH solution to remove organic fouling which tends to reduce the capacity of the resin.

* The light source shall be a carbon arc including the carbons and light filters regularly supplied with the apparatus that is used or specified.

Operate the machine in a room free from dust, fumes and cold drafts, and at a temperature not below 20°C (68°F).

Control the temperature within the apparatus by the circulation of air and, if necessary, by a spray of cooling water on the outside of the drum. The force of the cooling spray shall be kept as low as possible to avoid creating a mist that may fall on the test panels and affect gloss results. Maintain the temperature at $63 \pm 5^\circ\text{C}$ ($145 \pm 9^\circ\text{F}$) as measured by a standard black panel having a suitable thermometer fastened to the surface of the panel and the panel mounted in the test rack. Take readings through the window during the light-only cycle, if possible without opening the door to the test chambers.

For vertical exposure of specimens, the two lamps shall be placed along the drum diameter so that the closest distance from the center of each lamp to the drum wall is $10\frac{1}{8} \pm \frac{3}{8}$ in. (25.7 ± 1.0 cm) and the greatest distance (at right angles to the drum diameter along which the lamps are placed) is $15\frac{1}{2} \pm \frac{1}{2}$ in. (39.4 ± 1.3 cm). The lamps shall be staggered by a difference in height of $3\frac{1}{4} \pm \frac{1}{4}$ in. (83 ± 6 mm) to provide a more uniform exposure over the specimens.

Unless otherwise specified, mount the test specimens vertically, both above and below the horizontal center line of the light sources. To provide uniform distribution of light over the test surfaces, change the position of the specimens in four steps, from upper to lower specimen row and inverted in each row, making one of these changes per day.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	ACCELERATED WEATHERING TESTS FOR HOUSE PAINTS ON WOODEN PANELS	METHOD 122.4 May 1979

Supersedes Issue of
August 1974

Sand white pine panels and seal the ends in accordance with Method 97.1. Apply (Method 97.2) one coat of 1-GP-55 primer and allow to dry (Method 103.1) 24 h. Apply (Method 97.2) the material under test using the specified number of coats. Allow the final coat to dry 7 d, during which the backs and edges are coated with 1-GP-93M aluminum paint. Select, measure, expose and examine the panels in accordance with Methods 122.1 and 122.2.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	ACCELERATED WEATHERING TEST FOR TWO COATS OF AIR-DRYING MATERIAL ON STEEL PANELS	METHOD 122.6 May 1979

Supersedes Issue of
August 1974

Apply (Method 98.3) two coats of the material under test to clean steel panels (Method 100.1). Dry the coated panels 7 d under standard conditions (Method 103.1) prior to exposure to accelerated weathering. Select, measure, expose and examine the prepared panels in accordance with Methods 122.1 and 122.2.

Withdrawn/Retiré

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	ACCELERATED WEATHERING TEST FOR TWO COATS OF BAKING MATERIAL ON STEEL PANELS	METHOD 122.7 June 1980

Supersedes Issue of
May 1979

Apply (Method 98.5) two coats of the material under test to clean steel panels (Method 100.1). Unless otherwise specified air dry the first coat 30 min under standard conditions (Method 103.1) and bake the panels in an oven (Method 103.2) for the time and temperature specified by the manufacturer except that the baking time shall not exceed 30 min. Remove the panels from the oven, allow to cool and apply a second coat of the material. Unless otherwise specified air dry the second coat 30 min under standard conditions and bake similarly to the first coat. Keep the prepared panels under standard conditions for 24 h and then select, measure, expose and examine them in accordance with Methods 122.1 and 122.2.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	ACCELERATED WEATHERING TEST FOR ONE COAT OF AIR-DRYING MATERIAL ON STEEL OR ALUMINUM PANELS	METHOD 122.8 May 1979

Supersedes Issue of
August 1974

Apply (Method 98.2) one coat of the material under test to the specified panels; steel (Method 100.1) or aluminum (Method 99.1). Dry the prepared panels under standard conditions (Method 103.1) for 7 d and then select, measure, expose and examine them in accordance with Methods 122.1 and 122.2.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	ACCELERATED WEATHERING TEST FOR ONE COAT MATERIAL ON PRIMED STEEL PANELS	METHOD 122.9 May 1979

Supersedes Issue of
August 1974

Apply (Method 98.4) one coat of the specified primer to clean steel panels (Method 100.1) and dry for the specified time (Method 98.4). Apply (Method 98.4) one coat of the material under test.

After application of the final coat dry the prepared panels under standard conditions (Method 103.1) for 7 d and then select, measure, expose and examine them in accordance with Methods 122.1 and 122.2

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	ACCELERATED WEATHERING TEST FOR AIRCRAFT FINISHES ON PRIMED ANODIZED ALUMINUM PANELS	METHOD 122.10 May 1979

Supersedes Issue of
August 1974

Apply (Method 98.2) one coat of 1-GP-121M vinyl pretreatment coating by spray to clean anodized aluminum panels (Method 99.2) to give a dry-film thickness of $8 \pm 2 \mu\text{m}$ and allow to dry for not less than 30 min and not more than 2 h under standard conditions (Method 103.1). Apply the specified primer to produce an additional dry film of $8 \pm 2 \mu\text{m}$ and allow to dry for not less than 30 min under standard conditions.

If the material under test is an enamel, apply in one coat to give an additional dry film of $30 \pm 5 \mu\text{m}$ dry film thickness. If the material under test is a lacquer, apply in two coats, each of $15 \pm 3 \mu\text{m}$ dry film thickness with 45 min between coats to give a final lacquer thickness of $30 \pm 5 \mu\text{m}$. Condition the final coat 7 d under standard conditions and then select, measure, expose and examine the panels in accordance with Methods 122.1 and 122.2. Where specified, measure reflectance according to ASTM E 97.

Withdrawn/Revised

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	ACCELERATED WEATHERING TEST FOR WOOD PRIMER ON SEALED WOODEN PANELS	METHOD 122.11 May 1979

Supersedes Issue of
August 1974

Prepare the specified wooden panels (Method 97.1), completely immerse them in the specified sealer for 3 min, drain and allow to dry for 24 h under standard conditions (Method 103.1). Apply (Method 98.2) one coat of the priming paint and dry 18 h under standard conditions. Coat the edges and backs with 1-GP-93M aluminum paint. Condition the panels under standard conditions for the specified time and then select, measure, expose and examine them in accordance with Methods 122.1 and 122.2.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	ACCELERATED WEATHERING TEST FOR WOOD PRIMER ON SEALED AND TOPCOATED WOODEN PANELS	METHOD 122.12 May 1979

Supersedes Issue of
August 1974

Seal and prime the panels as in Method 122.11. Apply (Method 98.4) the specified topcoat to the test surfaces and dry 18 h under standard conditions (Method 103.1). Coat the edges and backs with 1-GP-93M aluminum paint. Condition the panels for the specified time and then select, measure, expose and examine them in accordance with Methods 122.1 and 122.2.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	ACCELERATED WEATHERING TEST FOR MASONRY COATINGS	METHOD 122.13 May 1979

Supersedes Issue of
August 1974

Apply the material under test as specified to CAN2-34.16-M Asbestos-Cement panels that have no silicone or other waterproofing treatment. Allow the material to dry under standard conditions (Method 103.1) for 7 d during which time coat the backs and edges of the panels with 1-GP-93M aluminum paint.

Then select, measure, expose and examine the panels in accordance with Methods 122.1 and 122.2.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	ACCELERATED WEATHERING TEST FOR STENCIL INK	METHOD 122.14 May 1979

Supersedes Issue of
August 1974

Stencil four or five letters about 20 mm high on three of the specified panels (Method 97.1 for wood; Method 101.1 for tin-plate) using a 22-GP-5 stencil brush and a stencil board, applying enough ink to give clear legible letters without smearing. Allow the lettered panels to dry 24 h (Method 103.1).

Expose two of the panels (Method 122.2) for the specified time and retain one panel for comparison. After exposure examine the letters on the panel.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	ACCELERATED WEATHERING - TEST FOR STENCIL LACQUER ON STEEL AND WESTERN RED CEDAR PANELS	METHOD 122.15 June 1980

Supersedes Issue of
May 1979

Apply (Method 98.3) two coats of the lacquer to clean steel panels (Method 100.1) and to red cedar panels (Method 97.1). Coat the backs and edges of the panels with 1-GP-93M aluminum paint and condition the panels 7 d under standard conditions (Method 103.1).

Select, measure, expose and examine panels so prepared in accordance with Methods 122.1 and 122.2.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	ACCELERATED WEATHERING TEST FOR INK PASTE ON PAINTED STEEL PANELS	METHOD 122.16 May 1979

Supersedes Issue of
August 1974

Apply (Method 98.2) a coat of quick-drying styrenated alkyd enamel 1-GP-114, Flat Green 503-301 (Method 150.1), to steel panels (Method 100.1) and allow to dry 1 h under standard conditions (Method 103.1).

Apply the ink over the enamel in the following manner:

Transfer a portion of the ink to a glass plate and roll out uniformly by means of a brayer 50 to 75 mm wide and 75 mm in diameter. When the surface of the brayer has been completely and evenly coated, transfer the ink to the painted panels by passing the brayer over the panels for their full length.

Dry the panels 24 h under standard conditions and bake 2 h (Method 103.2) at 60°C.

Select, measure, expose and examine panels so prepared in accordance with Methods 122.1 and 122.2.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	ACCELERATED WEATHERING TEST FOR STRIPPABLE COATING ON STEEL PANELS	METHOD 122.17 May 1979

Supersedes Issue of
August 1974

Prepare nine panels according to the specification. After force drying, allow them to dry 5 d (Method 103.1), during which time the backs and edges are given a protective coating.

Then select, measure and expose the panels for the specified time in accordance with Methods 122.1 and 122.2.

After exposure examine the film and panel surfaces, and test the film as specified.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	ACCELERATED WEATHERING TEST FOR TWO COATS OF PIGMENTED STAIN ON WOOD PANELS	METHOD 122.19 May 1979

Supersedes Issue of
August 1975

Apply (Method 97.2) the material without reduction to western red cedar panels (Method 97.1) and allow to dry 48 h under standard conditions (Method 103.1).

Similarly apply a second coat and allow to dry 7 d, under standard conditions during which time coat the backs and edges of the panels with 1-GP-93M aluminum paint.

Select, measure, expose and examine the panels in accordance with Methods 122.1 and 122.2.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	SEALING PROPERTIES	Method 123.2 May 1979

Supersedes Issue of August 1974
Amended September 1980
Re-edited September 1982

Immerse half of a flat-grain Douglas fir panel (Method 97.1) in the material under test for three min, then withdraw it and allow it to dry 18 h (Method 103.1) in a vertical position with the untreated end uppermost. Coat it (Method 98.4) with standard white undercoat (Method 150.3) and allow it to dry.

Apply one coat of 1-GP-88, Type 1, enamel and allow to dry for 24 h. Examine the panel by comparing the gloss, fullness and smoothness of the enamel film over the sealed and unsealed portions. If the sealed area is not superior to the unsealed area, the sealer is inadequate. Determine the average gloss reading over the sealed area according to Method 13.4.

Withdrawn/Revised

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	SCRUBBABILITY FILMS APPLIED DIRECTLY OVER GLASS (GENERAL PROCEDURE)	METHOD 125.1 October 1982

Supersedes Issue of
August 1974

Apply (Method 98.2) one coat of the material under test to a 150 × 430 mm plate-glass panel (Method 102.1), using an applicator 130 mm wide, and allow to dry under standard conditions (Method 103.1) for 7 d. Where specified measure the gloss in accordance with (Method 13.4). Place the panel in a Cardner Model 105 Straight Line Washability Machine or equivalent, and scrub with a hog-bristle brush as supplied with the instrument, the brush being weighted to 450 g. Unless otherwise specified, prepare a solution containing 1% reagent grade Na₂CO₃ and 2% nonionic detergent of the polyoxyethylene Iso-octyl phenol type containing 9-10 ethylene oxide units per molecule*.

Prior to commencement of scrubbing each day, immerse the hog-bristle brush to a depth of 15 mm in distilled water at 20-30°C for 30 min. Then shake the brush vigorously several times to remove excess water and soak it an additional 5 min in the scrubbing solution. Make a blank run of 500 cycles on an uncoated panel at the start of the day. A brush may be used continuously during the day but is should be washed thoroughly between runs, rinsed with distilled water, shaken and soaked in the detergent solution for 5 min.

Mount the panel firmly on the washability machine so that the brush will describe a straight line throughout its entire path and reverse its direction without bobbing (dipping and recovering at the end of a stroke). Place the saturated brush on the test film and set in motion at approximately 40 cycles per minute. During the test, drop additional solution into the middle of the scrubbed area at a rate just sufficient to keep the panel wet (about 12 drops per minute).

Remove the panel at the end of the specified number of cycles, each cycle consisting of a complete forward and reverse stroke. Immediately wash the panel in running water of a moderate temperature. Rinse it with distilled water and, while it is being rinsed, wipe it gently with a clean, soft, cotton cloth. Rinse the panel again, allow to dry 24 h under standard conditions in a vertical position and examine the middle 200 mm. Where specified, measure the gloss in accordance with Method 13.4.

* Such as Igepal CO-630, Triton X-100 or Renex 690

Canadian General Standards Board

CGSB Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	SCRUBBABILITY EMULSION FINISHES	METHOD 125.2 May 1979

Supersedes Issue of
August 1975

Apply (Method 98.1) a coat of standard white undercoat (Method 150.3) to the full length of clean 150 x 430 mm plate glass panels (Method 102.1) to obtain a dry film $55 \pm 5 \mu\text{m}$ thick and at least 125 mm wide*. For contrast, tint the standard white undercoat to about the color of Grey 101-320 of 1-GP-12c except where a grey finish is being tested. Allow the panels to dry (Method 103.1) not less than 7 d. They may be stored for up to 6 months if protected from contamination.

Apply the latex paint to be tested to the primed panels to give an additional $45 \pm 5 \mu\text{m}$ of dry film. If a film applicator is used, the runners shall travel on uncoated glass along the edges of the panel. Cure the test panels for the specified time in a horizontal position under standard conditions; 24 h before test, protect both ends of the panel for a distance of 110 mm with a coat of 1-GP-99 phenolic resin varnish.

At the end of the drying time scrub the panel in accordance with Method 125.1 using a 0.5% solution of nonionic detergent of the polyoxyethylene iso-octyl phenol type containing 9-10 ethylene oxide units per molecule**.

Remove the panel at the end of the specified number of cycles and immediately wash in water at moderate temperature. Rinse it with distilled water and inspect within the middle 200 mm of brush travel.

* A satisfactory device for obtaining the required test film is the Dow Film Caster, which has a $180 \mu\text{m}$ clearance 135 mm wide for the undercoat application, and a $250 \mu\text{m}$ clearance 140 mm wide for the emulsion finish.

**Such as Igepal CO-630, Triton X-100 or Renex 690.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	SCRUBBABILITY FILMS APPLIED OVER A PRIMER	METHOD 125.3 May 1979

Supersedes Issue of
August 1975

Apply (Method 98.4) one coat of 1-GP-48M primer to the full length of clean 150 x 430 mm plate glass panels (Method 102.1). Apply (Method 98.2) the material under test and allow to dry (Method 103.1) for the specified time. At the end of this time scrub the panel as described in Method 125.1. All details concerning the scrubbing apparatus, detergent solution, preparation of the brush, the preparatory blank run, etc., shall be as outlined in Method 125.1. Where specified, measure the gloss in accordance with Method 13.4.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	SCRUBBABILITY INTERIOR FLAT WALL FINISHES, EMULSION AND ALKYD TYPES	METHOD 125.4 May 1979

Supersedes Issue of
August 1975

Apply (Method 98.1) a coat of standard white undercoat (Method 150.3) to the full length of clean 150 x 430 mm plate glass panels (Method 102.1) to obtain a dry film 55 ± 5 μm thick and at least 125 mm wide. For contrast tint the standard white undercoat to about the color of Grey 101-320 of 1-GP-12c. Allow the panels to dry (Method 103.1) not less than 7 d. They may be stored for up to 6 months if protected from contamination.

Apply the finish to be tested to the primed panels to give an additional 35 ± 5 μm dry film and allow the finish to dry (Method 103.1) 7 d. Twenty-four hours before the test, protect both ends of the panel for a distance of 110 mm with a coat of 1-GP-99 phenolic resin varnish.

Scrub the above prepared panel in accordance with Method 125.1. All details concerning the scrubbing apparatus, detergent solution, preparation of the brush, the preparatory blank run, etc., shall be as outlined in Method 125.1. Where specified, measure the gloss in accordance with Method 13.4.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	SHOCK RESISTANCE	METHOD 126.1 May 1979

Supersedes Issue of
August 1975

Apply (Method 98.2) one coat of material to an abraded tinplate panel (Method 101.1) and allow to dry 2 h under standard conditions (Method 103.1). Heat (Method 103.2) the panel 5 h at $200 \pm 2^{\circ}\text{C}$. At the end of this time remove it from the oven, immediately immerse in water at $23 \pm 2^{\circ}\text{C}$, and keep it in the water for 5 min. Withdraw the panel and examine it.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	SANDING PROPERTIES	METHOD 127.1
	WET SANDING	May 1979

Supersedes Issue of
August 1975

Draw down (Method 98.1) the material on a 125 x 300 mm clean glass panel (Method 102.1) and allow to dry 18 h under standard conditions (Method 103.1). Rub one-half of the panel with No. 360 Silicon-carbide abrasive paper using moderate pressure. Wet the paper at intervals with water. After 30 strokes examine the abrasive paper. Wipe the panel dry and examine.

After 1 h apply (Method 98.4) the specified topcoat to the whole panel and dry 24 h under standard conditions. Examine the film over both sections of the panel for gloss differences, scratch marks or other defects due to poor sanding properties.

Withdrawn/Retired

Canadian General Standards Board

CGSB Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	SANDING PROPERTIES WOOD FILLER	METHOD 127.2 May 1979

Supersedes Issue of
August 1975

Reduce the filler as directed in the standard and apply by brush, in the direction of the grain, an amount in excess of that required to fill the pores of a 75 x 150 mm minimum white oak panel (Method 97.1) containing bands of characteristic open-pore areas. Allow the filler to "set" (i.e. become flat or dull due to solvent evaporation) and wipe off the excess across the grain, working the filler into the pores with a clean pad of cheesecloth. Dry the panel 18 h under standard conditions (Method 103.1) and then lightly sand in the direction of the grain, using moderate pressure, with No. 360 silicon-carbide abrasive paper.

After 30 strokes, examine the abrasive paper and the abraded panel.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	SANDING PROPERTIES DRY SANDING	METHOD 127.3 May 1979

Supersedes Issue of
August 1975

Draw down (Method 98.2) the material on a 125 x 300 mm clean glass panel (Method 102.1) and allow to dry under standard conditions (Method 103.1) for the specified time. Dry sand one-half of the panel with the specified abrasive paper using moderate pressure. After 30 strokes examine the paper. Blow the dust off the panel and examine the abraded section.

Where required, apply (Method 98.4) the specified topcoat to the whole panel and dry 24 h, under standard conditions. Compare the film over both sections of the panel for gloss differences, scratch marks or other defects due to poor sanding properties.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	SANDING PROPERTIES DRY SANDING PRIMER ON PRETREATED ALUMINUM	METHOD 127.4 May 1979

Supersedes Issue of
August 1975

Apply by spray (Method 98.2) one coat of 1-GP-121M vinyl pretreatment coating, to clean anodized aluminum panels (Method 99.2), to give a dry-film thickness of $8 \pm 2 \mu\text{m}$ and allow to dry for not less than 30 min and not more than 2 h under standard conditions (Method 103.1). Apply the primer under test to produce an additional dry film of $8 \pm 2 \mu\text{m}$ and allow to dry for 30 min under standard conditions. Dry sand one-half the panel with the specified abrasive paper using moderate pressure. Examine the paper after 30 strokes. Blow the dust off the panel and examine the abraded section.

Where required, apply (Method 98.4) the specified topcoat to the whole panel and allow to dry under standard conditions for 24 h. Compare the film over both sections for gloss differences, scratch marks or other defects due to poor sanding properties.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	MEASUREMENT OF FILM THICKNESS	METHOD 128.1
	DRY FILM THICKNESS	May 1979

Supersedes Issue of
August 1975

Measure the dry film thickness in accordance with the appropriate ASTM Method as described below:

- (1) ASTM D 1005 Measurement of Dry Film Thickness of Organic Coatings (Dial Micrometer Method). This method covers the measurement of film thickness of dried films of paint, varnish, lacquer and related products, applied to an acceptable plane rigid surface, for example, metal, glass, plastic, etc. The method is not recommended for films less than 10 μm in thickness and it should not be used on excessively soft films.
- (2) ASTM D 1186 Measurement of Dry Film Thickness of Nonmagnetic Organic Coatings Applied on a Magnetic Base. This is a nondestructive method for nonmagnetic films on a magnetic base, particularly useful for thin films less than 10 μm in thickness. It is not applicable to coatings which would be readily deformable under the load of the measuring instrument. The following instruments may be used for these measurements:
 - (a) Elcometer
 - (b) G.E. Film Thickness Gauge, Type B.
 - (c) Magne-Gage
 - (d) Mikro-Test or equivalent
 - (e) Elcotector
 - (f) Minitector
- (3) ASTM D 1400 Measurement of Dry Film Thickness of Nonmetallic Coatings of Paint, Varnish, Lacquer, and Related Products Applied on a Nonmagnetic Metal Base. This method covers measurement of thickness of electrically nonconductive dried films of paint, varnish, lacquer and related products applied over a non-magnetic metal base. Three types of instrument apply here:
 - (a) Method A — Inductance Thickness Gauge
 - (b) Method B — Penetration Thickness Gauge
 - (c) Method C — Eddy Current Instruments

Measure the thickness of the film just prior to its subsection to test and determine the number of readings to be taken by the variation of film thickness over the panel. Not less than 3 readings shall be taken on 75 x 150 mm panels and not less than 6 readings on 150 x 225 mm panels, and the mean and range of these calculated and reported.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	MEASUREMENT OF FILM THICKNESS DRY FILM – SOFT THICK FILM	METHOD 128.2 May 1979

Supersedes Issue of
August 1975

Apply (Method 98.1) the material to the specified substrate and air dry under standard conditions (Method 103.1) or cure (Method 103.2) for the specified time. Condition heated films 24 h. Measure the thickness of the film and panel using a micrometer having anvils with a diameter of 6.4 ± 0.3 mm and a load of 85 ± 3 g which is equivalent to a pressure of 24 to 30 kPa. Open the micrometer and carefully remove the film from the area where the measurement was taken. Determine the thickness of the panel at the same location; the difference in readings is the thickness of the film. Alternatively, the thickness of the panel may be measured prior to coating.

Determine the number of readings to be taken by the variation of film thickness over the panel. Not less than 3 readings shall be taken on 75 x 150 mm panels and not less than 6 readings on 150 x 225 mm panels. The mean and the range of these shall be calculated and reported.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	SALT-SPRAY CORROSION RESISTANCE GENERAL PROCEDURE	METHOD 129.1 May 1979

Supersedes Issue of
August 1975

Unless otherwise specified, prepare steel panels as in Method 100.2. Coat the panels with the material under test according to the specified method. Also coat the backs and edges of the panel with the material under test or other suitable material. When scored panels are required, draw two score lines from corner to corner to produce an X, the lines being produced with a sharp knife held at an angle of 30° to the panel with the plane of the blade perpendicular to the panel, or other device that avoids tearing the film. The scoring shall expose the bright metal.

Expose the panels in a salt-spray chamber conforming to ASTM B 117, Method of Salt Spray (Fog) Testing. Support the panels 15° from the vertical. If holes have been drilled in the panels to facilitate preparation, these holes should be at the bottom of the panels when the panels are placed in the salt-spray chamber.

After exposure for the specified length of time, remove the panels and rinse to wash away all salt solution and any soluble deposits. Immediately examine and evaluate the coated panels according to Method 95.1. With scored panels note the amount of under-rusting and measure the spread of rust under-creepage to 1.5 mm.

Completely remove the coating by means of a suitable paint remover from about one-half of the panel, selecting a half of the panel area which is representative, and observe the surface for evidence of rusting and pitting. Pitting or rusting along the edges of the panel shall be disregarded.

At least three panels are considered to constitute one test. The behavior of the majority of the test panels shall be taken as the performance of the material being tested.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	SALT-SPRAY CORROSION RESISTANCE CORROSION RESISTANCE ON GRIT-BLASTED STEEL PANELS	METHOD 129.2 May 1979

Supersedes Issue of
August 1975

Apply (Method 98.2) the material under test to steel panels (Method 100.2) and dry 7 d under standard conditions (Method 103.1). Also coat the backs and edges of the panel with the material under test or other suitable material. When required score the panels as described in Method 129.1. Expose and examine the panels in accordance with Method 129.1.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	SALT-SPRAY CORROSION RESISTANCE CORROSION RESISTANCE ON PHOSPHATED STEEL PANELS	METHOD 129.3 May 1979

Supersedes Issue of
August 1975

Apply (Method 98.2) the material under test to phosphated steel panels (Method 100.3) and dry 7 d under standard conditions (Method 103.1). Also coat the backs and edges of the panel with the material under test or other suitable material. Score, expose and examine the panels in accordance with Method 129.1.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	SALT-SPRAY CORROSION RESISTANCE CORROSION RESISTANCE OF BAKED FINISHES	METHOD 129.4 May 1979

Supersedes Issue of
August 1975

Apply (Method 98.5) the material under test to steel panels (Method 100.2), dry 30 min under standard conditions (Method 103.1) and bake (Method 103.2) at the specified temperature for the specified time. At the end of the baking period remove from the oven and condition under standard conditions for 24 h. Also coat the backs and edges of the panel with the material under test or other suitable material. When required score the panels as described in Method 129.1. Expose and examine the panels in accordance with Method 129.1.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	BEHAVIOR TOWARDS TOPCOATS PRIMERS ON PRETREATED ALUMINUM	METHOD 130.1 May 1979

Supersedes Issue of
August 1975

SCOPE

This method is for use in determining how zinc chromate primers applied to pretreated aluminum react when coated with enamel and/or lacquer.

PROCEDURE

Apply by spray (Method 98.2) one coat of 1-GP-121M vinyl pretreatment coating to each of a number of clean anodized aluminum panels (Method 99.2) to give a dry-film thickness of $8 \pm 2 \mu\text{m}$ and allow to dry under standard conditions (Method 103.1) for not less than 30 min and not more than 2 h. Apply the primer under test to produce an additional dry film of $8 \pm 2 \mu\text{m}$. At the end of each of the specified times select one primed panel for each specified topcoat and apply the topcoats as follows:

Apply 1-GP-88 Type 1 white enamel by spray (Method 98.3) in one coat to produce an additional dry-film thickness of $30 \pm 5 \mu\text{m}$. Using a different panel apply the specified lacquer in two coats, each $15 \pm 3 \mu\text{m}$ dry-film thickness with 45 min between coats to give a final lacquer thickness of $30 \pm 5 \mu\text{m}$. At the last drying interval also apply the specified topcoats to separate bare anodized panels.

Allow the coated panels to dry for 48 h after application of each final coat and then examine. Determine loss of adhesion and embrittlement by the knife test (Method 135.1). Determine mean gloss readings of the topcoats on the primed panels (Method 13.4) and compare with their respective means on the unprimed panels.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	BEHAVIOR TOWARDS TOPCOATS AIR-DRYING PRIMERS	METHOD 130.3 May 1979

Supersedes Issue of
August 1974

SCOPE

This method is for use in determining how air-drying primers applied to steel react when coated with specified topcoats.

PROCEDURE

Apply (Method 98.2) a coat of the primer to two clean steel panels (Method 100.1) and allow to dry (Method 103.1). At the end of the specified time apply a coat of the specified second coat to produce an additional dry-film thickness of $30 \pm 5 \mu\text{m}$. Allow the panels to dry 24 h and examine for uniformity of gloss and for blistering, wrinkling, loosening, softening or other defects. Where specified, determine the average gloss reading of the topcoat in accordance with Method 13.4.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	BEHAVIOR TOWARDS TOPCOATS	METHOD 130.4 May 1979
	BAKING PRIMERS	

Supersedes Issue of
August 1975

SCOPE

This method is for use in determining how baking primers applied to steel react when coated with baking enamel.

PROCEDURE

Apply (Method 98.2) a coat of primer to two clean steel panels (Method 100.1) and allow to dry 30 min under standard conditions, (Method 103.1). Bake the films (Method 103.2) at the specified temperature for the specified time and cool 30 min under standard conditions. Apply a coat of the specified topcoat to produce an additional dry-film thickness of $30 \pm 5 \mu\text{m}$, unless otherwise specified, dry 30 min under standard conditions and bake at the specified temperature for the specified time. Condition the panels 24 h under standard conditions and then examine for uniformity of gloss and for blistering, wrinkling, loosening, softening or other defects. Where specified, determine the average gloss reading of the topcoat in accordance with Method 13.4.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	BEHAVIOR TOWARDS TOPCOATS	METHOD 130.5 May 1979
	WOOD PRIMERS	

Supersedes Issue of
August 1975

SCOPE

This method is for use in determining how wood primers applied to oak react when coated with alkyd enamel.

PROCEDURE

Reduce 1-GP-103 wood filler as specified and apply by brush in the direction of the grain an amount in excess of that required to fill the pores of a 75 x 150 mm white oak panel (Method 97.1) containing bands of characteristic open-pore areas. Allow the filler to "set," i.e., become flat or dull due to solvent evaporation, and then wipe off the excess across the grain, working the filler into the pores with a clean pad of cheesecloth. Dry the panel 18 h under standard conditions (Method 103.1) and then lightly sand in the direction of the grain with No. 320 silicon-carbide abrasive paper. Thoroughly dust the panel and apply (Method 97.2) one coat of the priming paint under test and allow to dry 18 h under standard conditions. Coat the panels with 1-GP-61M enamel to produce an additional dry-film thickness of $30 \pm 5 \mu\text{m}$, allow to dry 24 h under standard conditions and examine. At the same time that the enamel is applied to the wood panels, apply it to a clean glass panel (Method 102.1). Dry both the glass and wood panels 48 h under standard conditions, determine the mean gloss readings of the topcoat on the glass and wood panels according to Method 13.4, and compare the gloss readings.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	BEHAVIOR TOWARDS TOPCOATS	METHOD 130.6 May 1979
	VINYL SEALER	

Supersedes Issue of
August 1974

SCOPE

This method is for use in determining how vinyl sealer applied to fir wood reacts when coated with vinyl primer.

PROCEDURE

Apply (Method 98.2) a coat of sealer to two Douglas fir panels (Method 97.1) and allow to dry 24 h (Method 103.1). Apply one coat of 1-GP-122 Type I primer to each panel to yield an additional dry-film thickness of $30 \pm 3 \mu\text{m}$ and allow to dry 24 h. Then examine the panels.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	BEHAVIOR TOWARDS TOPCOATS	METHOD 130.8 May 1979
	WOOD FILLERS	

Supersedes Issue of
August 1975

SCOPE

This method is for use in determining how wood fillers react when coated with varnish.

PROCEDURE

Reduce the filler as specified and apply by brush in the direction of the grain an amount in excess of that required to fill the pores of a 75 x 150 mm white oak panel (Method 97.1) containing bands of characteristic open-pore areas. Allow the filler to "set," i.e. become flat or dull due to solvent evaporation, and then wipe off the excess across the grain, working the filler into the pores with a clean pad of cheesecloth.

Dry the panel 18 h under standard conditions (Method 103.1) and then lightly sand in the direction of the grain with No. 320 silicon-carbide abrasive paper. Thoroughly dust the panel and apply (Method 97.3) one coat of 1-GP-36 varnish.

Examine the panel after it has dried for 3 d under standard conditions.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	BEHAVIOR TOWARDS TOPCOATS RESISTANCE TO STENCIL INKS	METHOD 130.9 May 1979

Supersedes Issue of
August 1975

Apply (Method 98.2) one coat of the material being tested to a steel panel (Method 100.1) and allow to dry 1 h under standard conditions (Method 103.1). With the aid of a stencil board and using a 22-GP-5 stencil brush, apply a number of 20 mm high letters to the paint film under test using 1-GP-106 and 1-GP-107 stencil inks and 1-GP-115 ink paste having a color different from that of the material under test. Apply only sufficient ink to make legible, opaque letters.

Allow the ink to dry 15 min under standard conditions and then examine the film.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	BEHAVIOR TOWARDS APPLIED FILMS LACQUER ON ZINC CHROMATE PRIMER	METHOD 131.1 May 1979

Supersedes Issue of
August 1974

SCOPE

This method is for use in determining the effect of spraying lacquer on zinc chromate primer applied to anodized aluminum.

PROCEDURE

Apply (Method 98.2) a coat of 1-GP-132M Type I zinc chromate primer to one of two clean anodized aluminum panels (Method 99.2) and dry 45 min (Method 103.1). At the end of this time apply a second coat of the primer to produce a total dry film $18 \pm 3 \mu\text{m}$ thick, and dry 6 h under standard conditions. Spray (Method 98.2) two coats of the lacquer with 45 min drying between coats, on both the primed and unprimed panels, dry them 24 h and examine. Determine the average gloss of the lacquer on both panels in accordance with Method 13.4.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	BEHAVIOR TOWARDS APPLIED FILMS	METHOD 131.2 May 1979
	GENERAL METHOD	

Supersedes Issue of
August 1974

SCOPE

This is a general method for determining the effect of a coating on a specified film applied to steel.

PROCEDURE

Apply (Method 98.2) the specified first coat to a steel panel (Method 100.1) and dry 18 h (Method 103.1). Coat the panel (Method 98.2) with the material under test and dry under standard conditions. Examine the panel when specified and again 24 h after the application of the material.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	BEHAVIOR TOWARDS APPLIED FILMS	METHOD 131.3 May 1979
	STENCIL LACQUER ON ENAMEL	

Supersedes Issue of
August 1974

SCOPE

This method is for use in determining the effect of spraying stencil lacquer on flat enamel applied to steel.

PROCEDURE

Coat (Method 98.2) a clean steel panel (Method 100.1) with quick-drying flat enamel (Method 150.1) and dry 30 min (Method 103.1). Place a sharply cut stencil, with letters about 25 mm high, on the panel and apply the lacquer by spray to form legible, opaque letters. Carefully remove the stencil and examine the panel immediately and at the end of 30 min for compliance with the specification requirement.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	BEHAVIOR TOWARDS APPLIED FILMS STRIPPABLE COATING ON ENAMEL	METHOD 131.4 May 1979

Supersedes Issue of
August 1975

Coat (Method 98.5) a 75 x 150 mm steel panel (Method 100.1) with 1-GP-81M Type 2 primer, allow a 30 min flash-off time and bake at 120°C for 5 min. Cool at room temperature for 1 h and apply a coat of 1-GP-88 Type 2 or 1-GP-98M Type 2 enamel and bake in accordance with the manufacturer's instructions. Condition the panel under standard conditions (Method 103.1) for 24 h. Coat the panel with the strippable coating under test, dry and condition as specified in the Standard 1-GP-120.

Expose the panel 7 d in a ventilated circulating oven (Method 103.2) at $70 \pm 2^\circ\text{C}$, cool 1 h and remove the strippable film manually.

Examine the strippable film and the enamel surface.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	SELF-LIFTING GENERAL PROCEDURE	METHOD 132.1 May 1979

Supersedes Issue of
August 1975

SCOPE

This is a general method for testing the ability of a material applied to steel to receive a second coat of the same material.

PROCEDURE

Apply (Method 98.3) one coat of the material under test to each of a number of clean steel panels (Method 100.1) to produce a dry film of the specified thickness and allow to dry under standard conditions (Method 103.1). At the end of each specified time apply a second coat of the material to one of the panels to produce an additional dry film of the same thickness as the first coat. In the case of lacquers both coats are to be sprayed. Dry the coated panels and examine when specified and again 24 h after the application of the second coat.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	SELF-LIFTING LACQUERS	METHOD 132.2 May 1979

Supersedes Issue of
August 1974

SCOPE

This method is for use in testing the ability of a first coat of lacquer applied to aluminum to receive a spray coat of the same lacquer.

PROCEDURE

Apply (Method 98.2) one coat of material to each of a number of clean aluminum panels (Method 99.1) and allow to dry (Method 103.1). At the end of each specified time spray one of the panels with a second coat of the material to produce an additional dry film of the same thickness as the first coat. Dry the panels 24 h and examine.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	SELF-LIFTING DIPCOATS	METHOD 132.3 May 1979

Supersedes Issue of
August 1974

SCOPE

This method is for use in testing the ability of a first coat of material applied to steel to receive a dip coat of the same material.

PROCEDURE

Apply (Method 98.2) one coat of material to each of a number of clean steel panels (Method 100.1) and allow to dry (Method 103.1). At the end of each specified time, apply a second coat to one-half of each of the panels by immersing each panel to a depth of approximately 60 mm in the material that has been reduced with 1 part of 1-GP-94 thinner to 4 parts by volume of the material. At the end of 5 s, withdraw the panels and allow to dry 1 h in a vertical position with the undipped end uppermost. Examine the coated panels.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	BEHAVIOR TOWARDS UNDERCOATS AND SELF-LIFTING FINISHES ON PRIMED ALUMINUM	Method 133.1 May 1979

Supersedes Issue of August 1974
Amended Septembre 1980
Re-edited September 1982

SCOPE

This method determines the effect of the first coat of lacquer or enamel finishes on zinc chromate primer, and the effect of the second coat of finish on the first coat.

PROCEDURE

Apply one coat of 1-GP-121M vinyl pretreatment coating by spray (Method 98.2) to each of a number of clean anodized aluminum panels (Method 99.2) to give a dry-film thickness of $8 \pm 2 \mu\text{m}$ and allow to dry for not less than 30 min and not more than 2 h under standard conditions (Method 103.1). Apply the specified primer to produce an additional dry film of $8 \pm 2 \mu\text{m}$ and allow to dry for 30 min under standard conditions. Apply the material under test by spray (Method 98.3) to produce an additional dry film of $15 \pm 3 \mu\text{m}$ for lacquers and $30 \pm 5 \mu\text{m}$ for enamels. At the end of each of the specified times, apply a second coat to one of the panels to produce a dry film of the thickness given above. Allow the coated panels to dry for 24 h after application of each final coat and then examine.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	BEHAVIOR TOWARDS UNDERCOATS AND SELF-LIFTING VINYL FINISH ON VINYL PRIMER	METHOD 133.2 May 1979

Supersedes Issue of
August 1975

SCOPE

This method is for use in testing the effect of the first coat of vinyl finish on vinyl primer and the effect of the second coat of finish on the first coat.

PROCEDURE

Apply (Method 98.2) a coat of 1-GP-121M vinyl pretreatment coating to a clean steel panel (Method 100.1) to give a dry thickness of $8 \pm 2 \mu\text{m}$ and dry 1 h under standard conditions (Method 103.1). Apply one coat of 1-GP-122M Type 2 primer to produce an additional dry film $30 \pm 3 \mu\text{m}$ thick and dry. At the end of 1 h apply the material being tested to give an additional dry film $35 \pm 5 \mu\text{m}$ thick. Examine the panel immediately and after 15, 30 and 45 min for crawling, wrinkling or lifting. At the end of 1 h examine the panel for softening of the primer by the material under test. Then apply a second coat of the material to produce a further $35 \pm 5 \mu\text{m}$. Examine the panel immediately for crawling, wrinkling or lifting, and after drying 24 h under standard conditions, for wrinkling, lifting or undercoat softening.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	BEHAVIOR TOWARDS UNDERCOATS AND SELF-LIFTING VINYL PRIMER ON VINYL PRETREATMENT	METHOD 133.3 May 1979

Supersedes Issue of
August 1975

SCOPE

This method is for use in testing the effect of the first coat of vinyl primer on vinyl pretreatment and the effect of the second coat of primer on the first coat and on the vinyl topcoat.

PROCEDURE

Apply (Method 98.2) a coat of 1-GP-121M vinyl pretreatment coating to a clean, steel panel (Method 100.1) to give a dry thickness of $8 \pm 2 \mu\text{m}$ and dry 1 h under standard conditions (Method 103.1). Apply one coat of the material being tested to produce an additional dry film $30 \pm 3 \mu\text{m}$ thick. Examine the panel immediately and after 15, 30 and 45 min for crawling, wrinkling or lifting. At the end of 1 h examine the panel for softening of the pretreatment coating. Apply a second coat of the material under test to give an additional dry film $30 \pm 3 \mu\text{m}$ thick. Examine the panel immediately and after 15, 30 and 45 min for crawling, lifting or wrinkling. At the end of 1 h examine the panel for softening of the first coat of primer by the second coat. Then apply one coat of 1-GP-123M vinyl antifouling paint to give a dry film $35 \pm 5 \mu\text{m}$ thick and examine the film immediately for crawling, wrinkling or lifting. After both 1 h and 24 h under standard conditions, examine it for film uniformity and for blistering, wrinkling, softening or other defects due to intercoat action.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	APPLICABILITY AND APPEARANCE ENAMELS ON SEALED BOARDS	Method 134.1 May 1978

Supersedes issue of
August 1974

SCOPE

This method is for testing the application properties, dry hiding-power and appearance of gloss, semigloss and flat enamels when two coats are brushed on sealed wallboard.

PROCEDURE

Mount vertically a 1.2 x 1.2 m panel of laminated fiberboard or of cream-faced gypsum plasterboard*. Using roller or spray application to eliminate brush marks, apply a coat of 1-GP-119 Primer-Sealer, Wall, Interior, Latex Type, that has been tinted to about the color of Grey 101-320 of 1-GP-12c and to a reflectance of $34 \pm 3\%$ (ASTM E 97). After drying 2 h (Method 103.1) brush on a coat of 1-GP-100 type flat black latex paint to form an "X" from corner to corner, with arms approximately 150 mm wide and the edges staggered and feathered, and allow to dry 24 h.

Using a 75 mm paint brush (22-GP-1M) for all applications, apply a brush coat of the material to the entire face of the panel, crossbrushing each section in turn by first using diagonal strokes and finishing off with light horizontal strokes. At the end of 18 h apply a second brush coat, using horizontal strokes, to the left-hand half of the panel with the wet edge of the second coat staggered and feathered. The time of painting this portion of the panel should not exceed 5 min. Five minutes after completion of this painting, apply a lap-in coat to the right-hand half of the panel, starting at the top and working towards and lapping into the other portion for at least 150 mm. During application, note the ease of brushing and odor of the material.

After 24 h drying examine the panel. Where specified, view the panel in normal daylight from a distance of 1.5 m in accordance with Method 134.19 to determine if the black "X" is discernible.

* In tests for referee purposes, only plasterboard shall be used.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	APPLICABILITY AND APPEARANCE ENAMELS ON PRIMED STEEL, BRUSH AND ROLLER APPLICATION	Method 134.3 May 1978

Supersedes issue of
August 1975

SCOPE

This method is for testing the application properties, dry hiding power and appearance of enamel applied by brush and roller to primed steel panels.

PROCEDURE

Apply a coat of 1-GP-48M primer by spray (Method 98.4) to two 600 x 600 mm smooth clean steel panels and allow to dry 24 h (Method 103.1).

Before applying the enamel by roller, wet out on a smooth surface with the enamel under test, a 190 mm paint roller complying with 22-GP-42, except that the roller sleeve shall be made from 100% modacrylic fiber, or a mixture of modacrylic and acrylic with not more than 70% of acrylic fiber, with a pile height (nap length) of 6 mm and a fiber mass per unit area of 545 — 815 g/m². * Mount one of the primed panels vertically. Using the wetted roller, apply the enamel to the entire face of the primed panel, starting with vertical strokes in a "W" pattern, spreading with horizontal strokes and finishing with vertical strokes, the finishing strokes alternating with and against the nap.

After 18 h apply a second roller coat to the left-hand half of the panel with the wet edge staggered. After 5 min apply a roller coat to the right-hand half of the panel, lapping into the previously painted portion approximately 150 mm. During application of both the first and second coats, assess the enamel for foaming characteristics. Allow the second coat of enamel to dry 24 h and examine the roller applied finish for compliance with specified requirements.

Mount the second primed panel vertically. Apply a brush coat of the enamel under test to the entire face of the second primed panel using a 75 mm paint brush complying with 22-GP-1M. Crossbrush each section of the panel in turn by first using diagonal strokes and finishing off with light horizontal strokes. At the end of 18 h apply a second brush coat, using horizontal brush strokes with the wet edge staggered and feathered, to the left hand half of the panel but leaving a 175 mm strip uncoated at the bottom of the panel. Immediately apply a roller coat across the 175 mm strip (using the same wetted roller that was used on the roller coated panel). Apply the roller finish with two horizontal strokes, one with and one against the nap. After 5 min apply a brush lap coat to the right-hand side of the panel, lapping in to both the left-hand brushed area and the roller applied strip. During application note ease of brushing and the odor of the enamel. After 24 h drying examine the enamel finish for evidence of color difference between the brushed and roller coated areas. To determine if the primer is completely obscured, view the panel in normal daylight from a distance of 1.5 m in accordance with Method 134.19.

* The following commercial rollers are reported to meet these requirements:

- (1) EZ Paintr, Pronel No. 7FPQ, manufactured by EZ Paintr Canada Ltd.
- (2) Simms, Trinel, manufactured by T.S. Simms and Co. Ltd.
- (3) Rubberset, Professional Flo-matic No. 5589, manufactured by Rubberset Co. Canada Ltd.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	APPLICABILITY AND APPEARANCE ENAMELS ON BARE STEEL	Method 134.4 May 1978

Supersedes issue of
August 1974

SCOPE

This method is for testing the application properties, dry hiding power and appearance of enamels when two coats are brushed on a bare steel panel.

PROCEDURE

Mount vertically a 600 x 600 mm smooth clean steel panel. Using a 75 mm paint brush complying with 22-GP-1M and the same method of brushing for all applications, apply a brush coat of the material to the entire face of the panel using diagonal strokes first and finishing off with light horizontal strokes. During application, note the ease of brushing and the odor of the material. After 24 h drying (Method 103.1) examine the panel for coarse particles, sagging, excessive brush marks and uniformity of hiding.

Apply a second coat of the material. After 24 h drying examine the film for lifting, wrinkling, lack of uniformity and other defects.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	APPLICABILITY AND APPEARANCE ENAMELS FOR WOODEN FLOORS	METHOD 134.5 August 1975

Supersedes Issue of
August 1974

SCOPE

This method is for testing the application properties and appearance of wooden floor enamels when a coat is brushed on a wooden panel that has been primed with the reduced enamel.

PROCEDURE

Prepare a 2 x 3 ft (0.6 x 0.9 m) panel from tongue-and-groove, dressed, white pine (Method 97.1) and mount vertically. Using a 3 in. (75 mm) paint brush for all applications, apply to the entire face of the panel a coat of enamel that has been reduced with 12% vol (1 pt per gal) (0.13 l per l) of 1-GP-4 thinner. At the end of 18 h drying (Method 103.1), coat the panel with unreduced enamel. During application note the ease of brushing and the odor of the material. Examine the panel after 24 h drying.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	APPLICABILITY AND APPEARANCE ENAMELS FOR CONCRETE FLOORS	METHOD 134.6 June 1979

Supersedes Issue of
May 1978

Scope — This method is for testing the application properties and appearance of concrete floor enamels when a coat is applied by brush and roller on asbestos-cement board that has been primed with the reduced enamel.

Procedure — Mount vertically a 1.2 x 1.2 m panel of CAN2-34.16-M asbestos cement board. Using roller, apply to the entire face of the panel a coat of enamel that has been reduced 12% by volume (125 mL/L) with 1-GP-70M thinner. Allow to dry 18 h under standard conditions (Method 103.1). Use a 75 mm paint brush (22-GP-1M) for all brush applications of the test material. Apply a brush coat of the unreduced enamel to almost the entire face of the panel, leaving a 350 mm wide area across the bottom of the panel uncoated, cross brushing by first using diagonal strokes and finishing off with horizontal strokes. The time of painting this portion of the panel should not exceed 5 min. During application, note the ease of brushing and odor of the material. Wet out on a smooth surface with the material under test, a 190 mm paint roller complying with 22-GP-42*, except that the roller sleeve shall be made from 100% modacrylic fiber, or a mixture of modacrylic and acrylic with not more than 70% acrylic fiber, with a pile height (nap length) of 6 mm and a fiber mass per unit area of 545-815 g/m². Using the wetted roller apply the material to the 350 mm wide area across the bottom of the panel, finishing with two adjacent horizontal strokes, one with, and one against, the nap. Perform the wetting-out and application in not more than 5 min. Note the ease of rolling and the foaming characteristics of the material during application. After 24 h drying, examine the brushed and roller coated areas of the panel for compliance with specified requirements.

*The following commercial rollers are reported to meet these requirements:

- (1.) EZ Paintr, Pronel No. 7EPQ and No. 7EPS, manufactured by EZ Paintr Canada Ltd.
- (2.) Simms, Trinel, manufactured by T.S. Simms and Co. Ltd.
- (3.) Rubberset, Professional Flo-matic No. 5589, manufactured by Rubberset Co. Canada Ltd.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	APPLICABILITY AND APPEARANCE PAINTS AND ENAMELS ON SEALED BOARDS, BRUSH AND ROLLER APPLICATION	Method 134.7 May 1978

Supersedes Issue of
August 1974

SCOPE

This method is for testing the brush and roller application properties, dry hiding power and appearance of organic solvent base and latex emulsion paints and enamels when two coats are applied on sealed wallboard.

PROCEDURE

Mount vertically a 1.2 x 1.2 m panel of laminated fiberboard or of cream-faced gypsum plasterboard.* Using roller or spray application to eliminate brush marks, apply a coat of 1-GP-119 Primer-Sealer, Wall, Interior, Latex Type, that has been tinted to about the color of Grey 101-320 of 1-GP-12c and to a reflectance of $34 \pm 3\%$ (ASTM E 97). After drying 2 h (Method 103.1), brush on a coat of 1-GP-100 type flat black latex paint to form an "X" from corner to corner, with arms approximately 150 mm wide, the edges staggered and feathered and allow to dry 24 h.

Using a 75 mm paint brush (22-GP-1M) for all brush applications, apply a brush coat of the material to the entire face of the panel, cross brushing each section in turn by first using diagonal strokes and finishing off with light horizontal strokes. At the end of 18 h, apply a second brush coat, using horizontal strokes, to the left-hand half of the panel with the wet edge of the second coat staggered and feathered, leaving a 350 mm wide area across the bottom of the panel uncoated. The time of painting this portion of the panel should not exceed 5 min. Wet out on a smooth surface with the material under test, a 190 mm paint roller complying with 22-GP-42**, except that the roller sleeve shall be made from 100% modacrylic fiber, or a mixture of modacrylic and acrylic with not more than 70% acrylic fiber, with a pile height (nap length) of 6 mm and a fiber mass per unit area of 545-815 g/m². Using the wetted roller apply the material to the 350 mm wide area across the bottom of the panel, finishing with two adjacent horizontal strokes, one with and one against the nap. Note the ease of rolling and the foaming characteristics of the material during application. The wetting out of the roller and application shall not take more than 5 min. Five minutes after application of the last brush coat, apply by brush a lap-in coat to the right-hand half of the panel, starting at the top and working towards and lapping into the other brushed area for at least 150 mm and into the roller coated area approximately 25 mm. During application, note the ease of brushing and odor of the material.

After 24 h drying, examine the brushed and roller-coated areas of the panel for compliance with specified requirements. Determine if the black "X" is discernible by viewing the panel in normal daylight from a distance of 1.5 m in accordance with Method 134.19. Examine the finish on the roller-coated and brushed areas of the panel for evidence of color difference.

* In tests for referee purposes, only plasterboard shall be used.

** The following commercial rollers are reported to meet these requirements:

- (1) EZ Paintr, Pronel No. 7FPQ and No. 7FPS, manufactured by EZ Paintr Canada Ltd.
- (2) Simms, Trinel, manufactured by T.S. Simms and Co. Ltd.
- (3) Rubberset, Professional Flo-matic No. 5589, manufactured by Rubberset Co. Canada Ltd.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	APPLICABILITY AND APPEARANCE PRIMERS AND PAINTS ON BARE STEEL	Method 134.8 May 1978

Supersedes Issue of
August 1974

SCOPE

This method is for testing the application properties, dry hiding power and appearance of primers and paints when one coat is brushed on a bare steel panel.

PROCEDURE

Mount vertically a 600 x 600 mm smooth, clean steel panel. Using a 75 mm paint brush complying with 22-GP-1M and horizontal strokes, apply a brush coat of the material to the left-hand half of the panel. The line between the painted and unpainted sections is not to be a straight vertical line but a staggered line with the meeting edge feathered. The time of painting this portion of the panel shall not exceed 5 min. Five minutes after completion of the painting, apply a lap-in coat to the unpainted portion of the panel, working towards and lapping into the painted portion for at least 150 mm. During application note the ease of brushing and lapping-in.

After 24 h drying (Method 103.1) examine the panel for uniformity of appearance, and for coarse particles, sagging, excessive brush marks, wrinkling or other defects. View the panel in normal daylight from a distance of 1.5 m in accordance with Method 134.19 to determine if the material has good hiding.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	APPLICABILITY AND APPEARANCE ENAMEL UNDERCOATS ON FIBERBOARD PANELS	Method 134.9 May 1978

Supersedes Issue of August 1974
Amended September 1980
Re-edited September 1982

SCOPE

This method tests the application properties and appearance of materials when one coat is brushed on sealed wallboard.

PROCEDURE

Using roller or spray application to eliminate brush marks, apply a coat of 1-GP-119M Primer-Sealer, Wall, Interior, Latex Type to a 1.2 X 1.2 m panel of laminated fibreboard or cream-faced gypsum plasterboard* and allow to dry for 2 h (Method 103.1). Mount the panel vertically and, using a 75 mm paint brush complying with 22-GP-1M, apply a coat of the material to the left-hand half of the panel, each section being cross-brushed in turn by first using diagonal strokes and finishing off with light horizontal strokes. The line between the painted and unpainted sections is not to be a straight vertical line but a staggered line with the meeting edge feathered. The time of painting this portion of the panel shall not exceed 5 min. Five minutes after completion of this painting, apply a lap-in coat to the right-hand half of the panel, working towards and lapping into the painted portion for at least 150 mm. During application note the ease of brushing and the odor of the material.

After drying 24 h examine the film thus formed in accordance with Method 134.19.

* In tests for referee purposes, only plasterboard shall be used.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	APPLICABILITY AND APPEARANCE ENAMEL UNDERCOATS, TOPCOATED	Method 134.10 - May 1978

Supersedes Issue of
August 1974

SCOPE

This method is for testing the application and undercoat properties of enamel undercoats when one coat is brushed on unsealed wood and topcoated with semigloss enamel.

PROCEDURE

Mount vertically, with the grain horizontal, a piece of dressed white pine or red cedar (Method 97.1) at least 150 mm wide by 600 mm long. Using a 75 mm paint brush complying with 22-GP-1M for all applications, apply a coat of the material under test with horizontal strokes to the entire face of the panel. During application note the ease of brushing and the odor of the material. After 18 h drying (Method 103.1) examine the film for coarse particles, ridges and brush marks.

Apply a brush coat of 1-GP-57M white semigloss enamel to the entire area using diagonal strokes first and finishing off with light horizontal strokes. At the end of 24 h similarly apply a second coat of the semigloss enamel to one half of the panel.

After 24 h drying examine the panel in accordance with Method 134.19 for uniformity of gloss and appearance, and for lifting, wrinkling or other defects.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	APPLICABILITY AND APPEARANCE SOLVENT BASED PRIMERS	Method 134.11 May 1978

Supersedes Issue of
August 1975

SCOPE

This method is for testing the application and priming properties of exterior solvent based primers when one coat is brushed on a wooden panel, and exterior solvent based paint and exterior latex paint are applied over the primer.

PROCEDURE

Prepare a panel 900 mm wide by at least 600 mm high from four pieces of 900 mm long white pine or red cedar beveled siding (Method 97.1), and mount vertically with the grain horizontal. Using a 75 mm paint brush complying with 22-GP-1M for all applications, apply a coat of the primer under test with horizontal strokes to the left-hand half of the panel. The line between the painted and unpainted sections is not to be a straight vertical line but a staggered line with the meeting edge feathered. Five minutes after completion of this painting, apply a lap-in coat of the primer to the unpainted half of the panel, working towards and lapping into the painted portion for at least 150 mm. During application note the ease of brushing.

After 24 h drying under standard conditions (Method 103.1), examine the panel for coarse particles, sagging and excessive brush marks. Apply a coat of 1-GP-28M paint, tinted to Grey 501-209 to the top half of the panel, using horizontal strokes. Similarly apply a coat of 1-GP-138M latex paint, tinted to Grey 501-309, to the lower half of the panel.

After 24 h drying under standard conditions, examine the two halves of the panel for uniformity of gloss, and for lifting, wrinkling or other defects, in accordance with Method 134.19.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	APPLICABILITY AND APPEARANCE PRIMER-SEALERS, BRUSH AND ROLLER APPLICATION	Method 134.12 May 1978

Supersedes Issue of August 1974
Amended September 1980
Re-edited September 1982

SCOPE

This method tests the application and priming properties of primer-sealers when one coat is brushed on wallboard, a second coat is rolled on half the panel and a coat of semigloss enamel is applied over the whole panel.

PROCEDURE

Mount vertically a 1.2 X 1.2 m panel of laminated fibreboard or of cream-faced gypsum plasterboard*. Using a 75 mm paint brush complying with 22-GP-1M for all brush applications, apply a coat of the material with horizontal strokes to the left-hand half of the panel, with the wet edge staggered and feathered. The time of painting this portion shall not exceed 5 min. Five minutes after completion of the painting apply a lap-in coat to the right-hand portion of the panel, starting at the top and working towards and lapping into the painted section for at least 150 mm. During application note the ease of brushing and the odor of the material.

After drying (Method 103.1) for the specified time, apply a second coat of the material to the lower half of the panel using a 190 mm paint roller complying with 22-GP-42** except that the roller sleeve shall be made from 100% modacrylic fiber, or a mixture of modacrylic and acrylic with not more than 70% of acrylic fiber, with a pile height (nap length) of 6 mm and a fabric mass per unit area of 545-815 g/m². First wet out the roller on a smooth surface with the material under test and then apply the material to the lower half of the panel starting with a

* In tests for referee purposes, only plasterboard, shall be used.

** The following commercial rollers are reported to meet these requirements:

- (1) EZ Painttr, Pronel No. 7FPQ and No. 7FPS, manufactured by EZ Painttr Canada Ltd.
- (2) Simms, Trinel, manufactured by T.S. Simms and Co. Ltd.
- (3) Rubberset, Professional Flo-matic No. 5589, manufactured by Rubberset Co. Canada Ltd.

Method 134.12

May 1978

horizontal W spreading with vertical strokes and finishing with horizontal adjacent strokes alternating with and against the nap. During roller application assess the material for foaming and spattering characteristics.

Allow to dry for the same length of time as the first coat and examine the roller and brush applied area of the panel for compliance with specified requirements. Immediately after the examination brush a coat of 1-GP-57M white semigloss enamel on the entire face of the panel except for a 150 — 200 mm strip along the left side of the panel. Cross brush each section in turn by first using diagonal strokes and finishing off with light horizontal strokes. After 18 h drying examine the panel again for compliance with specified requirements.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	APPLICABILITY AND APPEARANCE TWO COATS ON UNSEALED WOOD	METHOD 134.13 August 1974

Supersedes Issue of
January 1963

SCOPE

This method is for testing application properties and appearance when two coats of material are brushed on unsealed wood.

PROCEDURE

Sand a 2 x 2 ft (0.6 m x 0.6 m) panel of birch plywood with CGSB 30-GP-9 fine flint paper and mount vertically. Using a 3 in. (75 mm) brush complying with CGSB 22-GP-1 and the same method of brushing for all applications, apply a brush coat of the material to the entire face of the panel, using diagonal strokes first and finishing off with light horizontal strokes. After 18 h drying (Method 103.1) lightly sand the first coat and apply a second coat to the entire area. During application, note the ease of brushing and the odor of the material.

Examine the film thus formed immediately after application of the second coat and after drying for 24 h.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	APPLICABILITY AND APPEARANCE ONE COAT SPRAYED ON BARE STEEL	Method 134.14 May 1978

Supersedes Issue of
August 1974

SCOPE

This method is for testing the application properties and appearance of material when one coat is sprayed on a bare steel panel.

APPARATUS

A spray gun of the suction-feed type with external mix air cap and fluid nozzle 1.80 ± 0.02 mm in diameter*.

PROCEDURE

Mount vertically a 300 x 450 mm smooth, clean steel panel. Thin the material with 1-GP-4M thinner to a consistency of 20-25 s No. 4 Ford Cup (ASTM D 1200). Using an air pressure of 310 ± 35 kPa with the gun nozzle held 200 mm from the surface and the fan adjusted to spray a 150 to 200 mm band, spray sufficient material on the panel within 15 s to produce a wet film of 100 ± 20 μ m, and measure the thickness immediately upon application with a wet-film gauge (ASTM D 1212). During application note the ease of spraying and freedom from webbing or threading. Examine the wet film for sagging.

Allow the panel to dry 2 h (Method 103.1) in the vertical position and examine for uniformity of gloss and appearance, and for coarse particles, sagging, streaks, orange peel, mottling or other defects not attributable to spraying technique.

* The following combinations meet this requirement: Binks Model 18 gun, 66 material nozzle and 66SF or 66SA air nozzle; De Vilbiss MBC gun, E fluid tip and 30 air cap. Equivalent guns may be used.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	APPLICABILITY AND APPEARANCE TWO COMPONENT COATINGS, ROLLER APPLICATION	Method 134.17 May 1978

Supersedes Issue of
August 1974

SCOPE

This method is for testing the application properties, dry hiding power and appearance of urethane coatings, solution epoxy resin coatings and high-build type epoxy resin coatings when applied by roller.

PROCEDURE

Mount vertically a 1.2 x 1.2 m panel of cream-faced gypsum plasterboard. Using roller or spray application to eliminate brush marks, apply a coat of 1-GP-119 latex type primer-sealer, tinted to about the color of Grey 101-320 of 1-GP-12c and to a reflectance of $34 \pm 3\%$ (ASTM E 97). After drying 2 h (Method 103.1), brush on a coat of 1-GP-100 type flat black latex paint to form an "X" from corner to corner, with arms approximately 150 mm wide and edges staggered and feathered, and allow to dry at least 24 h.

Mix the components of the coating under test as directed in the applicable standard and allow to stand for the specified induction period. Before applying the mixed coating to the prepared test panel, wet out on a smooth surface with the material under test, a 190 mm paint roller complying with 22-GP-42** except that the roller sleeve shall be made from 100% modacrylic fiber, or a mixture of modacrylic and acrylic with not more than 70% of acrylic fiber, with a pile height (nap length) of 6 mm and a fiber mass per unit area of 545-815 g/m². Using the wetted roller, apply the mixed material to the entire face of the panel at a normal spreading rate*. Start with diagonal strokes, spread with horizontal strokes and finish with adjacent vertical strokes, alternating with and against the nap. Ensure that the relative humidity is less than 80% during the application and drying periods of epoxy coatings.

Examine the surface of epoxy coatings for slick*** at the end of the specified drying interval. If slick is present, remove it by washing the entire coating with an alcohol/water solution (1:9 by volume) and wipe dry. Allow the panel to dry 1 h. If slick is not present, application of the second coat of epoxy may be proceeded with immediately after the specified drying interval.

Apply by roller a second coat of newly mixed material, prepared as before, to the left-hand two-thirds of the panel. The application time shall not exceed 5 min. Five minutes after completion of this roller application, apply a lap-in coat to the right-hand one-third of the panel, also by roller, lapping into the previously painted portion at least 150 mm.

During application, and again after 24 h drying, examine the coating for compliance with the requirements of the relevant standard. To determine if the black "X" is discernible, view the panel in normal daylight from a distance of 1.5 m in accordance with Method 134.19.

* Where spreading rate (m²/L) is specified, determine as follows:

Weigh the roller tray filled with the mixed epoxy coating under test and the wetted out paint roller, before and after application of the epoxy coating and calculate spreading rate using the equation:

$$\text{Spreading Rate (m}^2\text{/L)} = \frac{\text{Density of epoxy (kg/L)} \times 1000 \times 1.44 (\text{panel area m}^2)}{\text{mass of epoxy applied (g)}}$$

** The following commercial rollers are reported to meet these requirements:

- (1) EZ Paintr, Pronel No. 7FPQ and No. 7FPS, manufactured by EZ Paintr Canada Ltd.
- (2) Simms, Trinel, manufactured by T.S. Simms and Co. Ltd.
- (3) Rubberset, Professional Flo-matic No. 5589, manufactured by Rubberset Co. Canada Ltd.

***Slick is defined as an exudation caused by action of moisture on the curing agents resulting in a stickiness or oiliness on the surface of the film.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	APPLICABILITY AND APPEARANCE ONE COAT OVER SIMULATED MASONRY SURFACE	Method 134.18 May 1978

Supersedes Issue of
August 1974

Mount vertically a 0.6 x 1.2 m panel of laminated fiberboard or of cream-faced gypsum plasterboard. Using roller application to eliminate brush marks, apply a coat of 1-GP-68M primer-sealer containing 30% by mass Graded Standard Sand (ASTM C 109) and tinted to about the color of Grey 101-320 of 1-GP-12c and to a reflectance of $34 \pm 3\%$ (ASTM E 97). After 24 h drying, brush on a coat of 1-GP-100 type flat black latex paint to form an "X" from corner to corner, with arms approximately 150 mm wide and the edges staggered and feathered, and allow to dry 24 h.

Using a 20 mm nap roller or a 75 mm paint brush complying with 22-GP-1M, as specified, apply one normal coat of the paint under test over the entire face of the panel. During application note the ease of application. After 24 h drying examine the film for uniformity of appearance, distribution of aggregate, hiding, sagging and any visible defects, the panel being viewed in normal daylight from a distance of 1.5 m in accordance with Method 134.19 to determine if the black "X" is discernible. When specified, examine the panel under 10 power magnification for cracks.

Weigh the paint and brush or roller before and after the test, calculate and report the rate of coverage.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	APPLICABILITY AND APPEARANCE EXAMINATION OF APPLIED FILMS (VIEWING STANDARD)	Method 134.19 May 1978

Supersedes Issue of
August 1974

Place the panel to be examined in an approximately vertical position at the observer's eye level so that the light falling on it is incident at 45 to 90° to the surface. Use only normal north daylight, fluorescent or incandescent light to provide at the panel surface an intensity of not less than 540 lx nor more than 1600 lx. As far as possible, view the panel in an area free from strong or sharply contrasting colors.

Observe the panel first "face-on" from a distance of 1.5 m for general appearance and, where required, for hiding power. Then observe it closely from all angles for such defects as may be specified.

In reporting results group the properties under general appearance, hiding, gloss differences, and film surface uniformity.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	APPLICABILITY AND APPEARANCE STAIN ON UNSEALED FIR PLYWOOD	METHOD 134.20 June 1979

Scope — This method is for testing the application properties and appearance of stain brushed and rolled on unsealed wood.

Procedure — Mount a 1.2 x 1.2 m panel of fir plywood vertically. Apply a brush coat of the stain to the entire face of the panel, using diagonal strokes first and finishing off with light horizontal strokes using a 75 mm brush complying with 22-GP-1M. After 24 h drying (Method 103.1) apply in the same manner a second coat to the top half of the panel. Immediately apply the stain by roller to the bottom half, using a 190 mm paint roller complying with 22-GP-42*, except that the roller sleeve shall be made from 100% modacrylic fiber or a mixture of modacrylic fiber with up to 70% acrylic fiber, with a pile height (nap length) of 6 mm and a fiber mass per unit area of 545-815 g/m². Before using the roller on the test panel, wet it out on a smooth surface with the stain under test. Apply the stain to the panel starting with horizontal strokes in a "W" pattern, spreading with vertical strokes and lapping into the brushed area. Finish with horizontal strokes, alternating with and against the nap. During application of the first and second brush coats assess the stain for ease of brushing and odor. During application of the roller coat assess for foaming. After 24 h drying examine the film for evidence of poor levelling and coarse particles. Examine the roller coated area for craters and bubbles.

*The following commercial rollers are reported to meet these requirements:

- (1.) EZ Paintr, Pronel No. 7EPQ and No. 7EPS, manufactured by EZ Paintr Canada Ltd.
- (2.) Simms, Trinel, manufactured by T.S. Simms and Co. Ltd.
- (3.) Rubberset, Professional Flo-matic No. 5589, manufactured by Rubberset Co. Canada Ltd.

Canadian General Standards Board

CGSB Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	ADHESION KNIFE TEST	METHOD 135.1 August 1974

Supersedes Issue of
February 1958

Apply the material (Method 98.2) to the specified surface. Where required, expose the film to the specified tests before subjecting it to the knife test.

At the end of the specified time test the film by cutting a thin ribbon of the coating from the panel with the point of a pen-knife (see illustration below) held so that the plane of the blade is normal to the surface of the panel and the major (longitudinal) axis of the blade is inclined at 30° to the panel. Draw the knife point across the panel with the plane of the blade perpendicular to the direction of draw.

Examine the ribbons of coating, the edges of the cuts, and the areas adjacent to the cuts.

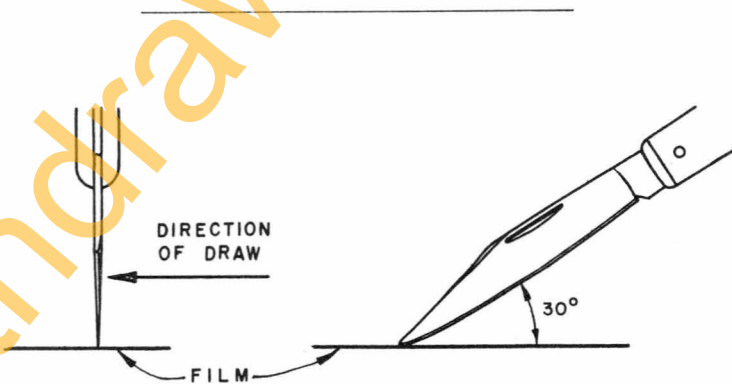


FIGURE 2

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	ADHESION TOUGHNESS AND ADHESION	Method 135.2 May 1978

Supersedes Issue of
August 1974

Prepare a panel as directed in the specification, force-dry for 24 h (Method 103.2) at $50 \pm 2^{\circ}\text{C}$ and condition for 24 h (Method 103.1).

Use a steel rod 8 mm in diameter and about 130 mm long, with one end rounded and polished to a hemisphere of 4 mm radius, to mar the panel both with and across the grain. Hold the rod perpendicular to the face of the panel and draw the rounded end across the finished surface using sufficient pressure to produce an indentation at least 2 mm wide. Examine the film along both indentations.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	ADHESION ADHESION OF VINYL PRIMER	Method 135.3 May 1978

Supersedes Issue of
August 1975

Apply (Method 98.2) a coat of 1-GP-121M vinyl pretreatment coating to a clean steel panel (Method 100.1) to give a dry film $8 \pm 2 \mu\text{m}$ thick, and allow to dry for not less than 30 min nor more than 2 h under standard conditions (Method 103.1). Apply one coat of the primer being tested to give an additional dry film $28 \pm 3 \mu\text{m}$ thick.

Dry the panel 1 h under standard conditions and apply a second coat of the primer to half the panel to give an additional dry film $28 \pm 3 \mu\text{m}$ thick.

Allow the panel to dry 24 h under standard conditions. Perform the knife test (Method 135.1) on the coating system to determine the adhesion of the first coat of the material to the pretreatment coating and the adhesion of the second coat to the first coat.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	ADHESION ADHESION OF VINYL COATINGS	Method 135.4 May 1978

Supersedes Issue of
August 1975

Apply (Method 98.2) a coat of 1-GP-121M vinyl pretreatment coating to a clean steel panel (Method 100.1) to give a dry film $8 \pm 2 \mu\text{m}$ thick, and allow to dry for not less than 30 min nor more than 2 h under standard conditions (Method 103.1). Apply one coat of 1-GP-122 Type 2 primer to produce an additional dry film $28 \pm 3 \mu\text{m}$ thick. Dry the film under standard conditions for not less than 30 min nor more than 2 h and apply the material being tested to give an additional dry film $36 \pm 4 \mu\text{m}$ thick and allow to dry for 1 h under standard conditions. Apply a second coat of the material to half the panel to give an additional dry film $36 \pm 4 \mu\text{m}$ thick. Allow the panel to dry 24 h under standard conditions and perform the knife test (Method 135.1) on the coating system to determine the adhesion of the first coat of material to the primer and the adhesion of the second coat to the first coat.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	ADHESION ADHESION OF PRIMER TO PRETREATED ANODIZED ALUMINUM	Method 135.5 - May 1978

Supersedes Issue of
August 1974

Apply one coat of 1-GP-121M, vinyl pretreatment coating by spray (Method 98.2) to clean anodized aluminum panels (Method 99.2) to give a dry-film thickness of $8 \pm 2 \mu\text{m}$ and allow to dry for not less than 30 min and not more than 2 h under standard conditions (Method 103.1). Apply the primer under test to produce an additional dry film thickness of $8 \pm 2 \mu\text{m}$ and allow to dry for 24 h. Determine the adhesion of the primer to the pretreatment coating by Method 135.1.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	ADHESION ADHESION OF FINISHES TO PRIMED ANODIZED ALUMINUM	Method 135.6 May 1978

Supersedes Issue of
August 1974

Apply one coat of 1-GP-121M vinyl pretreatment coating by spray (Method 98.2) to clean anodized aluminum panels (Method 99.2) to give a dry-film thickness of $8 \pm 2 \mu\text{m}$ and allow to dry for not less than 30 min nor more than 2 h under standard conditions (Method 103.1). Apply the specified primer to produce an additional dry film thickness of $8 \pm 2 \mu\text{m}$ and allow to dry not less than 30 min nor more than 2 h. Apply the material under test as follows:

Apply enamels in one coat to give an additional dry film $30 \pm 4 \mu\text{m}$ thick. Apply lacquers in two coats, each $15 \pm 3 \mu\text{m}$ dry-film thickness with 45 min drying between coats to give a final lacquer thickness of $30 \pm 5 \mu\text{m}$. Allow the coated panels to dry for 48 h after application of the final coat and determine the adhesion between coats by Method 135.1. Where specified, subject the panels to the Tape Test, Method A, ASTM D 3359.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	ADHESION ADHESION OF TOPCOATED PRIMERS	Method 135.7 May 1978

Supersedes Issue of August 1974

Amended September 1980

Re-edited September 1982

Apply one coat of 1-GP-121M vinyl pretreatment coating by spray (Method 98.2) to clean anodized aluminum panels (Method 99.2) to give a dry-film thickness of $8 \pm 2 \mu\text{m}$ and allow to dry for not less than 30 min or more than 2 h under standard conditions (Method 103.1). Apply the primer under test to produce an additional dry film thickness of $8 \pm 2 \mu\text{m}$ and allow to dry for not less than 30 min and not more than 2 h. Apply the specified topcoats as follows: Apply enamels in one coat to give an additional dry film $30 \pm 5 \mu\text{m}$ thick. Apply lacquers in two coats, each $15 \pm 3 \mu\text{m}$ dry-film thickness, with 45 min drying between coats to give a final lacquer thickness of $30 \pm 5 \mu\text{m}$. Allow the coated panels to dry for 48 h after application of the final coat and determine the adhesion to the metal and between coats by Method 135.1.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	ADHESION CROSS-CUT ADHESION TEST	METHOD 135.8 August 1974

Supersedes Issue of
October 1973

SCOPE

This method describes an empirical test for determining the resistance of coating to removal from the substrate when a lattice or grid is cut in the coating through to the substrate. While several film properties are involved it is believed that adhesion is the chief property evaluated by the test.

APPARATUS AND MATERIALS

- Cutting Tool - Sharp scalpel, knife or other cutting device having a uniform cutting edge and minimum blade thickness of 0.0075 in. (0.19 mm) and having a cutting edge angle between 15 and 30° that will make either a single cut or multiple cuts at once.
- Cutting Guide - A tempered steel edge or template to keep cuts straight if cuts are to be made manually (as opposed to a mechanical apparatus).
- Ruler - Tempered steel ruler graduated in 0.5 mm.
- Tape - 1 in. (25 mm) wide semitransparent pressure-sensitive tape with an adhesion strength of 36 ± 2.5 oz per in. width (10 ± 0.7 N per 25 mm width) when tested according to 43-GP-0 Method 8.9. The adhesion shall not change by more than $\pm 5\%$ of its mean value within 12 months. The backing of the tape may consist of fiber-reinforced cellulose acetate*, unplasticized polyvinyl chloride or polyester film.
- Eraser - Rubber eraser on the end of a pencil.
- Illumination - An overhead fluorescent light is helpful in determining whether the cuts have been made through the film to the substrate.
- Illuminated Magnifier - for use in examining the test areas during the test.

PROCEDURE

Apply (Method 98.2) the material under test to the specified substrate (Methods 99.1, 99.2, 100.1, 100.2 or 100.3) to the appropriate dry film thickness and unless otherwise specified allow to dry under standard conditions (Method 103.1) for the specified time. Where required subject the coated panels to a preliminary test before conducting the tape test.

After drying or testing, select an area free from blemishes and other minor surface imperfections. Place the panel on a firm base, and under the illuminated magnifier, make parallel cuts as follows:

- For coatings having a dry film thickness up to and including 2.0 mils (50 μ m)* space the cuts 1 mm apart and make 11 cuts.
- For coatings having a dry film thickness greater than 2.0 mils (50 μ m) space the cuts 2 mm apart and make 6 cuts.

All cuts are to be about 3/4 in. (20 mm) long. Cut through the film to the substrate in one steady motion, using just sufficient pressure on the cutting tool, to have the cutting edge reach the substrate. Hold the cutting tool at an angle of about 30° to the surface. When making single cuts with the aid of a guide, successive cuts should be made with the guide placed on the uncut area of the film.

* Cellulose acetate tape No. 710 manufactured by the 3M Company of Canada Ltd. is reported to meet these characteristics.

After the required cuts have been made, brush the film lightly with a soft brush or tissue to remove any detached flakes or ribbons of coating. Examine the cutting edge under 10-power magnification and discard if flat spots or nicks have developed. Make additional specified cuts at 90° to and centered on the original cuts. Brush the area as before. Inspect the incisions for reflection of light from the metal substrate to ensure that the film has been completely cut through.

Remove two complete laps of tape and discard. Remove an additional length at a steady (i.e. not jerked) rate and cut a piece about 3 in. (75 mm) long. Place the center of the tape over the grid and smooth into place by a finger. To ensure good contact with the film rub the tape firmly with the eraser on the end of a pencil. The color under the tape is a useful indication of when good contact has been made.

Allow the tape to remain in position for 1 min and then remove by seizing the free end and pulling it off rapidly at as close to an angle of 180° as possible. Inspect the grid area for removal of coating from the substrate or previous coating using the illuminated magnifier. Rate the adhesion according to the following scale:

- 5 - The edges of the cuts are completely smooth; none of the squares of the lattice is detached.
- 4 - Small flakes of the coating are detached at intersections; less than 5% of the area is affected.
- 3 - Small flakes of the coating are detached along edges and at intersections of cuts; the area affected is 5 - 15% of the lattice.
- 2 - The coating has flaked along the edges and on parts of the squares; the area affected is 15-35% of the lattice.
- 1 - The coating has flaked along the edges of cuts in large ribbons and whole squares have detached; the area affected is 35 - 65% of the lattice.
- 0 - Flaking and detachment worse than grade 1.

FIGURE 1

CLASSIFICATION OF ADHESION TEST RESULTS

Classification	Surface of cross-cut area from which flaking has occurred. (Example for six parallel cuts)
5	none
4	
3	
2	
1	
0	greater than 65%

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	APPLICATION PROPERTIES INK PASTE	Method 136.1 May 1978

Supersedes Issue of
August 1975

Spray the outside of a 280 mL can (75 mm diameter by 80 mm high) with quick drying enamel (Method 150.1) and allow to dry 30 min to 2 h under standard conditions (Method 103.1). Fill the can with sand and cover with a tight-fitting lid.

Place a portion of the ink paste under test on a clean glass plate (Method 102.1) and roll out uniformly with a brayer (ink roller) until the brayer is evenly coated. Transfer the ink from the brayer by rolling it over a rubber stencil mat consisting of several letters of the alphabet about 13 mm high. Roll the can over the inked stencil to allow transfer of the letters to the surface of the can and examine the letters. Ink the stencil as before and roll an empty spirally wound phenolic-impregnated fiber container 100 to 125 mm in diameter over the stencil. Examine the letters formed for compliance with the requirements.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	APPLICATION PROPERTIES STENCIL INK	METHOD 136.2 August 1975

Supersedes Issue of
August 1974

Apply the ink to the specified panel (Method 97.1 for white pine; Method 101.1 for abraded tinplate) through a sharply cut stencil by means of a 22-GP-5 stencil brush or a fountain brush. Apply only sufficient ink to make legible opaque letters. Lift the stencil straight up and examine the letters. Fill the bristles of the brush with ink and hold the brush vertically for 15 min with the bristles down to determine whether the ink drips.

Canadian General Standards Board

CGSB Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	APPLICATION PROPERTIES STRIPPABLE COATINGS	Method 136.3 May 1978

Supersedes Issue of
August 1974

Keep the material under test at 20-25°C for 24 h before using. To prepare for spraying, do not thin but mix thoroughly by shaking for 15-30 min before transferring to the pressure pot from which the material is to be sprayed.

The spray gun shall be of the pressure-feed type with external mix air cap and a fluid nozzle 1.8 ± 0.02 mm in diameter*. Spray the sample at an atomizing (air) pressure of 420-550 kPa and a fluid (pot) pressure of 170-200 kPa, with the nozzle held about 200 mm from a vertical surface and the spreader valve adjusted to spray a 150 to 200 mm wide band. Subject the material to the following tests:

- Make a single horizontal pass with a slow uniform motion on to a 150 x 150 mm steel panel (Method 100.1) mounted vertically. Allow the coating to dry in a vertical position for 24 h and measure the film thickness (Method 128.2).
- To a 300 x 300 mm steel panel (Method 100.1) mounted vertically, apply within 2 min sufficient coats of material to yield a dry film thickness of 950 ± 65 μ m. Apply each coat with slow uniform passes, with overlaps of about 25 ± 12 mm, allowing 15-20 s between coats. Allow the coating to dry (Method 103.1) for 48 h in a vertical position. Examine the panel and measure the film thickness (Method 128.2).

* The following combinations meet this requirement: DeVilbiss MBC gun, E fluid tip and 765 air cap; Binks Model 18 gun, 66 material nozzle and 63PA air nozzle. Equivalent guns may be used.

Canadian General Standards Board

CGSB Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	TAPE TEST ZINC CHROMATE PRIMER	METHOD 137.1 August 1974

Supersedes Issue of
April 1960

Apply the material (Method 98.2) to the specified substrate and dry for the specified time. Where required, expose the film to a preliminary test before subjecting it to the tape test.

After drying or testing, make two parallel cuts 1 in. (25 mm) apart, without delay, through the complete film system with a sharp knife blade. Apply a strip of fresh 1 in. (25 mm) pressure-sensitive tape that has been stored in an airtight metal container and complies* with specification 43-GP-3, Type 2, Grade A or B, across the lines and press down by two passes of a rubber-covered roller 3-1/2 in. (90 mm) in diameter and 1-3/4 in. (44 mm) wide, weighing 4-1/2 lb (2 kg), the rubber having a Durometer Hardness of 70-80.

Remove the tape immediately after application by pulling it back upon itself at 180° with one rapid motion, and examine the area under the tape.

* The tape may be checked for adhesiveness by Method 8.6 of CGSB 43-GP-0 Methods of Sampling and Testing Packaging Materials.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	TAPE TEST OVER BEND	Method 137.2 May 1978

Supersedes Issue of
August 1975

After carrying out the flexibility test (Method 119.13), apply a strip of fresh 25 mm wide pressure sensitive tape* perpendicular to and across the bend of the coated side of the flexibility panel. Apply a sufficient length of tape to extend approximately 25 mm on each side of the bend. Press the tape firmly to the panel to make good contact with the film, rolling out any air bubbles by pressure of the thumb. After applying the tape allow about 10 s for it to return to standard temperature. Then remove the tape by pulling it back upon itself at 180° with one rapid motion and examine the area under the tape.

*The tape shall be semitransparent pressure-sensitive tape with an adhesion strength of 10 ± 0.7 N per 25 mm width when tested according to 43-GP-0, Method 8.9. The adhesion shall not change by more than $\pm 5\%$ of its mean value within 12 months. The backing of the tape may consist of fiber-reinforced cellulose acetate, unplasticized polyvinyl chloride or polyester film.

Cellulose acetate tape No. 710 manufactured by the 3M Company of Canada Ltd., London, Ontario, is reported to meet these characteristics.

Canadian General Standards Board

CGSB Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	TAPE TEST ON FILMS AFTER IMMERSION	METHOD 137.3 August 1974

Supersedes Issue of
June 1962

At the end of the specified immersion time remove the panels, wipe dry with a soft cloth, and subject them to the tape test in accordance with Method 137.1.

The complete time lapse from removal of the panel from the water to stripping of the tape shall not exceed 60 s.

Canadian General Standards Board

CGSB Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	TAPE TEST AIRCRAFT ENAMELS AND LACQUERS	METHOD 137.4 August 1974

Supersedes Issue of
June 1962

Apply one coat of 1-GP-132 Type I zinc chromate primer (Method 98.4) to each of a number of clean anodized aluminum panels (Method 99.2) and allow to dry (Method 103.1) 45 min. At the end of this time apply a second coat of the primer to produce a total dry film of 0.7 ± 0.1 mil ($18 \pm 3 \mu\text{m}$), and dry 6 h. Apply the material, enamels in one coat to give an additional dry film of 1.2 ± 0.15 mils ($30 \pm 4 \mu\text{m}$) and lacquers in two coats with 45 min drying between coats to give an additional dry film of 1.2 ± 0.1 mils ($30 \pm 4 \mu\text{m}$).

Dry the panels for 16 h and then immerse them in distilled water at $23 \pm 2^\circ\text{C}$ ($73 \pm 3.5^\circ\text{F}$) for 24 h. At the end of this time remove the panels, wipe dry with a soft cloth, and subject them to the tape test in accordance with Method 137.1. The complete time lapse from removal of the panel from the water to stripping of the tape shall not exceed 60 s.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	RESISTANCE TO CHLORINATED WATER	Method 138.1 May 1978

Supersedes Issue of
August 1975

Apply two coats (Method 98.3) of the material under test to a 75 x 150 mm steel panel (Method 100.1) and an abraded tin-plate panel (Method 101.1) to produce a dry film $90 \pm 10 \mu\text{m}$ thick. Seal the panel edges with a further coating of the material and dry the panels 24 h under standard conditions (Method 103.1).

Immerse the panels at $45 \pm 2^\circ\text{C}$ in a solution containing sufficient 15-GP-32 calcium hypochlorite to provide a concentration of 50 mg/L available chlorine. The quantity of calcium hypochlorite to add to 1 L of water to obtain this concentration of available chlorine is calculated as follows:

$$\text{mass (g) calcium hypochlorite/litre} = \frac{100 \times 0.05}{\% \text{ available chlorine in the calcium hypochlorite}}$$

After immersion for the specified time, remove the panels from the calcium hypochlorite solution and immediately assess the steel panel for rusting and blistering.

After 2 h conditioning, under standard conditions, subject the tin-plate panel to the flexibility test (Method 119.4) and the steel panel to the knife test (Method 135.1).

Withdrawn/Retired

Canadian General Standards Board

CGSB Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	HEATING LOSS	Method 139.1 May 1978

Supersedes Issue of
August 1974

Obtain three specimens each approximately 25 x 75 mm and 760 μ m thick by stripping spray-applied films that have been prepared as specified and have air dried (Method 103.1) for 24 h. Condition the specimens for 72 h at $60 \pm 2^\circ\text{C}$, cool in desiccator and weigh. Suspend the samples in a forced-draft-oven at $105 \pm 2^\circ\text{C}$ for 5 h, each being hung vertically by a small hook or clamp. Remove the specimens, cool and weigh as before.

Calculate the percent mass loss and mean percent mass loss to 0.1%.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	GASOLINE REMOVABILITY	METHOD 140.1 August 1975

Supersedes Issue of
August 1974

GASOLINE REMOVABILITY

APPARATUS

- (a) Gardner Straight Line Washability Machine.
- (b) Block - A smooth softwood block 1-1/4 in. thick x 1-1/2 in. wide x 3-1/2 in. long (31 x 38 x 89 mm) with a piece of 1/2 in. (12.7 mm) felt attached to its face by means of a water-and-solvent-resistant glue.
- (c) Burette - 50 ml.
- (d) Drawblade with a 4-6 in. (100 - 150 mm) wide gate.

MATERIALS

- (a) Glass panels - Plate glass 6 x 17 in. (150 x 430 mm) (Method 102.1).
- (b) Gloss Enamel 1-GP-88 or 1-GP-98 Type 1.
- (c) Doctor's flannel, strips, 1-1/2 in. (38 mm) wide.
- (d) Hydrocarbon Test Fluid; 70 parts by volume reagent grade iso-octane and 30 parts by volume reagent grade toluene.

PREPARATION OF PANELS

Apply (Method 98.1) one uniform coat of 1-GP-88 or 1-GP-98 enamel to the glass panels (Method 102.1) to produce a dry film 1.2 ± 0.15 mils ($30 \pm 4 \mu\text{m}$) thick and allow to dry 7 d, under standard conditions (Method 103.1). Expose the coated panels in a Twin-Arc Weather-Ometer for 15 cycles (Method 122.2). Panels so prepared are used for the evaluation of gasoline removability.

Apply the paint under test to the coated glass panels by means of a drawblade to produce a film 4 to 6 in. (100 x 150 mm) wide and 1.4 ± 0.15 mils ($36 \pm 4 \mu\text{m}$) dry thickness. Dry the panels 7 d, under standard conditions, and expose to accelerated weathering for 20 cycles in a Twin-Arc Weather-Ometer (Method 122.2). At the end of this time, condition the panels 24 h, under standard conditions, and test for removability in the manner described below.

PROCEDURE

Place a panel on the tray of the Washability Machine. Attach a new piece of doctor's flannel to the belt-faced block by means of thumbtacks at the back of the block so as to cover the felt face. Use the flannel-covered felt-faced surface of the block in contact with the paint film being tested.

Immerse the flannel face of the block in the hydrocarbon test fluid for a few seconds, then remove and drain off excess fluid.

Immediately insert the block into the holder on the washability machine, place the block in contact with the paint film, and commence the scrubbing. At the same time allow test fluid to drop onto the paint in the path of the padded block to maintain a wet condition.

Examine the paint very quickly at the end of the specified number of cycles of scrubbing, by wiping with a piece of clean tissue. If the paint has been completely softened it will be immediately removable with the tissue. This action should not take more than a few seconds.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	EFFLORESCENCE TEST	METHOD 141.1 August 1974

Supersedes Issue of
April 1959

Prime (Method 98.2) a 3 x 6 in. (75 x 150 mm) glass panel (Method 102.1) with standard white undercoater (Method 150.3) and allow to dry (Method 103.1) for 24 h. Apply two coats of the paint (Method 98.3), the first coat being allowed to dry 2 h and the second coat 48 h. Place the panel in distilled water in such a way that only half of the panel is submerged in the water. Place the container in a refrigerator and hold the temperature at 4-7°C (40-45°F) for 24 h.

Remove the panel from the container and allow the excess water to drain. When the excess water has evaporated, remove the panel from the refrigerator and place in a desiccator for 1 h, after which it is examined.

NOTE: Efflorescence will usually appear immediately before the panel can be placed in the desiccator. The efflorescence, if any, will appear on that portion of the panel that has been above water level during the soaking.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	PRINT RESISTANCE LACQUERS	Method 142.1 May 1978

Supersedes Issue of
August 1974

SCOPE

This method is for testing the print resistance of lacquers or the effect of lacquer thinners on lacquer print resistance.

APPARATUS

- (a) Cylindrical weight with a diameter between 25 and 40 mm having a mass that will yield 7 kPa pressure. The contact surface of the weight shall be smooth and plane.
- (b) Muslin — mass per unit area 105 g/m² minimum, plain weave with 34 warp and 28 weft threads per centimetre.

PROCEDURE

Apply one coat of 1-GP-121M vinyl pretreatment coating by spray (Method 98.2) to clean anodized aluminum panel (Method 99.2) to give a dry film thickness of $8 \pm 2 \mu\text{m}$ and allow to dry under standard conditions (Method 103.1) for not less than 30 min nor more than 2 h. Apply the specified primer by spray to produce an additional dry film thickness of $8 \pm 2 \mu\text{m}$ and allow to dry under standard conditions for not less than 30 min nor more than 2 h.

When a lacquer is being tested, reduce it with the specified thinner in accordance with the manufacturer's instructions and apply in two coats, each $15 \pm 5 \mu\text{m}$ dry film thickness, with 45 min drying between coats to give a final lacquer thickness of $30 \pm 5 \mu\text{m}$.

When lacquer thinner is being tested, use 1 volume of the thinner to reduce 2 volumes of standard test lacquer (Method 150.4) and apply the reduced lacquer as described above.

Dry the final coat of lacquer for 16 h under standard conditions. Place the panel on a level surface and place a piece of the muslin on the film. Put the weight on the muslin for 1 h, then remove the weight and fabric. Allow the film to recover under standard conditions for the specified time and examine.

Canadian General Standards Board

CGSB Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	PRINT RESISTANCE FURNITURE LACQUERS	Method 142.2 May 1978

Supersedes Issue of
August 1975

SCOPE

This method is for testing the print resistance of furniture lacquers applied to wood.

APPARATUS

- Cylindrical weight as described in Method 142.1 to produce a pressure of 7 kPa.
- Cylindrical weight to produce a pressure of 3.5 kPa. The contact surface shall be smooth and plane.
- Bleached, undyed, 6-ounce (commercial designation) cotton duck meeting the following minimum requirements:

Mass/unit area	227 g/m ²
Threads/cm	18 x 11
Ply of yarns	Warp and weft 2

PROCEDURE

Prepare two panels according to the standard and allow to dry 48 h under standard conditions (Method 103.1). Place one panel on a level surface under standard conditions and place a piece of the cotton duck on the film. Place the mass producing 7 kPa on the duck for 24 h under standard conditions. Test the second panel similarly using 3.5 kPa at a temperature of $45 \pm 2^\circ\text{C}$.

At the end of 24 h remove the weights and fabrics, lightly polish the exposed areas with a pad of soft cloth and examine immediately.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	LONG-TERM OUTDOOR PERFORMANCE SELECTION, EXPOSURE AND EXAMINATION OF PANELS	METHOD 143.1 June 1980

Supersedes Issue of
May 1978

SELECTION

Prepare panels to conform to all the requirements for panel preparation in Method 97, 98 or 99, as applicable. Select panels that have the correct film mass or film thickness applied at the correct intervals and that are uniform in appearance and free from imperfections.

When called for, measure gloss and color just prior to exposure. Retain reference panels for judging visual color change. Panels shall not vary in gloss by more than 2 units, nor in color by more than 0.5 ΔE in the Adams Color Space both on one panel and among panels. The color may be assessed visually on panels prepared in accordance with Method 143.8.

EXPOSURE

45° Exposure — Unless otherwise specified expose at least two panels at 45° to the vertical at the stated locality, facing south.

Vertical Exposure — Unless otherwise specified expose at least two panels on a vertical fence at the stated locality, one panel facing north and the other panel facing south. Any other conditions of exposure may be defined in the requirement.

Suitably mount panels on test fences or test frames. These shall be of any convenient design provided that they are sturdy enough to withstand the load and strong winds. A number of designs of wood and tubular metal construction are in general use. A description of wooden racks is given in the Appendix to ASTM D 1006. Frames must be constructed to expose panels in the required direction and be free from shadows for most of the day. Mount all panels sufficiently high to avoid vegetation, spattering of mud, and snow banks. Insulate metal panels from contact with other metal.

EXAMINATION

Examine panels at the end of the specified time and at intervals as may be required for the effects stated in the condition in which they exist at the time. For the measurement of color and gloss, wash the panels lightly with a soft sponge (or soft brush when necessary) and a 0.5% solution of an oxyethylated, alkyl phenol, nonionic detergent (Igepal CA-630 or Triton X-100) at a temperature of 30-40°C, rinse with distilled water and dry. Washing of panels may also be helpful for noting other effects occurring on a minute scale, such as checking, microcracking and minute blistering. Unless otherwise specified, do not re-expose washed panels and allow at least two panels to remain on the exposure rack for the full term without being disturbed.

The procedures for rating the effects are as follows:

Color Change — Measure the color instrumentally by means of a spectrophotometer or various color difference meters in accordance with Method 12.1 or visually assess the color in accordance with Method 12.9.

Gloss — Determine by Method 13.4

Blistering — Rate by Method 95.1 for metal panels and ASTM D 714 for wood panels

Chalking — Rate by ASTM D 659

Checking — Rate by ASTM D 660

Cracking — Rate by ASTM D 661

Erosion — Rate by ASTM D 662

Flaking — Rate by ASTM D 772

Rusting — Rate by Method 95.1

Loss of Adhesion — Evaluate by ASTM D 3359, Method A or B

Rate other effects by one of the following two scales, as applicable.

Effect or Change		Performance or Property	
10	none	10	perfect
9	trace	9	excellent
8	very slight	8	very good
7	slight — very slight	7	good — very good
6	slight	6	good
5	moderate — slight	5	fair — good
4	moderate	4	fair
3	considerable — moderate	3	poor — fair
2	considerable	2	poor
1	severe	1	very poor
0	complete failure	0	no

Among the effects so rated are:

Embrittlement — Evaluate by Method 135.1

Peeling

Dirt Collection

General Appearance

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	LONG-TERM OUTDOOR PERFORMANCE TEST FOR ONE AIR-DRYING COAT ON PRIMED STEEL	Method 143.2 May 1978

Supersedes Issue of
August 1974

Coat (Method 98.4) 150 x 300 mm steel panels (Method 100.1) with the specified primer and air dry for the specified time. Then coat (Method 98.4) the panels with the material under test and allow to dry at least 7 d.

Select, expose at an angle of 45° and eventually evaluate panels in accordance with Method 143.1.

When required, hand polish a portion of the film with 25-GP-11 liquid auto polish, using a soft cloth and not more than moderate pressure. Examine the polished area for restoration of color and gloss.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	LONG-TERM OUTDOOR PERFORMANCE TEST FOR ONE BAKED COAT OF MATERIAL ON PRIMED STEEL	Method 143.3 May 1978

Supersedes Issue of
August 1974

Coat (Method 98.5) 150 x 300 mm steel panels (Method 100.1) with 1-GP-81 Type 2 primer and bake for the specified time at 120°C. Allow the panels to cool 1 h at room temperature, then give them one coat of the material under test and bake as specified. Allow the panels to condition at least 7 d.

Select, expose at an angle of 45° and eventually evaluate panels in accordance with Method 143.1.

When required, hand polish a portion of the film with 25-GP-11 liquid auto polish, using a soft cloth and not more than moderate pressure. Examine the polished area for restoration of color and gloss.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	LONG-TERM OUTDOOR PERFORMANCE TEST FOR ONE COAT STYRENATED FLAT ALKYD ENAMEL ON STEEL	Method 143.4 May 1978

Supersedes Issue of
August 1974

Prepare steel panels 150 x 300 mm as in Method 100.3, except that the amount of phosphate deposit shall be between 4.5 and 11 mg/dm².

Spray the test panels (Method 98.1) with the enamel to give a dry film thickness $25 \pm 3 \mu\text{m}$ and allow to air dry 96 h (Method 103.1). Score all specimens through to metal vertically the entire length of the panels along a line 25 mm from the edge of the long dimension.

Allow the panels to condition at least an additional 3 d and then expose at an angle of 45° and eventually evaluate them in accordance with Method 143.1, noting rusting from the score line.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	LONG-TERM OUTDOOR PERFORMANCE TEST FOR STRIPPABLE PROTECTIVE COATING APPLIED TO STEEL	Method 143.5 May 1978

Supersedes Issue of
August 1974

Condition the material and apply according to the specification. Air-dry 24 h (Method 103.1), bake 24 h (Method 103.2) at $60 \pm 2^{\circ}\text{C}$, age the panels at least 7 d and then select for uniformity and freedom from imperfections.

Expose the panels at an angle of 45° and eventually evaluate in accordance with Method 143.1.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	LONG-TERM OUTDOOR PERFORMANCE TEST FOR TWO AIR-DRYING COATS OF MATERIAL ON STEEL	Method 143.6 May 1978

Supersedes Issue of
August 1974

Coat steel panels (Method 100.1) 150 x 300 mm with two coats (Method 98.3) of the material under test, and age the coated panels at least 7 d.

Prior to exposure, score the panels to bright metal by drawing two score lines from corner to corner to produce an "X", using a sharp knife held at an angle of 30° to the panel, with the plane of the blade perpendicular to the panel, and parallel to the direction of the draw.

Select, expose at an angle of 45° and eventually evaluate the panels in accordance with Method 143.1.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	LONG-TERM OUTDOOR PERFORMANCE TEST FOR PRIMER ON ANODIZED ALUMINUM	Method 143.7 May 1978

Supersedes Issue of August 1974

Amended September 1980

Re-edited September 1982

Apply (Method 98.4) a coat of the material to 150 X 300 mm anodized aluminum panels (Method 99.2) and dry 45 min (Method 103.1). At the end of this time apply a second coat of the primer to produce a total dry film $18 \pm 3 \mu\text{m}$ thick, and dry 6 h. Then coat half the number of panels with 1-GP-88 Type 1 enamel to yield an additional dry-film thickness of $30 \pm 5 \mu\text{m}$. Apply two coats of standard test lacquer (Method 150.4) with 45 min drying between coats, to the remaining panels to give an additional dry film thickness of $30 \pm 5 \mu\text{m}$.

Allow the panels to condition at least 7 d and then select, expose at an angle of 45° and eventually evaluate them in accordance with Method 143.1

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	LONG-TERM OUTDOOR PERFORMANCE PREPARATION OF WOODEN PANELS FOR EXPOSURE OF EXTERIOR FINISHES	METHOD 143.8 June 1980

Supersedes Issue of
May 1978

Select in accordance with Method 97.1, three boards of red cedar and three boards of white pine bevel siding, 20 x 150 mm and not less than 700 mm long, and assemble the six boards into one unit, which shall be considered a panel, as follows:

Overlap the boards 25 mm and mount on 6 mm exterior grade plywood using corrosion resistant fastening devices. Extend the plywood 20 mm beyond the two sides of the bevel siding, and mount strips of white pine 20 x 25 mm on the plywood to fit tightly around the butt ends of the siding and flush with the edges of the plywood. Cap the top of the panel with a strip of white pine 30 x 25 mm to seal the siding and the plywood. Groove the underside of the white pine cap in such a manner that the top board of the bevel siding fits snugly in the groove. Protect the strips of white pine, the exposed plywood edges and the back of the plywood with two coats of self-primed exterior enamel.

To facilitate examination for color stability of the paint under test, a wooden flap 90 mm wide and 750 mm long may be mounted on one side of the panel. Mount the wooden flap with hinges and hold it closed by means of a wooden button and paint it with the paint system under test.

As an alternative, the test panels may be constructed according to ASTM D 1006.

Expose in a vertical position and evaluate after the specified period according to Method 143.1.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	LONG-TERM OUTDOOR PERFORMANCE TEST FOR ALKYD PRIMER ON WOOD	Method 143.9 May 1978

Supersedes Issue of
August 1974

Sand smooth six 25 x 150 x 300 mm birch panels (Method 97.1), particularly at the end grain. If panels are to be mounted by means of screws, drill and countersink holes of suitable size to accommodate the screws. Immerse the panels for 3 min in 1-GP-102 sealer, drain and allow to dry 24 h in a vertical position. Protect the edges, backs and screw holes by means of two coats of 1-GP-93M aluminum paint. Apply one coat of the material under test (Method 97.3). Dry three of the panels 6 h (Method 103.1) and coat with white 1-GP-88 Type 1 enamel (Method 97.3).

Age the panels 7 d and then expose at a 45° angle and eventually evaluate in accordance with Method 143.1.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	LONG-TERM OUTDOOR PERFORMANCE TEST FOR TOPCOATS ON PRIMED ALUMINUM	METHOD 143.10 August 1974

Supersedes Issue of
April 1961

Apply one coat of 1-GP-132 Type 1 zinc chromate primer (Method 98.4) to 6 x 12 in. (15 x 30 cm) anodized aluminum panels (Method 99.2) and dry 45 min (Method 103.1). At the end of this time apply a second coat of primer to produce a total dry film 0.7 ± 0.1 mil ($18 \pm 3 \mu\text{m}$) thick, and dry 6 h. Then apply the material, enamels in one coat to give an additional dry film of 1.2 ± 0.15 mils ($30 \pm 4 \mu\text{m}$) and lacquers in two coats, with 45 min drying between coats, to give an additional 1.2 ± 0.1 mils ($30 \pm 3 \mu\text{m}$).

Allow the panels to condition at least 7 d and then select, expose and eventually evaluate them in accordance with Method 143.1.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	LONG-TERM OUTDOOR PERFORMANCE MASONRY FINISHES ON MORTAR PANELS	Method 143.11 May 1978

Supersedes Issue of
August 1974

Prepare mortar panels 300 x 600 mm and 25 mm thick according to Method 96.2.

Apply (Method 98.2) the specified paint systems by brush to the face and edges of the mortar panels. After application of the final coat, examine the panels for acceptability as outlined in Method 143.1. Allow the coated panels to dry 7 d prior to exposure.

Mount the prepared panels on a vertical wood test fence by means of a wooden frame constructed of 50 x 50 mm pieces of pine or cedar, as shown in Figure 1. The frame shall have been protected with one coat of 1-GP-189M primer and two coats of 1-GP-59M enamel. The top and bottom of the frame are bevelled as illustrated. The side pieces of the frame are rabbeted 25 x 25 mm so that the sides fit over the mortar test panel. The frame pieces are drilled to accommodate corrosion-resistant mounting fittings;

Expose the coated panels and eventually evaluate them in accordance with Method 143.1.

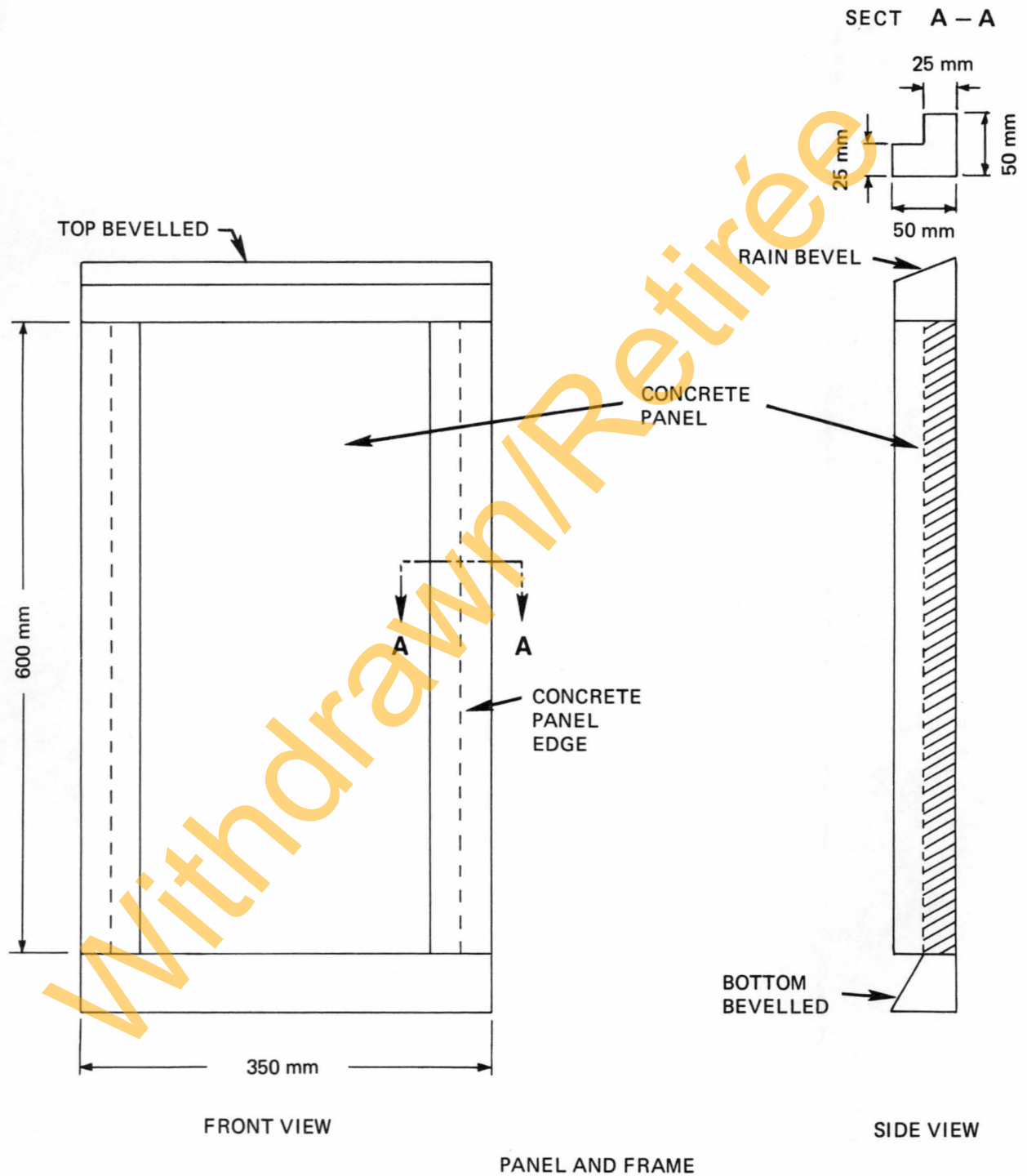


FIGURE 1
WOODEN FRAME FOR MORTAR PANELS
FOR OUTDOOR EXPOSURE OF MASONRY FINISHES

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	LONG-TERM OUTDOOR PERFORMANCE TWO COATS OF EXTERIOR STAIN ON WOOD	METHOD 143.12 August 1974

Supersedes Issue of
August 1964

Coat two wooden panels, prepared according to Method 143.8, with two coats of the unreduced stain. The coverage for each coat and the drying interval between coats shall be as specified in Methods 97.2 and 97.1, respectively. Allow the coated panels to dry 7 d after application of the final coat prior to exposure.

Place the prepared panels on a vertical test fence, one panel facing north and the other panel facing south.

Expose and examine the panels according to Method 143.1.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	LONG-TERM OUTDOOR PERFORMANCE TWO COATS OF EXTERIOR FINISH ON PRIMED WOOD	Method 143.14 May 1978

Supersedes Issue of
August 1974

Prime two wooden panels, prepared according to Method 143.8, with one coat of the specified priming paint, and topcoat with two coats of the exterior enamel under test. The coverage for each coat and the drying interval between coats shall be as specified in Methods 97.2 and 97.1, respectively.

Allow the coated panels to dry 7 d after application of the final coat prior to exposure.

Place the prepared panels on a vertical test fence, one panel facing north and the other panel facing south.

Expose and examine the panels according to Method 143.1.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	ODOR AND TASTE TEST	Method 144.1 May 1978

Supersedes Issue of
August 1974

SCOPE

This method is for determining the effect on the odor and taste of water in contact with the particular coating material.

MATERIALS

- Two approximately 250 mL glass jars with screw cap covers.
- Chlorinated Water Rinse: 3.3 g of a 6% solution of commercial bleach (NaClO solution, relative density 1.086) to 100 mL with distilled water. Dilute 10 mL of this solution to one litre with distilled water.
- Reference Water: Dissolve 0.100 g of reagent grade m-cresol in 100 mL distilled water. Dilute 5 mL of this to one litre with distilled water.

PROCEDURE

Coat the inside of an approximately 250 mL glass jar with the material under test by introducing a quantity of the material as received into the jar, rotating the jar and then inverting it to drain the excess. Perform this coating process at a temperature of $20\text{--}25^\circ\text{C}$. Dry the coated jar with free access to air in an inverted position for 24 h. At the end of this time, flush out the jar with air to remove solvent vapor.

Fill a coated jar and an uncoated jar with chlorinated water and allow to stand for 4 h at room temperature. At the end of this time discard the chlorinated water and rinse the jars three times with distilled water by filling the jars each time. Pour 200 mL of distilled water into the coated jar and 200 mL of reference water into the uncoated jar, close each tightly with the screw cap and set aside for 14 d at a temperature of $38 \pm 2^\circ\text{C}$. At the end of this time place the jars at $20\text{--}25^\circ\text{C}$ for 24 h. After this carry out taste evaluation by a panel of six or more people, as follows:

Divide the contents of each of the jars into six equal portions, in clean glass vials with screw caps, keeping the two sets separate till they have been marked. Mark the vials by letters or numbers in a random fashion and note the code. Assign to each of the six panel members independently a vial of test sample water and reference water.

Taste testing is performed by swirling the whole sample of water in the mouth for a few seconds, noting flavor, and then discarding it. The second sample is then tested in a similar way. Testing is preferably carried out during mid-morning or mid-afternoon in a clean, fume and odor-free neutral environment.

Ask each panel member to state which of the two samples is the more undesirable or if they are judged to be equal. The test sample water shall be considered acceptable only when all six tasters agree that the material under test has not imparted tastes and odors to the test water that make it more objectionable than the reference water.

The need for complete agreement among the six testers is essential because of the small number of tasters; this agreement must exist for reasons of statistical significance. It is preferable to avoid this dependance on the agreement of every individual taster by arranging replicates of the panel of six tasters or increasing the size of the panel. Three replicated blocks will provide 18 individual replicates, or alternatively 18 tasters may be used, in which instances five disagreements are permitted. Table 1 provides the critical number of agreements in replications up to 36.

TABLE 1

CRITICAL NUMBER OF CORRECT RESULTS FOR
PAIR COMPARISONS AT 5 PER CENT SIGNIFICANCE LEVEL

<u>Number of Replicates</u>	<u>Critical Number of Agreements</u>
6	6
7	7
8	7
9	8
10	9
11	9
12	10
14	11
16	12
18	13
20	15
22	16
24	17
26	18
28	19
30	20
32	22
34	23
36	24

When larger taste panels are used, additional test jars of the same size are included in the test.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	NONBRIDGIBILITY	Method 145.1 May 1978

Supersedes Issue of
August 1974

Bend a 150 x 300 mm steel panel (Method 100.1) lengthwise to a permanent angle of 90° around a 12.7 mm diameter mandrel and coat (Method 98.5) the surfaces forming the internal 90° angle with white 1-GP-88 Type 2 enamel. Bake the enamel 1 h (Method 103.2) at $120 \pm 2^{\circ}\text{C}$ and then condition 24 h (Method 103.1).

At the end of this time mount the panel with the long axis horizontal. Apply the compound as directed in the specification, spraying along the long axis of the angle to form a dry film $950 \pm 65 \mu\text{m}$ thick over the enamel.

After the film has dried 5 h (Method 103.1), trim the portion of the film overhanging the panel with a sharp cutting tool, care being exercised not to lift the film.

Keep the panel 96 h under standard conditions and then examine.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	ALCOHOL RESISTANCE	Method 146.1 May 1978

Supersedes Issue of
August 1974

Prepare a panel as directed in the standard and allow to dry for 7 d (Method 103.1). Fill a watch glass, approximately 65 mm diameter, having a smooth edge, with ethyl alcohol of the specified concentration and place the panel over the watch glass to form a tight seal. Invert the panel and glass and allow the solution to remain in contact with the film at $23 \pm 2^{\circ}\text{C}$.

At the end of the specified time position the panel vertically, remove the watch glass and run off the alcohol. Allow any solution remaining on the panel to evaporate and examine the film. If marks are present, lightly polish the exposed area with a pad of soft cloth and re-examine. The line of contact of the watch glass is disregarded in the examination.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	IMPACT RESISTANCE	METHOD 147.1 August 1974

Supersedes Issue of
December 1961

Apply the material to steel panels (Method 100.3) to a dry film thickness of 1.5 ± 0.2 mils ($38 \pm 5 \mu\text{m}$). After the film has dried 7 d (Method 103.1), determine the direct (coated side) and indirect (reverse side) impact resistance by means of a Gardner Variable Impact Tester with ring inlay having a $5/8$ in. (15.9 mm) opening.

After the film in the impact area has been subjected to the specified minimum inch-pounds, examine it under 10-power magnification.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	IMPACT RESISTANCE FALLING BALL METHOD	Method 147.2 May 1978

Supersedes Issue of
August 1974

Prepare and condition panels according to the specified method. Subject the coated side of the prepared panel to 25 impacts of a 1 kg solid steel ball dropped from a height of 2.25 m unless otherwise specified.

Centrally position the test panel on a 400 x 400 x 50 mm minimum horizontal steel base plate. The base plate must be placed on a solid base such as a concrete floor. Level the base plate with the aid of a spirit level.

Each of the 25 impacts is to impinge on the test panel in an area 100 x 100 mm at points 20 mm apart. To assist in positioning the prepared panel for the test, draw a square grid pattern consisting of twenty-five, 20 mm squares on the base plate, test panel and an uncoated dummy panel. Centrally position the dummy panel on the grid on the base plate.

Use an electro-magnet with a centering tip for dropping the steel ball. Using a plumb-bob, position the electro-magnet directly over the dummy panel, drop the steel ball on the dummy panel and adjust position of electro-magnet until ball falls in the grid square required. Replace dummy panel with the test panel and carry out the 25 drops, 20 mm apart, moving the test panel 20 mm for each impact, using the grid on the base plate as the positioning guide. Do not permit the steel ball to rebound.

RATING

Upon completion of the impact test carefully examine each specimen visually and try to remove some of the coating with a scraper such as a screwdriver. Then assign one of the following ratings:

- 10 — No effect beyond slight indentation; no break in the coating; coating hard and tough, with firm adhesion in the entire impact region.
- 9 — Slight cratering; coating removable with some difficulty with scraper in the indentations; coating hard and tough, difficult to remove in areas between indentations.
- 8 — Slight cratering; slight flaking of coating in the indentations only; coating removable with some difficulty with scraper in the indentations; coating hard and tough, difficult to remove in areas between indentations.
- 7 — Slight to moderate cratering; slight flaking in the indentations; coating firm, removable with some difficulty with scraper in the entire impact region.
- 6 — Moderate cratering; moderate flaking of coating in the indentations; coating firm, removable with some difficulty with scraper in the entire impact region.
- 5 — Moderate cratering; moderate flaking of coating in and between indentations; coating firm, removable with some difficulty in the entire impact region.
- 4 — Moderate cratering; moderate flaking of coating in and between indentations; coating removable with little difficulty in the entire impact region because of softness or brittleness: in the case of soft coatings, some material from the specimen adheres to the steel ball after each impact.
- 3 — Severe cratering; coating readily removable with scraper in the entire impact region; considerable material adhering to the ball after each impact or severe flaking in and between indentations.
- 2 — Severe cratering; coating soft and readily removable in large sheets between indentations with considerable material adhering to the ball after each impact, or severe separation and flaking of coating in the entire impact region with the remainder of the coating readily removable with the scraper.

- 1 — Complete separation or flaking from plate in the entire impact region with the possible exception of a small amount remaining in the indentations.
- 0 — Little or no adhesion of coating to plate; coating readily peelable from area of plate not subject to impact.

Withdrawn/Retirée

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	SLICK RESISTANCE	Method 148.1 May 1978

Supersedes Issue of
August 1974

Apply (Method 98.1) a wet film of the specified thickness to a glass panel (Method 102.1). Immediately after application, and for the following 24 h, maintain the film at $23 \pm 2^{\circ}\text{C}$ and at the specified relative humidity.

Examine the film at the end of the 24 h period and compare with a similarly coated panel that has been dried under standard conditions (Method 103.1) and not exposed to high humidity.

Withdrawn/Retired

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	IMPERFECTIONS IN GLASS BEADS	Method 149.1 May 1978

Supersedes Issue of
August 1974

SCOPE

This method is intended to determine the quantity of defective glass beads in a sample of beads within an accuracy of $\pm 10\%$.

PROCEDURE

Take a random sample of true sphere beads (ASTM D 1155) and completely transfer it to a sticky transparent surface such as pressure sensitive tape or a plastic film thinly coated with adhesive. Place the surface over a grid such as graph paper to facilitate counting. Count a sample of 900 to 1000 beads, including all beads within a randomly selected area or areas, and examine under 40-50 power magnification. Count the number of defective beads and calculate the percentage defective. Defective beads are those that are milky, opaque, scratched, pitted, fractured or contain bubbles greater than $1/4$ of the diameter of the bead.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	STANDARD FORMULAS FOR TEST MATERIALS FORMULA* FOR QUICK-DRYING STYRENATED ALKYD ENAMEL, FLAT GREEN 503-301	METHOD 150.1 August 1974

Re-edited September 1982

Supersedes Issue of
October 1958

Ingredient	% by weight	lb/100 gal
Synthetic Yellow Iron Oxide (Norden Pigments Ferrite No. 305)	11.80	145
Lampblack (Bear)	2.44	30
Magnesium Silicate (Nytal 300)	21.98	270
Styrenated Alkyd Z ₁ - Z ₃ at 50% in Mineral Spirits (Cycopol S201-1)	11.39	140
Xylene	17.09	210
Diethylamine	0.10	1.25
Grind and reduce with:		
Styrenated Alkyd Z-Z ₃ at 60% in Xylene (Cycopol S203-5)	23.60	290
Xylene	11.39	140
6%-Cobalt Napthenate	0.10	1.25
Antiskinning Agent (Exkin No. 2)	0.10	1.25

*In this section formulas are given for coatings that are used as standards when determining the intercoat effect of test materials or when a definite material is required in a multiple-coat test. The coatings are not used for comparison with materials of the same type. Trade names are specified to minimize possible differences due to variations in the materials used in the formulations. There is no implication that the particular materials listed are in any way superior to other comparable grades available on the market.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	STANDARD FORMULAS FOR TEST MATERIALS FORMULA* FOR FLAT BLACK**	METHOD 150.2 August 1974

Re-edited September 1982

Supersedes Issue of
December 1958

Ingredient	% by weight	lb/100 gal
Carbon Black (Statex B-12)	3.33	40
Ground Whiting (Atomite)	36.69	440
Antisettling Agent (Bentone 34)	0.42	5
Alkyd Resin Z ₁ -Z ₃ at 40% in		
Low Odor Solvent (Glyptal G6740)	42.52	510
Low Odor Solvent (Bronoco 140)	15.84	190
Lead Naphthenate, 24%	0.5	6
Calcium Naphthenate, 4%	0.42	5
Cobalt Naphthenate, 6%	0.2	2.4
Antiskinning Agent (Exkin No. 2)	0.08	1
	100.00	1199.4

*In this section formulas are given for coatings that are used as standards when determining the intercoat effect of test materials or when a definite material is required in a multiple-coat test. The coatings are not used for comparison with materials of the same type. Trade names are specified to minimize possible differences due to variations in the materials used in the formulations. There is no implication that the particular materials listed are in any way superior to other comparable grades available on the market.

**The reflectance of the paint shall be not greater than 4% (ASTM E 97).

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	STANDARD FORMULAS FOR TEST MATERIALS FORMULA* FOR STANDARD WHITE UNDERCOAT**	METHOD 150.3 August 1974

Re-edited September 1982

Supersedes Issue of

October 1958

Ingredient	% by weight	lb/100 gal
Titanium-calcium pigment 30% TiO ₂ (RC-HT)	35.15	550
Titanium Dioxide, rutile (Ti-Pure R-610)	8.95	140
Aluminium Silicate (ASP 400)	11.18	175
Diatomaceous Silica (Celite 281)	3.71	58
Alkyd Resin, 70% solids***	24.67	386
Mineral Spirits (I-GP-4)	15.85	248
Cobalt Naphthenate, 6%	0.12	1.9
Lead Naphthenate, 24%	0.37	5.8
	100.00	1564.7

*In this section formulas are given for coatings that are used as standards when determining the intercoat effect of test materials or when a definite material is required in a multiple-coat test. The coatings are not used for comparison with materials of the same type. Trade names are specified to minimize possible differences due to variations in the materials used in the formulations. There is no implication that the particular materials listed are in any way superior to other comparable grades available on the market.

**The undercoat shall have a fineness of not less than 4 Hegman units when tested according to ASTM D1210, and a viscosity of 75-85 KU.

***Long Soya Alkyd Z₁-Z₄ at 70% solids in Mineral Spirits; 24% Phthalic Anhydride, 60-65% Soya Oil Acids. The following resins are of this type: Archer-Daniels-Midland "Aroplaz" 1450-M-70, General Electric "Glyptal" G2504-70, Reichhold "Beckosol" P470-70, Rohm & Heas "Duraples" D65A.

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	STANDARD FORMULAS FOR TEST MATERIALS FORMULA* FOR STANDARD TEST LACQUER**	METHOD 150.4 August 1974

Re-edited September 1982
Supersedes Issue of
October 1958

Ingredient	% by Weight	lb/100 gal
Titanium Dioxide	2.88	28
Iron Blue	1.29	12.5
Carbon Black	.64	6.25
Alkyd Resin, 60% solids***	26.9	261
Toluene	18.14	176
Lacquer Diluent ◀	4.23	41
Nitrocellulose, 65% in Ethanol	12.06	117
Ethanol, Denatured	1.39	13.5
Tricresyl Phosphate	3.2	31
Methyl Isobutyl Carbinol	4.74	46
Methyl Isobutyl Ketone	7.01	68
n-Butyl Acetate	12.57	122
Ethyl Acetate	4.95	48
	100.00	970.25

*In this section formulas are given for coatings that are used as standards when determining the intercoat effect of test materials or when a definite material is required in a multiple-coat test. The coatings are not used for comparison with materials of the same type. Trade names are specified to minimize possible differences due to variations in the materials used in the formulations. There is no implication that the particular materials listed are in any way superior to other comparable grades available on the market.

**The lacquer shall have a gloss of not less than 80 units (Method 13.2) and a fineness of not less than 7 Hegman units when tested according to ASTM D 1210. It may be preferable to disperse the pigments separately.

***Nondrying coconut alkyd Z₂-Z₅ at 60% solids in Xylene: 43-45% Phthalic Anhydride; 31-34% Coconut Oil Acids. The following resins are of this type: Rohm & Haas "Duraplex" ND-78; Reichhold "Beckosol" P-878; General Electric "Glyptal" G2570; and G2572 Cyanamid "Rezyl" 99-5

◀ Aliphatic Naphtha with the following distillation range and properties:

	°C	°F
Initial Boiling Point, min.	85	185
10% Fraction, max.	102	215
50% Fraction, max.	107	225
90% Fraction, max.	121	250
End Point, max.	143	290

Kauri-butanol value 30-45
Specific Gravity 0.708-0.768

Canadian General Standards Board

 Ottawa Canada K1A 1G6	Methods of Testing Paints and Pigments	CGSB 1-GP-71
	RESISTANCE TO CATHODIC PROTECTION	METHOD 151 June 1980

Supersedes Issue of
May 1978

SCOPE

This method of test determines the resistance to lifting and loss of adhesion of a coating system applied to steel that is immersed in sea water and cathodically protected.

APPARATUS

- Acrylic Plastic Sea Water Immersion Tank** — A suitable tank is illustrated in Fig. 1. The panels are suspended on brass rods within loosely fitting glass tubes, placed transversely across the tank and fitting into depressions on each side wall. The anodes are mild steel rods immersed transversely across the tank between alternate rows of panels.
- Microammeter** — The instrument used for current measurement should have an accuracy of 1% or better, should cover a range of 5 to 50 μA or greater and must not introduce an additional resistance to the circuit greater than 200 Ω .
- Potentiostat** — Capable of regulating and measuring the voltage applied to the panels within $-1.00 \pm 0.01 \text{ V}$. A circuit diagram showing how the potentiostat is connected is illustrated in Fig. 2.
- Control Board** — The connectors, switches, plugs, etc. mounted on the control board should match the instruments used for the voltage and current requirements. If the panels are all connected in parallel, their potential may be measured by any plug/jack arrangement that connects the voltmeter between them and a reference electrode. The plugs for measuring the cathodic current should be of the shorting type that connects the microammeter before the circuit is broken so that the degree of polarization is not disturbed.
- Silver/Silver Chloride Reference Electrode** — Capable of supplying the current required by the potentiostat. This should not exceed 100 μA but many potentiostats would not require more than about 1 μA .

TEST PANELS

Description — Test panels shall be of mild steel, at least 75 x 100 mm and 2.6 – 2.7 mm thick with a mild steel hook attached to the center of one edge. All corners and edges of the panel shall be rounded. There shall be no pits or bulges on the surface of the panel except the dimple at the wire swage.

Hook Attachment — Attach a hook of mild steel wire to the panel as follows. Drill a hole into the center of the top edge of the panel to a depth of approximately 10 mm. Swage the mild steel wire at one end and insert that end into the hole in the panel such that the wire is firmly held in place and good electrical contact is made between the wire and the panel (See Figure 3). The wire shall be at least 75 mm long, to the other end of which are made suitable electrical connections. Do not use grease or oil in the attachment of the hook to the panel.

Surface Preparation — Prepare panels as specified in method 100.2.

APPLICATION OF THE COATING SYSTEM

Materials — Unless otherwise specified, pretreat test panels with 1-GP-121M vinyl wash primer. Where a primer is being tested, topcoat it with 1-GP-123M antifouling paint. Where an antifouling paint is under test, apply it over Type 3, 1-GP-122M vinyl primer.

Edge Coats — It is important that edges and the junction of the hook and panel be very carefully coated if current readings obtained are to be meaningful. Using a small artist's brush apply a coat around the perimeter of the panel and three quarters of the distance up the hook. When dry to touch similarly apply a second coat but extend the material about 2 mm onto each face. This procedure is hereinafter referred to as one double edge coat.

Application Procedure — Apply one coat of vinyl wash primer at a dry film thickness of $8 \pm 2 \mu\text{m}$. Following this, spray the edges with one pass of the gun, facing the edge towards the spray gun. Coat the hook about 3/4 of the distance up the handle. Allow to dry between 0.5 and 2 h.

Apply one double edge coat of anticorrosive primer and after drying, one coat of anti-corrosive primer at a dry film thickness of $28 \pm 3 \mu\text{m}$.

Apply one double edge coat of anticorrosive primer and allow to dry until it is dry to the touch. Apply another double edge coat of anticorrosive primer. Allow to dry at least 15 h after application of the first coat of anticorrosive primer.

Apply a second coat of anticorrosive primer at a dry film thickness of $28 \pm 3 \mu\text{m}$.

Apply one double edge coat of anticorrosive primer and allow to dry until it is dry to the touch. Apply another double edge coat of anticorrosive primer. Allow to dry at least 15 h after application of the second coat of anticorrosive primer.

Apply one coat of vinyl antifouling paint at a dry film thickness of $35 \pm 5 \mu\text{m}$.

Apply one double edge coat of antifouling paint. Allow the full coat of antifouling paint to dry for 15 to 24 h and test according to test procedures herein.

Scoring the Coated Panels — Prior to immersion, with a sharp scalpel make two cuts, each $75 \pm 2 \text{ mm}$ long, in the shape of an X through the coating to bare steel. Check for penetration with a 10-power microscope.

TEST PROCEDURES

Immerse the prepared panels of each coating system to be tested in sea water in the testing tank as shown in Figure 2. Connect each panel by means of suitable individual connections between the panel hook and the voltage supply. Check the voltage readings between the test panels and reference electrode and, if required, adjust the voltage to $-1.00 \pm 0.01 \text{ V}$ by means of the potentiostat. About 2 h after immersion, when the cathodic current has stabilized, record the cathodic current.

Supply sea water continuously so that there is a constant overflow from the tank with consequently a constant level of continuously replaced sea water in the tank. A rate of flow of about 4.5 L/min for a tank constructed in accordance with Figure 1 has been found by practice to be satisfactory.

Periodically during the test record the cathodic current. When making a reading on a particular panel place an insulating piece of clean plastic between the rod and the hook of the panel. Unless otherwise specified, after an immersion period of 100 d measure the cathodic current in microamperes and record this reading.

Do not allow salt deposits to accumulate on the glass supporting rods where their conductivity might affect current readings. Periodically apply a thin film of petroleum jelly to the uncoated portion of each hook and clean sediment from the tank.

EXAMINATION OF EXPOSED PANELS

Unless otherwise specified remove the panels after an immersion period of 100 d.

Blistering — Examine the panel to determine:

- (a) between which layers blistering occurred
- (b) the distance of blisters from the score lines

- (c) the size of blisters and their percentage of the surface area of the scored side of the panel
- (d) if blisters occurred on the unscored side of the panel

Ignore all blisters within a distance of 6.5 mm from a score line in the above examination.

Adhesion — Determine adhesion of the coating system to the steel substrate by cutting through the coating system to the steel substrate with a sharp scalpel. Make two straight line cuts, between 2 and 3 mm apart, perpendicular to and meeting one of the score lines. If adhesion is lost, the coating between the cuts can be readily lifted near the score line with the aid of scalpel. Use 10X magnification to examine for loss of adhesion.

REFERENCE

This test method is based on the following:

Evaluation Procedure for Marine Underwater Paint Systems
by W.A. Anderton and J.R. Brown
Materials Report 65-F, October 1965

A copy of this report may be obtained from:

Chief
Defence Research Establishment Pacific
F.M.O.
Victoria, B.C.

Withdrawn/Retirée

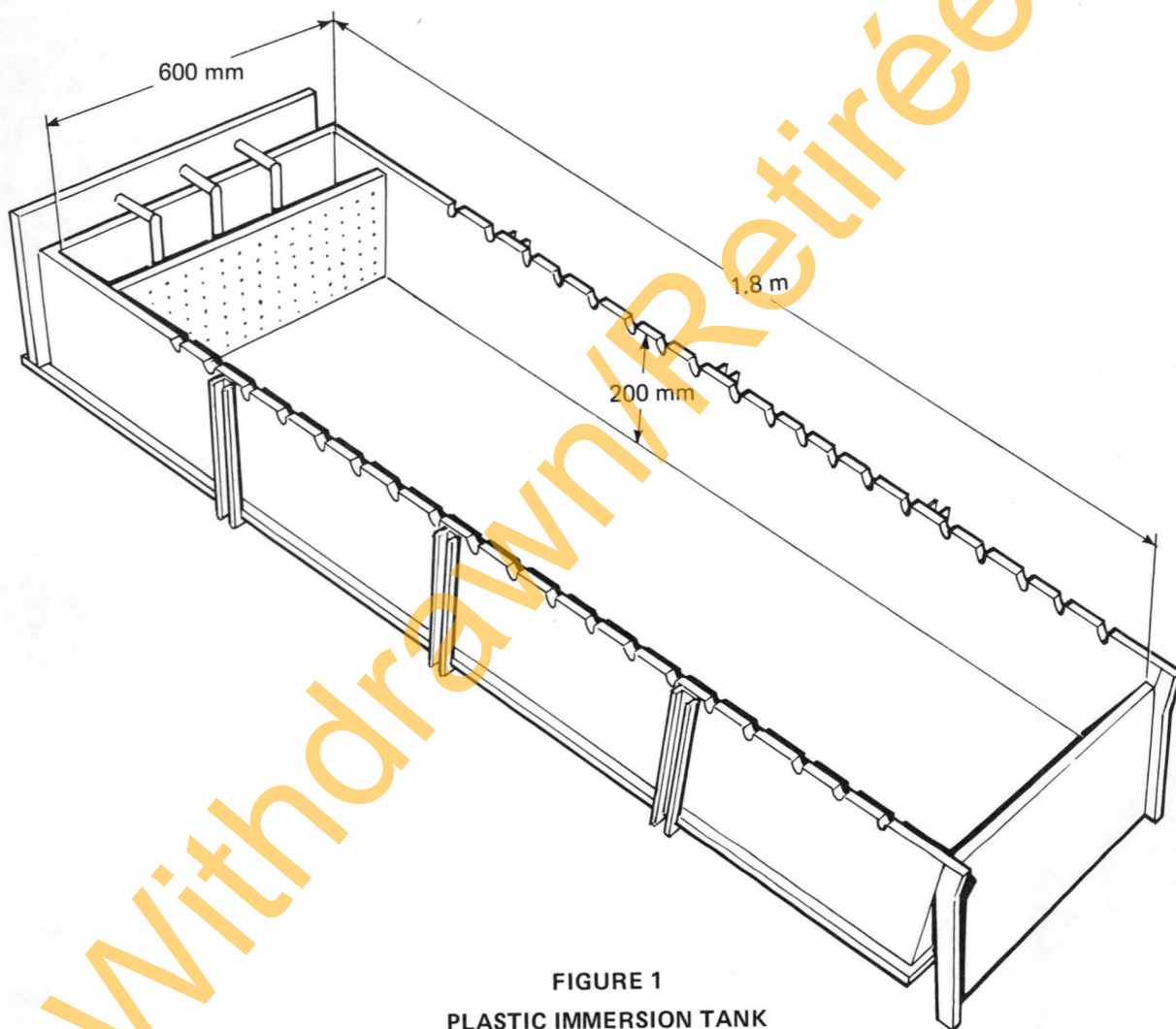


FIGURE 1
PLASTIC IMMERSION TANK

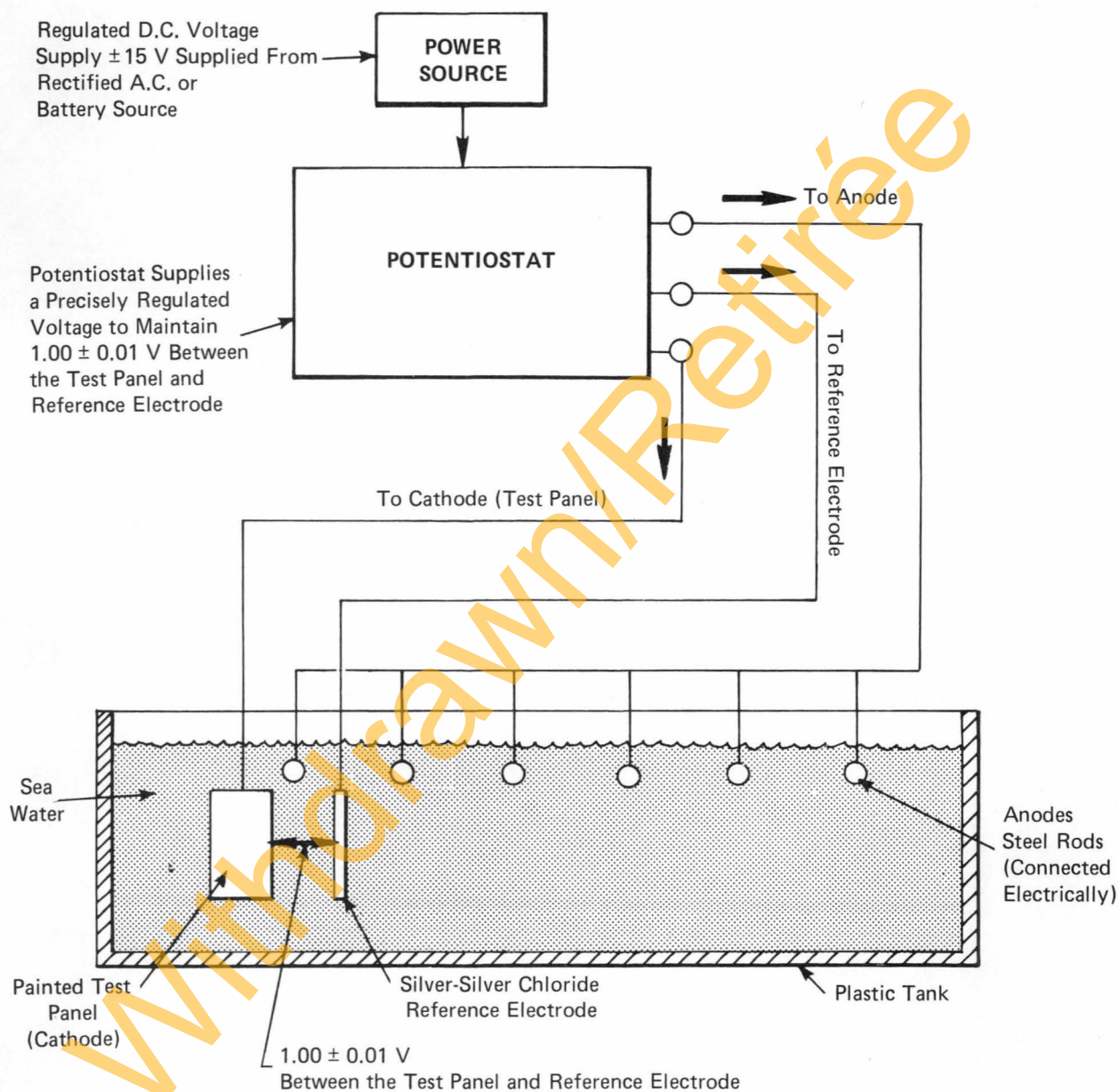


FIGURE 2
SIMPLIFIED DIAGRAM OF ELECTRICAL SYSTEM FOR TESTING
PAINT SYSTEMS ON CATHODICALLY PROTECTED STEEL

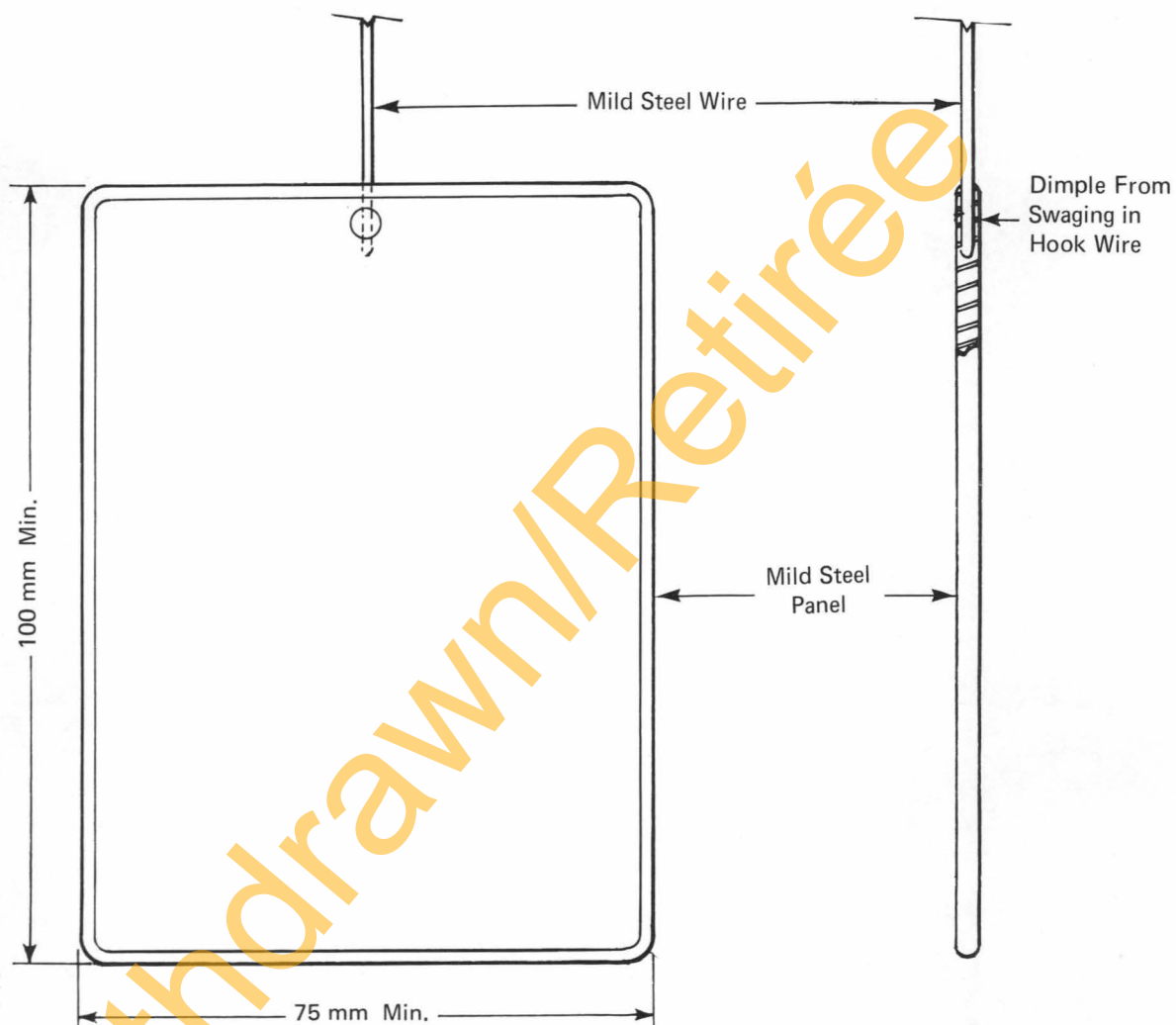


FIGURE 3
PAINT TEST PANEL