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# Canadian Building Digest

Division of Building Research, National Research Council Canada

**CBD 172**

## General Recommendations For Painting Buildings

*Originally published July 1975*

*H.E. Ashton*

### **Please note**

This publication is a part of a discontinued series and is archived here as an historical reference. Readers should consult design and regulatory experts for guidance on the applicability of the information to current construction practice.

The types of coating to be used on different substrates for service conditions inside and outside buildings have been discussed in several Digests ([CBD 90](#), [CBD 91](#), [CBD 98](#), [CBD 131](#)). In an effort to make this information more easily accessible, it is now summarized in tabular form (Tables I - IV). For many readers the problem of how to order or purchase the type of material that is recommended is a difficult one. This Digest includes, therefore, the standards numbers of the Canadian Government Specifications Board (CGSB) to assist in consolidating the recommendations and provide guidance with identification of products.

### **Specifying the Finish**

Digests concerned with coatings have used generic titles for the various materials, a practice that is almost mandatory because commercial names of one or two companies can scarcely be used to the exclusion of those of the remaining producers. When specifications have to be prepared or tenders issued, however, generic names are not usually specific enough to establish the quality of the finish. For example, a "siliconized" finish may contain only a few parts per million of silicone additive and a silicone enamel may have a vehicle containing 30 per cent silicone resin, although both are said to be made with silicones. The consumer clearly requires some basis of comparison.

Architects and others who have to specify coatings for buildings frequently use the term "Brand X or equal." The manufacturer of Brand X is naturally pleased unless Brand Y takes its place in the next specification. The problems of how to prove, and who is responsible for proving, equality of a suggested replacement have sometimes caused "or equal" to be deleted. Several years ago paint producers in Canada tried to answer this question by designating the quality of certain products. Unfortunately, they were unable to resolve all the difficulties involved and the scheme was dropped.

The individual consumer is generally forced to rely on the name of the manufacturer and the price of the product. In the latter case it is assumed that the higher the cost the greater the likelihood that the material will be satisfactory. The consumer, however, is not in a position to evaluate merit in relation to cost, and hence is not usually able to recognize genuine bargains when they are available. Another result of the price-quality assumption is that products that

could quite legitimately be sold at a lower price are not for fear of the stigma attached to a lower price. Consumer organizations in the United States attempt to assist by testing commercial paints, but they can only investigate a few of the thousands of products available. In addition, their findings do not normally relate to products in other countries even when the same brand name is used.

Different countries have attempted to meet the problems of both the individual and the volume buyer in various ways. In South Africa the Bureau of Standards tests materials for compliance with specifications issued for the different kinds of coatings. If found to comply, the product is labelled with the mark of the South African Bureau of Standards, and this is considered desirable commercially. The system apparently functions quite well. The chief complaint is that the quality of some products that formerly exceeded by far the specification requirements has been lowered to meet the price of materials that only just comply. On average, however, the over-all quality of coatings is believed to have been improved by the scheme.

In Sweden, the paint manufacturers' association guarantees the quality of coatings sold to the general public and paint labels carry some information to assist consumers. The laboratory of the association is responsible for checking the quality of products offered in the main categories of paints for buildings. In the United States, some States require that the general composition of a coating be given on the label, but as most consumers are not paint chemists the information is not always helpful for comparing quality. A few years ago American architects suggested that an unbiased organization should write paint specifications to help in specifying materials. To date there has been little progress.

In Canada the only alternative to price or brand name is the CGSB standards number as an indication of the type or quality of finish. Through the cooperation of leading paint manufacturers, the Board prepares standards generally aimed at providing the government with the equivalent of good commercial brands, but without the use of brand names in tenders or other purchase documents. The standards are intended primarily for use by federal government departments or agencies in their purchasing procedures, but they may be used by other organizations. Although large industrial concerns frequently issue their own paint specifications, it would be simpler and less costly for manufacturers to have to meet only one instead of several specifications for the same type of material.

It is not the intention to suggest that all materials should be bought to CGSB standards. Such a purchasing system normally requires laboratory testing to show that products do meet the standards, particularly when the lowest-tender-purchase system is in use. It would be helpful to specifiers, however, if information could be available as to whether a coating meets a given specification. It would then be possible to make selections in the knowledge that certain materials are fairly comparable. Although the paint industry has not regarded this suggestion with favour, manufacturers of other building components such as sealants have considered it worth while to state that their products comply with appropriate Canadian standards. Like recommendations of restaurants by motorist associations, specification numbers would not automatically ensure the best material, but their use would ensure that one could avoid the poorest. In this connection it is occasionally claimed that CGSB standards do not really provide quality products. If there is any truth in the remark, industry members who help write the standards must bear some responsibility for not upgrading them.

CGSB numbers may be of less assistance to individual consumers. As mentioned in **CBD 90**, coatings are generally compromises; everyone does not necessarily agree on the best balance of properties for each type of finish. One paint formulation may place more emphasis on a particular property than another, with the result that commercial coatings intended for the same service vary somewhat from company to company. Another consequence is that brand name products often differ in one or several details from CGSB standards and the manufacturer is unable to label them as complying. Nevertheless, it would probably assist the general public, particularly when use is made of this Digest, if the label were to indicate to which standard the material is equivalent (or even superior) with regard to intended use. The commercial product that a purchaser would like to buy in order to follow the recommendations in Table I, Table II,

Table III, & Table IV would then be more readily evident. Such a system could also be beneficial to manufacturers now that so many purchases of paint are made in stores where technically qualified assistants are not available.

**Table I. Interior Walls, Ceilings, Trim And Floors**

Type	CGSB No.	Application
<b>Primer-Sealer</b>		
Solvent-base	1-GP-68	Gypsum board and cured plaster; raises fibre on gypsum board.
Latex	1-GP-119	Gypsum board and dry plaster
<b>Undercoat</b>	1-GP-38	Wood
<b>Finish, Flat</b>		
Latex	1-GP-100	Gloss may range into eggshell; self-priming on plaster, gypsum board, concrete and brick.
Alkyd	1-GP-118	Low sheen - self-primed or over 1-GP-68 or -119 on gypsum board and plaster, over 1-GP-38 on wood.
Alkyd	1-GP-202, Type 1	More washable than 1-GP-118 - over 1-GP-68 or -119 on gypsum board and plaster, over 1-GP-38 on wood.
Oil	1-GP-34 (Cancelled 1956)	On gypsum board and plaster, self-priming in light colours, dark colours require sealing with 1-GP-68.
Alkyd-emulsion	1-GP-8 (Cancelled 1956)	More washable than calcimine or casein paints but not so good as latex or solvent-based coatings.
Casein	1-GP-63 powder (Cancelled) 1-GP-64 paste (Cancelled 1956)	Inexpensive finish with better properties than calcimine.
<b>Finish, Eggshell</b>		
Alkyd	1-GP-202, Type 2	Over 1-GP-68 or -119 on gypsum board or plaster, over 1-GP-38 on wood.
<b>Finish, Semi-gloss</b>		
Alkyd	1-GP-57	Over 1-GP-68 or -119 on gypsum board and plaster, over 1-GP-38 on wood.
Latex	1-GP-195	Self-priming on gypsum board, over 1-GP-119 on plaster and masonry, over 1-GP-38 on wood.
<b>Finish, Gloss</b>		
Alkyd	1-GP-60	Over 1-GP-68 or -119 on gypsum board and plaster, over 1-GP-38 on

wood.

## Varnish

Alkyd	1-GP-36, Type 1	Gloss finish for wood furniture, paneling, woodwork and floors; lighter colour than oleoresinous varnishes.
	1-GP-36, Type 2	Semi-gloss - not for use on floors.
Urethane		
Oil-modified	1-GP-175, Type 1	Gloss - wood furniture, panelling, woodwork and floors; good abrasion resistance - usually adequate for residences; quick drying.
	1-GP-175, Type 2	Semi-gloss - not for use on floors.
Moisture-cure	1-GP-176, Type 1	General purpose; excellent abrasion resistance - not usually required for residences; slow-drying at very low humidities.
	1-GP-176, Type 2	Non-yellowing; light colour but use not usually justified because of high cost.
Two-component	1-GP-180, Type 1	On woodwork where outstanding abrasion resistance desired; not usually required in residences.

## Pigmented Finish for Floors

(for Clears see Varnish above)

Oleoresinous or alkyd	1-GP-73	Not so tough as urethanes but usually serviceable.
Urethane		
Oil-modified	-	Usually all that is required in residences.
Moisture cure	-	Difficult to produce in pigmented form
Two-component, general purpose	1-GP-180, Type 2	Outstanding abrasion resistance; not usually required for residences.
Two-component, non-yellowing	1-GP-177	Expensive - not really necessary on interior surfaces.
Epoxy		
Ester	-	Not sufficiently better than 1-GP-73 to warrant use.
Two-component	1-GP-146	Excellent abrasion resistance and adhesion; not usually required for residences.
Alkali-resistant (rubber base)	1-GP-66	For use on relatively new concrete but not so abrasion-resistant as above finishes.
Latex	1-GP-154	Low gloss - for use on new concrete floors but mars readily.

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**Table II. Exterior Masonry Surfaces**

Type	CGSB No.	Application
<b>Water-Based</b>		
Latex		
Block filler	1-GP-188	To fill holes and joints in concrete block walls prior to painting; may be used under latex or solvent-based coatings.
Paint	1-GP-138	Self-priming on masonry - normal film thickness.
Coating, high-build	1-GP-162	Self-priming; contains aggregate that provides texture to obscure minor surface imperfections; transmits moderate amounts of water vapour.
Cement paint	1-GP-130 (cancelled 1967)	Inexpensive but chalks excessively if not properly applied; difficult to repaint; not to be used on bricks.
<b>Solvent-Based</b>		
Alkyd coating, high-build	1-GP-144	Same as 1-GP-162 but not for use on fresh concrete or on damp surfaces.
Rubber base	-	Based on synthetic or isomerized rubber; claimed to have good resistance to efflorescence.

**Table III. Exterior Wood Surfaces**

Type	CGSB No.	Application
<b>Primer</b>		
Oil	1-GP-55 (Cancelled 1975)	For use under oil or latex topcoats; slow drying and tends to show brush marks; on repainting, binds chalk well.
Alkyd	1-GP-189	For use under alkyd or latex topcoats; dries overnight; on repainting, do not apply over old paint.
Latex	-	Used extensively in Europe under alkyd topcoats; may be stained by redwood and cedar but should not transmit colour to latex topcoat; should not be applied over chalking paints.
Aluminum	1-GP-93	Used extensively except in North America; excellent water resistance; difficult to hide with white in one coat; can be used as knot sealer.
<b>Topcoat</b>		
Alkyd enamel	1-GP-28, Type 2	Fairly high gloss with moderate gloss retention; only used on siding in North America recently but much longer

		elsewhere; good levelling but more difficult to apply than latex or oil; good flexibility and colour retention; should not be applied over oil paint.
Alkyd enamel	1-GP-59	Higher gloss than 1-GP-28, Type 2; usually applied to trim and lawn furniture.
Latex paint	1-GP-138	Flat finish; not self-priming on wood - use latex, alkyd or oil primer; quick-drying and can be applied on damp surfaces but <i>not</i> at low temperatures; excellent flexibility; recommended where previous coatings have tended to blister.
Oil paint		
White and tints	1-GP-28, Type 1 (Cancelled 1975)	Medium gloss, poor gloss and colour retention; applies easily and is tolerant of low temperatures but tends to show brush marks; tends to crack and peel under severe conditions.
Dark colours	1-GP-41 (Cancelled 1975)	
<b>Stain</b>		
Fortified oil	-	U.S. Forest Products Laboratory (Madison) Formula - best results in DBR exposure tests; contains wax as water repellent so cannot be repainted for at least 1 year; light colours do not perform so well as dark colours; two coats much better than one.
Oil	1-GP-43	Shingle stain; considerable disagreement on usefulness of material.
Oil-alkyd	1-GP-145, Type 1	Has not performed so well as USFPL stain but better than creosote stain in DBR tests; two coats required on exterior.
Latex	-	Only recently introduced so durability unknown at present.
<b>Clear Finish</b>		
Phenolic varnish	1-GP-99	Not recommended unless user willing to accept frequent maintenance; normal product should last 3 summers but better performance if varnish contains 5 per cent UV absorber.
Knot sealer	1-GP-126	For sealing knots before painting to reduce staining or resin exudation.

**Table IV. Exterior Metal Surfaces\***

Type	CGSB No.	Application
<b>Primer**</b>		
FERROUS		
Oil, red	1-GP-14	Very slow drying and should be brush

lead applied; only needed where little surface preparation can be given; unless dried very thoroughly requires oil paint for topcoat.

Oil-alkyd:

zinc chromate-iron oxide 1-GP-40 50 per cent oil - overnight dry; requires at least very thorough hand preparation but preferably power cleaning.

red lead-iron oxide 1-GP-140

lead silico-chromate 1-GP-166

Type 1 80 per cent oil - suitable for hand-cleaned steel but requires 2 days to dry.

Type 2 67 per cent oil - 24-hour dry; for use in field as second coat over types 1 or 3.

Type 3 50 per cent oil - overnight dry; preferably used on grit-blasted surface.

Alkyd:

zinc chromate-red lead 1-GP-48 8-hour dry - requires good surface preparation; has performed well in marine environments over pretreated or pickled steel.

zinc chromate-iron oxide 1-GP-81 Fast dry (6 hours) automotive type - requires very good surface preparation, usually chemical pretreatment; normally applied by spray.

Zinc rich 1-GP-181 So-called "cold galvanizing"; very good performance in rural areas but for severe exposures use 1-GP-171 or -183; grit blasting required for most surfaces.

ZINC (INCLUDING GALVANIZE)

Vinyl wash 1-GP-121 Two-component for application to new surfaces to ensure good adhesion to zinc; no other primer required in normal exposures but should be topcoated.

Zinc dust-zinc oxide 1-GP-178 Two-component for application to new zinc; can also serve as finish coat where flat grey acceptable.

Oil-cement 1-GP-198 Ready-mixed for application to new zinc; overnight dry; should be topcoated

ALUMINUM

Vinyl wash 1-GP-121 Required for adhesion unless aluminum pretreated chemically or anodically; for exterior service usually followed by zinc chromate primer.

Zinc chromate 1-GP-132 Intermediate coat for exterior aluminum coated with wash primer; not required for interior.

COPPER AND BRASS

Vinyl wash 1-GP-121 Used to promote adhesion; usually only



topcoated.

### Topcoat

Alkyd enamel	1-GP-59	General purpose enamel for brush application; durable with fairly good gloss retention in normal exposures.
Alkyd enamel, lead silico-chromate	1-GP-167	Contains some anti-corrosive pigment in finish coat; intended for use over 1-GP-166; gloss and gloss retention lower than 1-GP-59 but otherwise similar.
Alkyd enamel	1-GP-88	Automotive type enamel usually applied by spray; good gloss retention in normal exposures
Silicone-alkyd enamel	-	Frequently factory applied but can be brushed; used where gloss retention worth additional cost
Silicone enamel	-	Used for high temperature exposures but must be baked to cure.
Acrylic enamel	-	Excellent colour and gloss retention but must be factory applied because baking required to cure.
Urethane enamel	1-GP-177	Non-chalking, non-yellowing, two-component type usually applied by spray; excellent colour and gloss retention but expensive; applied over 1-GP-165 epoxy primer.
Oil paint	1-GP-28, Type 1 (Cancelled 1975)	See under Wood Topcoats; normally restricted on metal to use over soft primers like 1-GP-14.
Latex paint, flat	1-GP-138	Suitable where flat finish desired on primed incidental metal.
Latex enamel, gloss	-	Just being introduced; initial gloss not so high as that of alkyd enamel but claimed to have better gloss retention.

### Clear Finish

Aluminum	-	Unpigmented acrylic and cellulose acetate-butyrate lacquers used to maintain bright appearance of exposed aluminum surfaces; for long performance the aluminum should be first anodized; CAB lacquers have also been promoted for use where unpainted aluminum comes in contact with alkaline materials like concrete.
Brass and Bronze	-	Clear finish to prevent tarnishing; acrylic lacquers have given best performance in several exposure studies.

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\* Because of the many different products designed for specific end uses, this section does not list coatings intended for chemical plants, ships, docks and similar construction.

\*\*Usually one coat of primer is used in rural environments and two coats in urban or marine environments.

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### **Recommended Finishes**

Because of the acknowledged difficulties of identification and despite the fact that most paint products are not so labeled now, CGSB standards numbers will be used to describe the types of coating recommended for different uses. In order to include as alternatives some of the types described in **CBD 78** and **CBD 79**, a few cancelled standards are listed. Cancellation means that the product is no longer used by government departments in sufficient quantities to require a standard although the material may still be available commercially. It also tends to show which materials have been replaced by newer, more satisfactory coatings.

When more than one type of finish is listed for a particular service, more detailed information may be obtained from the following Digests:

**CBD 90** - Coatings for Interior Walls

**CBD 91** - Exterior Coatings for Wood

**CBD 98** - Coatings for Exterior Metal

**CBD 131** - Coatings for Masonry Surfaces

Requests for information regarding CGSB standards should be directed to the Canadian Government Specifications Board, c/o Department of Supply and Services, 88 Metcalfe Street, Ottawa, K1A 0S5.