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These CGSB standards and National Standards of Canada are hereby withdrawn due to limited use and support for their revision.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

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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.

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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 repeinture 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'amiant
(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)

NATIONAL STANDARD OF CANADA

CAN2-1.500-75

Formerly CGSB 1-GP-500

Methods of Test for Toxic Trace Elements in Protective Coatings

Prepared by



Specifications
Board

Approved by



Standards Council of Canada

Withdrawn/Retirée

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Those who have a need to apply standards are encouraged to use National Standards of Canada whenever practicable. These standards are subject to periodic review; therefore, users are cautioned to obtain the latest edition from the organization preparing the standard.

National Standards of Canada are approved by:

Standards Council of Canada,
350 Sparks Street,
Ottawa, Ontario,
Canada
K1R 7S8

**METHODS OF TEST FOR TOXIC
TRACE ELEMENTS IN PROTECTIVE COATINGS**

This standard was formerly issued as
CGSB 1-GP-500 in December 1973

PUBLISHED JULY 1975 BY CANADIAN GOVERNMENT
SPECIFICATIONS BOARD, 88 METCALFE ST., OTTAWA,
ONTARIO. K1A 0S5

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Kroetz, H.	Canadian Pittsburgh Industries Limited
Latham, W.A.	Canadian Penitentiary Service
Laycraft, N.E. (Chairman)	Department of Public Works
McQuitty, H.A.	Department of Public Works
Mehkeri, A.	Department of Consumer and Corporate Affairs
Nickells, R.G.	Bapco Paint Limited
Northcott, J.E.	Department of National Defence
Perlus, T.G.	Ontario Research Foundation
Power, J.T.	Department of Industry, Trade and Commerce
Rigby, E.J.	Department of National Defence
Roberts, P.	T. Eaton Co. Limited
Rocque, G.	Canadian Arsenals Limited
Roy, M.	Sico Inc.
Rubec, P.	Department of Public Works
Stubbs, K.E.	Department of Public Works
Tate, H.W.	Department of National Defence
Vincent, R.H.	Department of National Defence
Watt, J.S.	National Harbours Board
Wiezoreck, G.	Master Painters and Decorators Association of B.C.
Williamson, A.S.	Ontario Hydro

Standards Officer – W.J. Ireland, CGSB

Acknowledgement is made for the French translation of this National Standard of Canada by the Translation Bureau of the Department of the Secretary of State and the technical editing of the translation by the Materiel Data Management Branch of the Department of Supply and Services.

Les Normes nationales du Canada sont disponibles en versions française et anglaise.

1-GP-500
December 1973
Supersedes Test Methods
50 21P to 50 28P Inclusive
in Amendments No 16 and
No 17 to 1-GP-71

CANADIAN GOVERNMENT SPECIFICATIONS BOARD

**Standard
for**

**METHODS OF TEST FOR TOXIC TRACE ELEMENTS IN PROTECTIVE
COATINGS**

SCOPE

1.1 This standard describes methods of test for determining toxic elements in low concentration in protective coatings, employing wet chemical and atomic absorption and visible-ultraviolet spectrophotometric techniques

APPLICABLE PUBLICATION

- 2.1 The following publication is applicable to this standard
Canadian Government Specifications Board (CGSB)
1-GP-71 Methods of Testing Paints and Pigments
Method 17.1 Volatile Matter, Paints and Enamels

Withdrawn / Retirée

METHODS OF TEST

This standard contains the following methods of tests:

Method	Title
1-GP-500.1	Determination of Lead (Pb) in Low Concentration
1-GP-500.2	Determination of Leachable Cadmium (Cd) in Low Concentration
1-GP-500.3	Determination of Leachable Barium (Ba) in Low Concentration
1-GP-500.4	Determination of Leachable Antimony (Sb) in Low Concentration
1-GP-500.5	Determination of Leachable Selenium (Se) in Low Concentration
1-GP-500.6	Determination of Leachable Mercury (Hg) in Low Concentration
1-GP-500.7	Determination of Leachable Arsenic (As) in Low Concentration
1-GP-500.8	Determination of Leachable Chromium (Cr) in Low Concentration

Withdrawn/Retirée

DETERMINATION OF LEAD (Pb) IN LOW CONCENTRATION

SCOPE

This method is for use in the determination of total lead (Pb) in (a) wet paint and (b) applied coatings.

REAGENTS AND APPARATUS

Acetone or other suitable solvent
Atomic Absorption Spectrophotometer
Hydrochloric Acid, 6N
Lead Standard Solution 1000 ppm (AA Grade)
Muffle Furnace
Nitric Acid, 6N
Steam Bath
Vacuum Oven (operated at 25 mm mercury)

PROCEDURE

3.1 Sample Preparation

3.1.1 For Wet Paint

First, determine the volatile matter as % by weight of the sample as described in Method 17.1 of CGSB 1-GP-71. Subtract the % volatile matter from 100 to obtain the % non-volatile matter (total solids) of the sample. Accurately weigh about 1 g of sample into a porcelain crucible (or casserole). Evaporate on a steam bath for 1 h or until the solvent has been completely evaporated. Place the porcelain crucible in a muffle furnace at about 200°C (390°F). Allow the sample to char slowly without flame by gradually raising the temperature of the furnace to a max. of 540°C (1000°F) and maintain at that temperature for 1 h. Remove the crucible from the furnace, cool, add 40 ml 6N HNO₃ and evaporate to near dryness. Add 40 ml 6N HCl, stir thoroughly, add 100 ml hot distilled water and stir again. Filter hot through a filter paper into a 250 ml volumetric flask and carefully wash with hot distilled water. Cool the filtrate and make up to volume with distilled water.

3.1.2 For Applied Coating

Remove the coating from the article with a suitable solvent (usually acetone), being careful not to remove any of the underlying material from the substrate. Where immersion in the solvent is not practical, carefully scrape the coating from the object. Transfer the removed coating to a porcelain crucible (or casserole) and evaporate the solvent on a steam bath, then dry the removed coating to constant weight in a vacuum oven at 60°C (140°F). Remove the crucible from the oven and cool. Accurately weigh approximately 50 mg sample of the dried coating into a porcelain crucible, place the crucible in a muffle furnace operating at about 200°C (390°F). Gradually raise the temperature of the furnace to a max. of 540°C (1000°F) and maintain at that temperature for 1 h. Remove the crucible from the furnace, cool, add 4 ml 6N HNO₃ and evaporate to near dryness. Add 4 ml 6N HCl stir thoroughly, add 10 ml hot distilled water and stir again. Filter hot through a filter paper into a 25 ml volumetric flask and carefully wash with hot distilled water. Cool the filtrate and make up to volume with distilled water.

3.2 Preparation of Blank

Prepare a blank consisting of 4 ml 6N HNO₃ and 4 ml 6N HCl added to a 25 ml volumetric flask and made up to volume with distilled water.

3.3 Preparation of Lead Standard Solutions

Make up lead standard solutions of appropriate concentration by diluting the 1000 ppm AA Grade lead standard solution as required.

3.4 Determination of Lead (Pb)

Determine the concentration of lead in the sample as prepared in the appropriate par. 3.1.1 or 3.1.2, using the atomic absorption spectrophotometer operated with an air-acetylene flame and at a wavelength of either 283.3 nm, or 217 nm using the AA Grade lead standards in the appropriate range. Determine the lead content of the blank and if lead is present, subtract from the lead content of the sample.

CALCULATIONS

(a) % Lead (Pb) in Wet Paint Sample

% Lead (Pb) by weight in the non-volatile matter

$$\text{(total solids) of the sample} = \frac{0.025 \times C}{W \times NVM}$$

Where: C = Concentration of lead (Pb) found in the sample solution (ppm)

W = Weight of wet sample used (g)

NVM = % non-volatile matter in the sample expressed as a decimal.

(b) % Lead (Pb) in Applied Coating

% Lead (Pb) by weight in the dried film (total solids)

$$\text{of the applied coating sample} = \frac{0.0025 \times C}{W}$$

Where: C = Concentration of lead (Pb) found in the sample solution (ppm)

W = Weight of dried film used (g)

DETERMINATION OF LEACHABLE CADMIUM (Cd) IN LOW CONCENTRATION

SCOPE

This method is for use in the determination of leachable cadmium (Cd) in applied coatings

REAGENTS AND APPARATUS

Acetone or other suitable solvent
Atomic Absorption Spectrophotometer
Cadmium Standard Solution 1000 ppm (AA Grade)
Dilute Hydrochloric Acid Leaching Solution
(5 ml conc. HCl (sp. gr. 1.19) and 95 ml distilled water)
Steam Bath
Vacuum Oven (operated at 25 mm mercury)

PROCEDURE

3.1 Sample Preparation

Remove the coating from the article with a suitable solvent (usually acetone), being careful not to remove any of the underlying material from the substrate. Where immersion in the solvent is not practical, carefully scrape the coating from the object. Transfer the removed coating to a porcelain crucible (or casserole) and evaporate the solvent on a steam bath. Dry the removed coating in a vacuum oven at 60 C (140 F) to constant weight. Remove the crucible from the oven, cool and then grind the dried coating into a powder with a mortar and pestle.

First, sieve the powdered coating through a 500 μm (No. 35) sieve. The sample passing the 500 μm sieve is then sieved through a 250 μm (No. 60) sieve. That portion of the powdered sample that passed the 500 μm sieve and was retained on the 250 μm sieve is used for the test. Accurately weigh approximately 200 mg of the powdered coating into a 100 ml beaker. Add 25 ml of the dilute HCl leaching solution and stir for 10 min at 23 ± 2 C (73 ± 3.5 F). Filter into a 50 ml volumetric flask and wash well with hot distilled water. Cool and make up to volume with distilled water (Solution A).

3.2 Preparation of Blank

Prepare a blank consisting of 25 ml of the dilute HCl leaching solution added to a 50 ml volumetric flask and made up to volume with distilled water.

3.3 Preparation of Cadmium Standard Solutions

Make up cadmium standard solutions of appropriate concentration by diluting the 1000 ppm AA Grade cadmium standard solution as required.

3.4 Determination of Cadmium (Cd)

Determine the concentration of leached cadmium in the sample using the atomic absorption spectrophotometer operated with air-acetylene flame and at a wavelength of 229 nm, using the AA Grade cadmium standard solutions in the appropriate range. Also determine the cadmium content of the blank and if cadmium is present, subtract from the cadmium content of the sample.

$$\text{\% Cadmium (Cd) by weight of the dried film (total solids)} = \frac{0.005 \times C}{W}$$

Where C = Concentration of Cadmium found in the sample solution (ppm)
W = Weight of dried film used (g)

DETERMINATION OF LEACHABLE BARIUM (Ba) IN LOW CONCENTRATION

SCOPE

This method is for use in the determination of leachable barium (Ba) in applied coatings

REAGENTS AND APPARATUS

Acetone or other suitable solvent
Atomic Absorption Spectrophotometer
Barium Standard Solution 1000 ppm (AA Grade)
Dilute Hydrochloric Acid Leaching Solution
(5 ml conc. HCl (sp. gr. 1.19) and 95 ml distilled water)
Potassium Chloride Solution, KCl 2.5%
Steam Bath
Vacuum Oven (operated at 25 mm mercury)

PROCEDURE

3.1 Sample Preparation

Prepare and leach the sample as described in Method 1-GP-500.2, par. 3.1

Place a 20 ml aliquot of the prepared leachate (Solution A) into a 25 ml volumetric flask, add 1 ml of 2.5% KCl solution (to provide a concentration of 0.1% KCl) and make up to volume with distilled water. The KCl solution is added to suppress ionization interference in the spectrophotometer.

3.2 Preparation of Blank

Prepare a blank which consists of 10 ml of dilute HCl leaching solution, 1 ml of 2.5% KCl solution made up to volume with distilled water in a 25 ml volumetric flask.

3.3 Preparation of Barium Standard Solutions

Make up barium standard solutions of appropriate concentration by diluting the 1000 ppm AA Grade barium standard solution and adding 2.5% KCl solution in the same proportion that was in the sample.

3.4 Determination of Barium (Ba)

Determine the concentration of leached barium in the sample using the atomic absorption spectrophotometer operated with a nitrous oxide-acetylene flame and at a wavelength of 554 nm, using the AA Grade barium standard solutions in the appropriate range. Also determine the barium content of the blank and if barium is present, subtract from the barium content of the sample.

CALCULATIONS

% Barium (Ba) by weight of the dried film

$$\text{(total solids)} = \frac{0.005 \times C \times D}{W}$$

Where: C = Concentration of barium found in sample solution (ppm)

D = Dilution Factor = 1 25

W = Weight of dried coating used (g)

Withdrawn/Retirée

DETERMINATION OF LEACHABLE ANTIMONY (Sb) IN LOW CONCENTRATION

SCOPE

This method is for use in the determination of leachable antimony (Sb) in applied coatings

REAGENTS AND APPARATUS

Acetone or other suitable solvent
Antimony Standard Solutions: 0.25, 0.5, 1.0, 2.0, 3.0 and 4.0 μg of Sb per ml
Brilliant Green Solution a 0.05% aqueous solution freshly prepared
Dilute Hydrochloric Acid Leaching Solution (5 ml conc. HCl (sp. gr. 1.19) and 95 ml distilled water)
Hydrochloric Acid, conc. (sp. gr. 1.19)
Sodium Hexametaphosphate (NaPO_3)₆ Solution, 10%
Sodium Nitrite Solution, 5%
Steam Bath
Toluene, Spectral Grade
Urea Solution, 10% in water
Vacuum Oven (operated at 25 mm mercury)
Visible — Ultraviolet Spectrophotometer, equipped with 1 cm silica cells

PROCEDURE

3.1 Sample Preparation

Prepare and leach the sample as described in Method 1-GP-500.2, par. 3.1. Use a 5 ml aliquot of the prepared leachate (Solution A).

3.2 Determination of Antimony (Sb)

Place the 5 ml aliquot of leachate (Solution A) into a 125 ml separatory funnel, add 6 ml distilled water, 8.2 ml conc. HCl and mix. Add 0.5 ml of sodium nitrite solution, shake for 1 min, add 1 ml of urea solution and shake for 2 min. Add 25 ml of sodium hexametaphosphate solution, mix, add 5 ml of Brilliant Green solution and mix again. Add 10 ml toluene, shake for one min and allow the layers to separate. Draw off the aqueous layer and then filter the toluene layer through a plug of absorbent cotton into a 1 cm silica cell. Measure the absorbance on the spectrophotometer at 640 nm against toluene.

Repeat the above procedure six times, using 2 ml of each of the antimony standard solutions in turn, in place of the 5 ml aliquot of sample.

For each antimony standard solution plot the absorbance against concentration in μg on a graph. Determine the concentration of antimony in the sample solution from the graph.

CALCULATIONS

% Antimony (Sb) by weight of the dried film

$$\text{(total solids)} = \frac{C}{W \times 10^{-1}}$$

Where C = μg of antimony determined from the graph

W = Weight of dried coating used (g)

- References:
- (1) Galliford D.J.B. and Yardley J.T.
Analyst, 1963, 88, 653
 - (2) Fogg A.G., Jillings J., Marriott D.R., and
Thorburn Burns D.
Analyst 1969, 94, 768

Withdrawn/Retirée

DETERMINATION OF LEACHABLE SELENIUM (Se) IN LOW CONCENTRATION

SCOPE

This method is for use in the determination of leachable selenium (Se) in applied coatings.

REAGENTS AND APPARATUS

Acetone or other suitable solvent
Ammonium Hydroxide 6N
Dilute Hydrochloric Acid Leaching Solution:
(5 ml conc. HCl (sp. gr. 1.19) and 95 ml distilled water)
3-3 diaminobenzidine hydrochloride solution
0.05% in water (store solution in refrigerator)
EDTA Solution, 0.1M (disodium salt of ethylene diamine
tetraacetic acid)
Formic Acid 2.5M
pH Meter
Selenium Standard Solutions, 1000 ppm (AA Grade)
Steam Bath
Vacuum Oven (operated at 25 mm mercury)
Visible-Ultraviolet Spectrophotometer equipped with 1 cm
silica cells

PROCEDURE

3.1 Sample Preparation

Prepare and leach the sample as described in Method 1-GP-500.2, par. 3.1. Use an aliquot of the leachate (Solution A) which contains not more than 50 μg of selenium (usual sample size is 10 ml).

3.2 Determination of Selenium (Se)

Place the required aliquot of leachate (Solution A) in a beaker. Dilute to approximately 50 ml with distilled water, add 2 ml of 2.5 M formic acid and 5 ml of EDTA solution. Using the pH meter, adjust the pH to 2 to 3 by addition of 2.5M formic acid as required. Add 2 ml of 0.5% diaminobenzidine solution and let stand for 30 to 50 min. Again, using the pH meter, adjust the pH to 6 to 7 with 6N ammonium hydroxide. Transfer to a 125 ml separatory funnel, add exactly 10.0 ml of toluene and shake vigorously for 30 sec. Allow the layers to separate. Draw off the aqueous layer and transfer the required quantity of the toluene layer to the 1 cm silica cell. Measure the absorbance on the spectrophotometer at 420 nm, using toluene as reference.

Repeat the above procedure, using selenium standard solutions containing 5, 10, 20 and 25 μg of selenium, in place of the aliquot of sample.

For each selenium standard solution used, plot the absorbance against concentration of selenium in μg on a graph. Determine the concentration of selenium in the sample solution from the graph.

CALCULATIONS

% Selenium (Se) by weight of the dried film:

$$\text{(total solids)} = \frac{50C}{VW \times 10^4}$$

Where: C = μg of selenium determined from the graph

V = Volume of aliquot used for the selenium determination (ml)

W = Weight of dried coating used (g)

Reference: Standard Methods of Chemical Analysis
N.H. Furman, Vol. 1, 6th Edition

Withdrawn/Retirée

DETERMINATION OF LEACHABLE MERCURY (Hg) IN LOW CONCENTRATION

SCOPE

This method is for use in (a) the detection of and (b) the quantitative determination of leachable mercury (Hg) in applied coatings

REAGENTS AND APPARATUS

Acetone or other suitable solvent
Ammonium Hydroxide Solution 1.1 (one part by vol. conc. NH_4OH sp. gr. 0.90 in 1 part by vol. distilled water)
Chloroform, CHCl_3 , spectral grade
Dilute Hydrochloric Acid Leaching Solution:
(5 ml HCl (sp. gr. 1.19) and 95 ml distilled water)
Diphenylcarbazone Solution, saturated (1.5 — 2.0%) in alcohol
Dithizone Solution (10 mg specially-purified dithizone dissolved in one litre spectral grade chloroform)
EDTA Solution 0.001 M (disodium salt of ethylene diamine tetra acetic acid)
Mercury Standard Solutions 1000 ppm (AA Grade)
Sodium Acetate, powder
Steam Bath
Sulfuric Acid, 6N
Sulfuric Acid Solution 1.17 (one part by vol. conc. H_2SO_4 sp. gr. 1.84 and 17 parts by vol. of distilled water)
Vacuum Oven (operated at 25 mm mercury)
Visible — Ultraviolet Spectrophotometer equipped with 1 cm silica cells

PROCEDURE

3.1 Sample Preparation

Prepare and leach the sample as described in Method 1-GP-500 2, par. 3.1. Use a 10 ml aliquot of the leachate (Solution A) for the Qualitative Detection of Mercury Test par. 3.2.1. Use an aliquot of the leachate (Solution A) which contains 10-20 μg of mercury (usual sample size is 10 ml), for the Quantitative Determination of Mercury.

3.2 Analysis for Mercury

3.2.1 Qualitative Detection of Mercury (Hg)

Make the 10 ml aliquot of the leachate (Solution A) neutral or faintly alkaline by adding sodium acetate. Add one drop of the diphenylcarbazone solution to the leachate. A violet or blue color indicates the presence of mercury. Lead, copper, tin, cadmium, nickel, cobalt also give color reaction in this test, however, if the test is positive, proceed with the quantitative determination of mercury.

3.2.2 Quantitative Determination of Mercury

Because the color of the complex is sensitive to light, carry out the analysis in subdued light.

Place an aliquot of the leachate (Solution A) containing 10-20 μg of mercury in a separatory funnel. Neutralize with 1.1 ammonium hydroxide solution, dilute to 20 ml with distilled water and add 20 ml of 1.17 sulfuric acid solution. Add 5 ml dithizone solution. Shake for 1 min and allow the layers to separate. If no distinct color (either green or red-violet) of the chloroform layer

appears, continue to add 5 ml portions of dithizone solution, shaking for 1 min after each addition, until a positive color appears. If the color is green, indicating copper is absent, follow procedure A. If the color is red-violet, indicating copper is present, follow procedure B.

Procedure A (Copper absent): Draw off the chloroform layer and if it is not clear, centrifuge in a stoppered tube. Transfer to a 25 ml volumetric flask, make up to volume with spectral grade chloroform and immediately determine the absorbance of the mercury dithizonate at 500 nm on the spectrophotometer. Check that an excess of dithizone is present by reading absorbance at 625 nm. During this procedure expose the sample to light as little as possible.

Procedure B (Copper Present): Draw off the chloroform layer and shake with 6 ml of 6N H₂SO₄. Using the pH meter, adjust the pH to 1.5 to 2 by slow addition of the 1:1 ammonium hydroxide solution. Add 5 ml of 0.001M EDTA solution, shake again and allow the layers to separate. Draw off the aqueous layer, add 20 ml 1:17 H₂SO₄ solution and 5 ml dithizone solution. Shake for 1 min. Continue to add 5 ml increments of dithizone solution, shaking for 1 min after each addition, until a distinct green color appears. Allow the layers to separate. Follow procedure A.

Preparation of Graph: Repeat the above procedure, (from the beginning of par. 3.2.2) using standard mercury solutions containing 0, 5, 10, 15 and 20 µg of mercury in place of the sample under test. For each mercury standard solution, plot the absorbance against concentration of mercury in µg on a graph. Use the absorbance reading of 0 µg of mercury as the zero point on the graph. Determine the concentration of mercury in the sample solution from the graph.

CALCULATIONS

% mercury (Hg) by weight of the dried film

$$\text{(total solids)} = \frac{50 \times C}{VW \times 10^4}$$

Where: C = µg of mercury determined from the graph

V = Volume of aliquot used for the mercury determination (ml)

W = Weight of dried coating used (g)

References: (1) W. C. Johnson, Organic Reagent for Metals
1st Edition, 1955

(2) Standard Methods of Chemical Analysis
N. H. Furman, Vol. 1, 6th Edition

DETERMINATION OF LEACHABLE ARSENIC (As) IN LOW CONCENTRATION

SCOPE

This method is for use in the determination of leachable Arsenic (As) in applied coatings

REAGENTS AND APPARATUS

Acetone or other suitable solvent
Arsenic Evolution Apparatus (Fig. 1)
Arsenic Standard Solutions, 1000 ppm (AA Grade)
Conc. Hydrochloric Acid (sp. gr. 1.19)
Dilute Hydrochloric Acid Leaching Solution
(5 ml conc. HCl (sp. gr. 1.19) and 95 ml distilled water)
Lead Acetate Solution, 10 g lead acetate dissolved in 100 ml distilled water
Potassium Iodide Solution, 15%
Silver Diethyldithiocarbamate solution
(1 g silver diethyldithiocarbamate dissolved in 200 ml spectral grade pyridine and the solution filtered. This arsine absorbing solution is stable)
Stannous Chloride Solution, 40 g SnCl_2 dissolved in 100 ml HCl (sp. gr. 1.19)
Steam Bath
Stopcock Grease
Vacuum Oven (operated at 25 mm mercury)
Visible — Ultraviolet Spectrophotometer equipped with 1 cm silica cells
Zinc, granular, 20 mesh

PROCEDURE

3.1 Sample Preparation

Prepare and leach the sample as described in Method 1-GP-500.2, par. 3.1. Use a 5 ml aliquot of the prepared leachate (Solution A).

3.2 Determination of Leachable Arsenic (As)

Transfer 5 ml aliquot of the leachate (Solution A) into a 125 ml Erlenmeyer flask and add 30 ml distilled water. Add 5 ml conc. HCl (sp. gr. 1.19), 2 ml 15% KI solution, 8 drops of the SnCl_2 solution and swirl the flask. Allow to stand 15 min to ensure reduction of all the arsenic to the trivalent form.

Place 5 ml of the silver diethyldithiocarbamate solution in the absorbing tube of the arsenic evolution apparatus (Fig. 1). Impregnate the glass wool in the scrubber with the lead acetate solution by either soaking the glass wool in the lead acetate solution, draining and then drying it or alternatively by adding a few drops of lead acetate on the glass wool just before evolution of arsine. Attach the absorbing tube to the scrubber containing the impregnated glass wool. Lubricate all ground glass joints with stopcock grease, add 3 g of granular zinc to the solution in the flask and immediately insert the scrubber. At the end of 30 min, transfer the absorbing solution to a 1 cm silica cell and measure the absorbance against a blank silver diethyldithiocarbamate solution at 560 nm on the spectrophotometer.

Repeat the above procedure using arsenic standard solutions containing arsenic in the 0-15 µg range.

For each arsenic standard solution used, plot the absorbance against concentration of arsenic in µg on a graph. Determine the concentration of arsenic in the sample solution from the graph.

CALCULATIONS

% Arsenic (As) by weight of the dried film

$$\frac{\text{(total solids)}}{\text{}} = \frac{C}{W \times 10^1}$$

Where: C = µg of arsenic determined from the graph

W = Weight of dried coating used (g)

Reference: Standard Methods of Chemical Analysis
N. H. Furman, editor, Vol. 1, 6th Edition

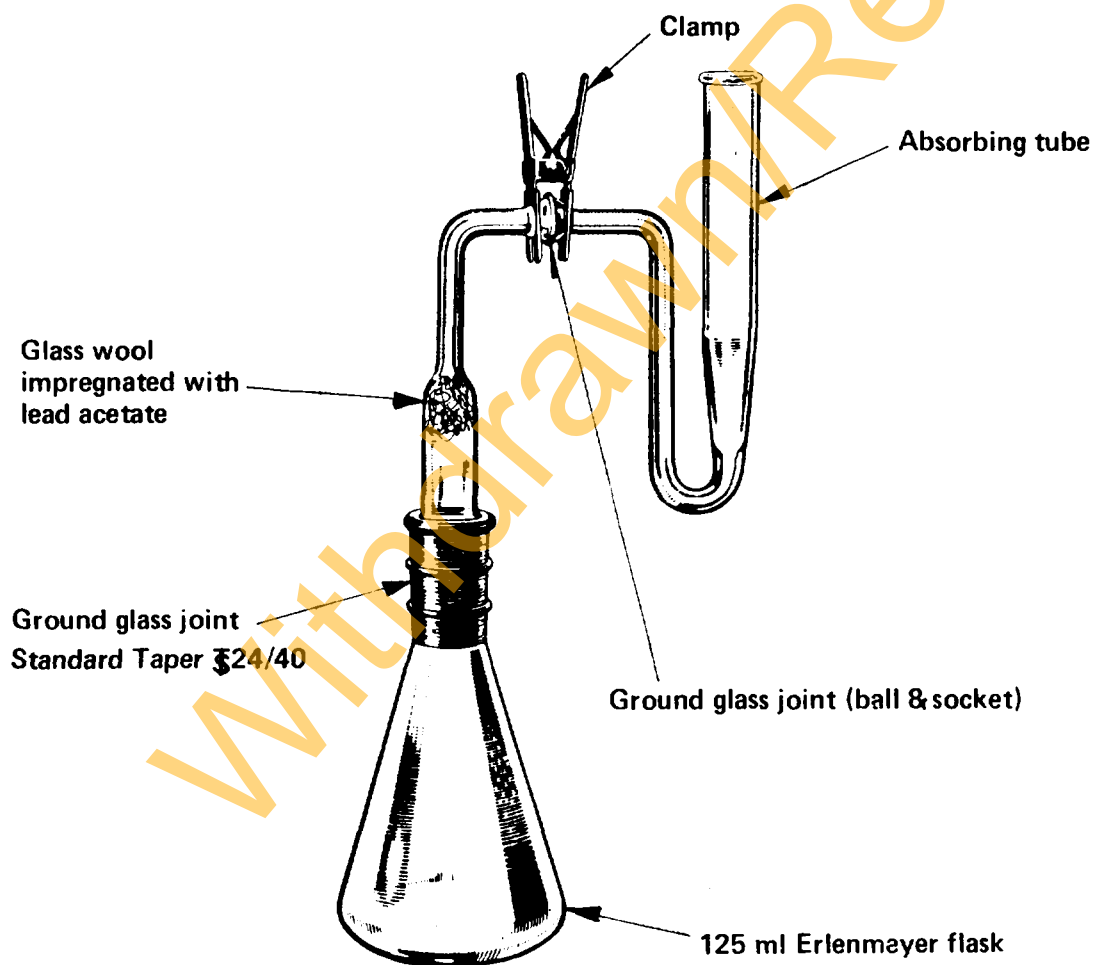


FIGURE 1
ARSINE GENERATOR

DETERMINATION OF LEACHABLE CHROMIUM (Cr) IN LOW CONCENTRATION

SCOPE

This method is used for the determination of leachable chromium (Cr) in applied coatings.

REAGENTS AND APPARATUS

Acetone or other suitable solvent
Atomic Absorption Spectrophotometer
Chromium standard solution 1000 ppm (AA Grade)
Dilute Hydrochloric Acid Leaching Solution
(5 ml conc. HCl (sp. gr. 1.19) and 95 ml distilled water)
Steam Bath
Vacuum Oven (operated at 25 mm mercury)

PROCEDURE

3.1 Sample Preparation

Prepare and leach the sample as described in Method 1-GP-500.2, par. 3.1

3.2 Preparation of Blank

Prepare a blank consisting of 25 ml of dilute HCl leaching solution added to a 50 ml volumetric flask and made up to volume with distilled water.

3.3 Preparation of Chromium Standard Solution

Make up chromium standard solutions of appropriate concentrations by diluting 1000 ppm AA Grade chromium standard solution as required.

3.4 Determination of Chromium (Cr)

Determine the concentration of the leached chromium in the sample using the atomic absorption spectrophotometer operated with air-acetylene flame and at wavelength 358 nm, using the AA Grade Chromium standard solutions in the appropriate range. Also determine the chromium content of the blank and if chromium is present, subtract from the chromium content of the sample.

CALCULATIONS

% Chromium (Cr) by weight of the dried film

$$\text{(total solids)} = \frac{0.005 \times C}{W}$$

Where C = Concentration of Chromium found in the sample solution (ppm)

W = Weight of dried film used (g)