

CAN/CGSB-1.134-M91

WITHDRAWAL

June 1993

**CANADIAN GENERAL
STANDARDS BOARD**

**AIRCRAFT LACQUER,
GLOSS CELLULOSE NITRATE**

This standard is hereby withdrawn. It has been determined that the product covered by this standard is no longer used in quantities that warrant the continued maintenance of the standard. It is replaced by CAN/CGSB-1.159 -- Acrylic Cellulose Nitrate Gloss Lacquer.

RETRAIT

Juin 1993

**OFFICE DES NORMES
GÉNÉRALES DU CANADA**

**PEINTURE-LAQUE ET VERNIS-LAQUE
AU NITRATE DE CELLULOSE, BRILLANTS
POUR AÉRONEFS**

Cette norme est retirée par le présent avis. Il a été constaté que le matériau qui fait l'objet de la présente norme n'est plus utilisé en quantité suffisante pour maintenir cette norme en vigueur. Elle est remplacée par CAN/CGSB-1.159 -- Produit-laque à la résine acrylique et au nitrate de cellulose.

NATIONAL STANDARD OF CANADA

CAN/CGSB-1.134-M91

Supersedes 1-GP-134M

**Aircraft Lacquer,
Gloss Cellulose Nitrate**



QUALITY

Canadian General Standards Board

CGSB

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AIRCRAFT LACQUER, GLOSS CELLULOSE NITRATE

This new edition supersedes 1-GP-134M, March 1978. There are no substantial technical changes.

The Department of National Defence administers a Qualification Listing Program for products conforming to the requirements of this standard. Further information on the listing program is available from the Director of Engineering and Maintenance Planning and Standardization (DEMPS 4), Ottawa, Canada K1A 0K2.

Prepared by the

Canadian General Standards Board



Approved by the

Standards Council of Canada



Published May 1991 by the
Canadian General Standards Board
Ottawa, Canada K1A 1G6

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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 for the publishing by MGL Publishing Inc.

CANADIAN GENERAL STANDARDS BOARD

AIRCRAFT LACQUER, GLOSS CELLULOSE NITRATE**1. SCOPE**

- 1.1 This standard applies to cellulose nitrate gloss lacquer intended primarily for use as a finish for aircraft but used for other primed interior and exterior metal surfaces where a quick-drying finish is required. This lacquer is not intended for use over bare metal.
- 1.2 In emergencies only, it may be used for insignia and for marking on doped fabric.
- 1.3 The testing and evaluation of a product against this standard may require the use of materials and/or equipment that could be hazardous. This document does not purport to address all the safety aspects associated with its use. Anyone using this standard has the responsibility to consult the appropriate authorities and to establish appropriate health and safety practices in conjunction with any existing applicable regulatory requirements prior to its use.

2. APPLICABLE PUBLICATIONS

- 2.1 The following publications are applicable to this standard:

- 2.1.1 Canadian General Standards Board (CGSB)

- 1-GP-12 — Standard Paint Colors, Part III
 - 1-GP-22M — Aluminum Pigment for Paint, Powder
 - 1-GP-24M — Aluminum Pigment for Paint, Paste
 - 1-GP-71 — Methods of Testing Paints and Pigments
 - 1-GP-110M — Thinner, General Purpose, for Lacquers
 - 1-GP-136M — Thinner, Antiblush, for Cellulose Nitrate Lacquer.

- 2.1.2 Department of Consumer and Corporate Affairs

- Hazardous Products Act.

- 2.1.3 ASTM

- D 1200 — Test Method for Viscosity of Paints, Varnishes and Lacquers by Ford Viscosity Cup
 - D 1210 — Test Method for Fineness of Dispersion of Pigment-Vehicle Systems
 - D 1644 — Test Methods for Nonvolatile Content of Varnishes
 - D 3133 — Method for Quantitative Determination of Cellulose Nitrate in Alkyd Lacquers by Infrared Spectrophotometry.

- 2.2 Reference to the publications in par. 2.1.2 and 2.1.3 and to other related standards is to the latest issues unless otherwise specified by the authority applying this standard. The sources for all publications are shown in the Notes section.

3. CLASSIFICATION

3.1 The lacquer shall be supplied in one of the following types as specified (par. 8.1):

Type 1 — Clear

Type 2 — Pigmented.

4. GENERAL REQUIREMENTS

4.1 Type 1 clear lacquer shall consist of cellulose nitrate, resins and plasticizers in a suitable solvent mixture.

4.2 Type 2 pigmented lacquer shall consist of the same vehicle as Type 1 but with the addition of thoroughly dispersed suitable pigments.

4.3 The nonvolatile vehicle of both Type 1 and Type 2 lacquer shall on a mass basis, be composed of 28 to 31% half-second R.S. nitrocellulose, 58 to 62% alkyd resin and 10 to 13% plasticizers. The resin portion shall consist of non-oxidizing phthalic alkyd containing 43 to 47% phthalic anhydride by mass and 30 to 34% coconut-oil acid modification (par. 7.1).

4.4 The lacquer shall be suitable for spraying when reduced with CGSB standard 1-GP-110M lacquer thinner in accordance with the manufacturer's instructions. Under adverse temperature and humidity conditions, a portion of the thinner used may be replaced with antiblush thinner conforming to CGSB standard 1-GP-136M.

4.5 The lacquer shall be homogeneous and free from lumps and grit. It shall have good flow-out properties and shall dry to a uniform appearance without streaking, running, sagging or orange peel.

4.6 The lacquer shall not show any hard settling, thickening, curdling or undue loss in viscosity in the original unopened container for two years from date of shipment when stored at temperatures not exceeding 40°C. At the end of this time, it shall be capable of being readily mixed to a uniform condition by stirring and shall comply with the requirements for applicability and appearance (par. 5.23).

5. DETAILED REQUIREMENTS

Lacquer to this standard shall comply with the following detailed requirements when tested in accordance with the specified test methods:

		Test Method			
		Min.	Max.	CGSB 1-GP-71	ASTM
5.1	Drying time, dry hard, minutes	—	40	5.1*	—
5.2	60° gloss, units	80	—	13.2	—
5.3	Fineness of grind, Hegman, Type 2	7	—	—	D 1210
5.4	Benzene, % by mass	—	0.1**	65.1	—
5.5	Chlorinated compounds boiling below 125°C	—	Nil	73.1	—
5.6	Phenolic resins	—	Nil	75.2	—

* Except dry film thickness shall be $25 \pm 3 \mu\text{m}$.

** Hazardous Products Act.

5.7 Nonvolatile Vehicle Composition

5.7.1 **Phthalic Anhydride** — The content of phthalic anhydride shall be within $\pm 2\%$ of the value established in the qualification submission and in no case shall it be less than 25% by mass of the nonvolatile vehicle of the lacquer, when tested in accordance with CGSB standard 1-GP-71, Method 57.1.

5.7.2 **Nitrocellulose** — The nitrocellulose content shall be between 28 and 31% by mass of the nonvolatile vehicle of the lacquer when tested in accordance with ASTM D 3133.

5.8 **Colour** — Type 2 lacquer shall conform to CGSB standard 1-GP-12 gloss colours listed below, or to such other colours specified (par. 8.1), when tested in accordance with CGSB standard 1-GP-71, Method 12.9.

Grey	Blue	Green	Brown	Yellow	Orange	Red	Black	White
501-101	202-101	503-104	504-104	505-101	508-101	509-101	512-101	513-101
501-102	502-101	503-108				509-102		
501-103	502-103	503-111						
501-106	502-106	503-120						
501-108								
501-109								

5.9 **Hiding Power** — Type 2 lacquer shall meet the following contrast ratio requirements when applied to black and white carrara glass in accordance with CGSB standard 1-GP-71, Methods 14.7 and 128.1.

Colour	Colour Number (Note 1)	Dry Film Thickness max.	Contrast Ratio min.
Grey	501-101	25 μm	0.99
	501-102	"	0.99
	501-103	"	0.99
	501-106	"	0.99
	501-108	"	0.99
	501-109	"	0.98
Blue	202-101	25 μm	0.98
	502-101	"	0.98
	502-103	"	0.98
	502-106	"	0.98
Green	503-104	25 μm	0.98
	503-108	"	0.99
	503-111	"	0.99
	503-120	"	0.99
Brown	504-104	"	0.99
Yellow	505-101	"	0.88
Orange	508-101	38 μm	0.96
Red	509-101	"	0.87
	509-102	"	0.87
Black	512-101	25 μm	1.00
White	513-101	"	0.90

Note 1: For other colours specify contrast ratio and lacquer composition (par. 8.1).

5.10 **Viscosity** — When reduced with thinner conforming to CGSB standard 1-GP-110M in the ratio of 1 part of thinner to 1 part of lacquer by volume, the viscosity shall not be less than 14 and not more than 24 s by the No. 4 Ford Cup, when tested in accordance with ASTM D 1200.

5.11 **Composition**

5.11.1 Type 1 lacquer shall have a nonvolatile content of not less than 30%.

5.11.2 Type 2 lacquer shall meet the following composition requirements in percent by mass according to colour when tested in accordance with ASTM D 1644, Method A.

Colour	Colour Number (Note 2)	Nonvolatile min.
Grey	501-101	40
	501-102	40
	501-103	40
	501-106	40
	501-108	40
	501-109	40
Blue	202-101	40
	502-101	32
	502-103	40
	502-106	40
Green	503-104	40
	503-108	40
	503-111	40
	503-120	40
Brown	504-104	40
Yellow	505-101	40
Orange	508-101	32
Red	509-101	32
	509-102	32
Black	512-101	32
White	513-101	40

Note 2: Aluminum coloured lacquer may be obtained by mixing 4.5 L of Type 1 lacquer with 283 g of Class A powder (CGSB 1-GP-22M) or 425 g of Class A paste aluminum pigment (CGSB 1-GP-24M). For other colours, specify contrast ratio and lacquer composition (par. 8.1).

5.12 **Accelerated Storage Stability** — The lacquer shall withstand 96 h heating in a full container at 60°C without caking, gelling, thickening, curdling or seeding. A film prepared from the lacquer so conditioned shall be uniform in appearance, free from streaking, mottling or seeding, and the change in gloss shall not exceed 5 units when tested in accordance with CGSB standard 1-GP-71, Method 30.3.

5.13 **Blushing Resistance** — No blushing shall occur when the lacquer is dried at 65% RH and tested in accordance with CGSB standard 1-GP-71, Method 38.2.

5.14 **Dilution Stability**

5.14.1 The lacquer shall withstand reduction with thinner in the ratio of 1 volume of lacquer to 2 volumes of thinner conforming to CGSB standard 1-GP-110M without curdling, separation or precipitation being evident when stirred after 24 h standing.

- 5.14.2 The dry film formed by the reduced lacquer shall show no streaking or other non-uniformity when tested in accordance with CGSB standard 1-GP-71, Method 45.1.
- 5.15 **Gasoline Resistance** — A system of zinc chromate primer conforming to CGSB standard 1-GP-132M and lacquer shall withstand 4 h immersion in a 70:30 mixture of iso-octane / toluene at $23 \pm 2^\circ\text{C}$ in accordance with CGSB standard 1-GP-71, Method 107.5, without marked softening, blistering, lifting, wrinkling, loosening nor peeling. After subsequent drying for 24 h it shall show no evidence of softening or discolouration and not more than a slight drop in gloss. When subjected to the knife test in accordance with CGSB standard 1-GP-71, Method 135.1, there shall be no flaking, loosening or separation of coats in the area adjacent to the scratch. The recovered film shall show no flaking when subjected to the flexibility test (par. 5.18).
- 5.16 **Water Resistance** — The coating system of zinc chromate primer conforming to CGSB standard 1GP-132M topcoated with lacquer shall withstand 24 h immersion in water at $23 \pm 2^\circ\text{C}$ in accordance with CGSB standard 1-GP-71, Method 110.10, without blistering, lifting, loosening or peeling. After subsequent drying for 2 h it shall show no evidence of softening, discolouration or dulling. When subjected to the knife test in accordance with CGSB standard 1-GP-71, Method 135.1 the ribbon produced shall be free from crumbling and evidence of intercoat separation. There shall be no flaking, loosening or separation of coats in the area adjacent to the scratch.
- 5.17 **Baking Resistance** — When heated for 48 hours at 60°C , the coating system of lacquer over primer conforming to CGSB standard 1-GP-132M shall not show more than slight hazing and slight colour change, when tested in accordance with CGSB standard 1-GP-71, Method 112.13.
- 5.18 **Low-Temperature Flexibility** — The dried lacquer when applied over CGSB standard 1-GP-132M primer film shall show no flaking nor peeling when subjected to the bending test at 0°C using a 6.4 mm mandrel in accordance with CGSB standard 1-GP-71, Method 119.15.
- 5.19 **Accelerated Weathering Resistance** — The lacquer film, applied over primer conforming to CGSB standard 1-GP-132M shall withstand an exposure period of twenty 24 h cycles in an accelerated weathering machine when tested in accordance with CGSB standard 1-GP-71, Method 122.10, without showing evidence of blistering, chalking checking, cracking, flaking, peeling or appreciable colour change. The final gloss shall not be less than 55 units. The change in $45^\circ, 0^\circ$ directional reflectance of colour Orange 508-101 (International Orange) after 7 cycles shall not exceed 3 units.
- 5.20 **Behaviour Towards Undercoats and Self-Lifting** — Two coats of lacquer, with intervals of 4, 24 and 48 h between coats, applied over panels primed with CGSB standard 1-GP-132M zinc chromate primer shall not cause lifting nor wrinkling of the system. When the panels are placed in a vertical position immediately after application of the second coat of lacquer, the lacquer shall not run, sag nor streak when tested in accordance with CGSB standard 1-GP-71, Method 133.1. For Type 2 lacquer, the loss of gloss of the lacquer compared with its gloss over unprimed, pretreated panels shall not exceed 5 units.
- 5.21 **Adhesion** — The coating system conforming to CGSB standard 1-GP-132M applied to panels and topcoated with the lacquer shall produce a ribbon free from crumbling and evidence of intercoat separation when subjected to the knife test in accordance with CGSB standard 1-GP-71, Method 135.6. There shall be no flaking, loosening or separation of coats in the area adjacent to the scratch. When subjected to the tape test, there shall be no separation of topcoats from the primer or of the primer from the metal.
- 5.22 **Print Resistance** — The lacquer film, applied over primer conforming to CGSB standard 1-GP-132M, dried 5 h and then subjected to the print test using a pressure of 6.9 kPa for one hour shall show no imprint 2 h after removal of the fabric, when tested in accordance with CGSB standard 1-GP-71, Method 142.1.
- 5.23 **Applicability and Appearance** — The lacquer shall have good spraying properties and the applied lacquer finish shall be smooth and uniform in appearance, with no sagging, wrinkling, bubbling, streaking, pinholing, orange peel or other defects. The first coat of lacquer shall not lift nor wrinkle the primer. The second coat of lacquer shall not lift or wrinkle the first coat of lacquer. The lacquer shall have satisfactory recoating and drying time (par. 7.2.2).

6. PREPARATION FOR DELIVERY

6.1 Unless otherwise specified (par. 8.1), preparation for delivery shall conform to normal commercial practice.

6.2 **Labelling** — In addition to complying with the labelling requirements of any relevant Acts or regulations, each container shall bear a single label showing the following information:

Name of material

Type

Colour and number, CGSB 1-GP-12

Standard number: CAN/CGSB-1.134-M91

Manufacturer's name and address

Manufacturer's batch number

Manufacturer's code number

Date of manufacture

Thinning instructions for spraying using thinner conforming to CGSB standard 1-GP-110M.

CAUTIONARY NOTE to indicate that:

- contents are flammable
- the material shall be used with adequate ventilation
- the material shall be stored at temperatures not exceeding 40°C
- the material shall be kept away from sparks and open flame.

7. INSPECTION

7.1 Sampling shall be carried out in accordance with CGSB standard 1-GP-71, Method 1.1. When requested by the inspection authority, samples of the alkyd resin without plasticizer and cellulose nitrate, packaged separately, shall be supplied for inspection to the requirements in par. 4.3.

7.2 Testing

7.2.1 **Thinning for Spraying** — When test panels are prepared for spraying, the amount of thinner conforming to CGSB standard 1-GP-110M used to reduce the lacquer shall be in accordance with the manufacturer's instructions.

7.2.2 **Applicability and Appearance** — Prepare (CGSB 1-GP-71, Method 99.1) a 300 x 300 mm aluminum panel and mount vertically. Apply a spray coat of zinc chromate primer conforming to CGSB standard 1-GP-132M to provide a uniform dry film $9 \pm 2 \mu\text{m}$ thick. Dry for a minimum of 30 min. Apply by spray one coat of the lacquer under test, thinned in accordance with the manufacturer's instructions, to the primed panel to provide a dry film $15 \pm 3 \mu\text{m}$ thick. The spray gun shall be of a type suitable for spraying lacquers and shall be operated in accordance with the spray gun manufacturer's instructions. Allow the lacquer to dry 45 min. Examine the applied lacquer film for compliance with the specified requirements. Apply a second coat of lacquer by spray to provide a dry film $15 \pm 2 \mu\text{m}$ thick and allow the lacquer to dry 45 min. Examine the applied lacquer film for compliance with the specified requirements.

8. NOTES

8.1 **Options** — The following options must be specified in the application of this standard:

- a. Type (par. 3.1)
- b. Colour (par. 5.8) — For colours other than those listed in par. 5.8, the contrast ratio, dry film thickness at which the contrast ratio is determined, and lacquer composition must be specified (par. 5.9 and 5.11.1)
- c. Preparation for delivery, if other than as specified (par. 6.1).

8.2 Related Publications

8.2.1 CGSB standards as to coating system:

1-GP-121 — Coating, Vinyl, Pretreatment, for Metals (Vinyl Wash Primer)
1-GP-132M — Primer, Zinc Chromate, Low Moisture Sensitivity.

As to end use:

1-GP-88M — Enamel, Alkyd Air Drying and Baking, Gloss.

8.2.2 U.S. Federal Specification

TT-L-32, Lacquer, Cellulose Nitrate, Gloss, for Aircraft Use.

8.3 Sources of Referenced Publications

8.3.1 The publications referred to in par. 2.1.1 and 8.2.1 may be obtained from the Canadian General Standards Board, Sales Unit, Ottawa, Canada K1A 1G6. Telephone (819) 956-0425 or 956-0426. Fax (819) 956-5644.

8.3.2 The publication referred to in par. 2.1.2 may be obtained from the Canada Communication Group, Publishing, Ottawa, Canada K1A 0S9. Telephone (819) 956-4802.

8.3.3 The publications referred to in par. 2.1.3 may be obtained from ASTM, 1916 Race Street, Philadelphia, PA 19103, U.S.A. or from the Standards Council of Canada, Standards Sales Branch, 350 Sparks Street, Suite 1200, Ottawa, Ontario K1P 6N7.

8.3.4 The publication referred to in par. 8.2.2 may be obtained from the Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120, U.S.A.



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