Government of Canada
Gouvernement du Canada

Canadian General Standards Board
Office des normes générales du Canada

CAN/CGSB-44.227-2008

Supersedes CAN/CGSB-44.227-2000

Free-standing Office Desk Products and Components

ICS 97.140

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NATIONAL STANDARD OF CANADA **CAN/CGSB-44.227-2008**

Supersedes CAN/CGSB-44.227-2000

FREE-STANDING OFFICE DESK PRODUCTS AND COMPONENTS

Prepared by the

Canadian General Standards Board CGSB

Approved by the

Standards Council of Canada

Published September 2008 by the
Canadian General Standards Board
Gatineau, Canada K1A 1G6

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Acknowledgment is made for the translation of this National Standard of Canada by the Translation Bureau of Public Works and Government Services Canada.

Supersedes CAN/CGSB-44.227-2000

CANADIAN GENERAL STANDARDS BOARD

FREE-STANDING OFFICE DESK PRODUCTS AND COMPONENTS

1. SCOPE

1.1 This standard provides dimensional and performance requirements for safety, durability and structural adequacy of free-standing components of office desk products.

1.2 This standard also provides dimensional and adjustment requirements that respect generally accepted ergonomics guidelines or standards, such as those of CAN/CSA-ISO 9241-5-00, using NATICK/TR-89/044, 1988 as its source of anthropometric data.

1.2.1 The dimensional and adjustment requirements aim to address the estimated needs of the 5th to 95th percentile of adult office workers when in the seated position.

1.3 The selected methods for measuring desk products and components and for assessing their performance are based on the actual field and product-testing experience of the members of the Canadian General Standards Board Committee on Free-standing Office Desk Products and Components.

1.4 Quantities and dimensions used in this standard are given in metric units with imperial equivalents shown in brackets where appropriate. The metric units shall be regarded as official in the event of dispute.

1.5 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 health and safety practices in conjunction with any applicable regulatory requirements prior to its use.

2. REFERENCED PUBLICATIONS

2.1 The following publications are referenced in this standard:

2.1.1 Canadian Standards Association (CSA)

CAN/CSA-ISO 9241-5-00 — Ergonomic Requirements for Office Work with Visual Display Terminals (VDTs) — Part 5: Workstation Layout and Postural Requirements

C22.2 No. 9.0 — General Requirements for Luminaires

C22.2 No. 12 — Portable Luminaires.

2.1.2 American Association of Textile Chemists and Colorists (AATCC)

EP 1 — Grey Scale for Color Change.

2.1.3 American National Standards Institute (ANSI)/BIFMA International

ANSI/BIFMA X5.5-2008 — Desk/Table Products — Tests

ANSI/BIFMA X5.9-2004 — Storage Units — Tests.

2.1.4 American National Standards Institute (ANSI)/National Electrical Manufacturers Association (NEMA)

ANSI/NEMA LD 3-2005 — High-Pressure Decorative Laminates.

2.1.5 ASTM International

C 297-04 — Standard Test Method for Flat Tensile Strength of Sandwich Constructions

D 523-89(1999) — Standard Test Method for Specular Gloss

D 3359-02 — Standard Test Methods for Measuring Adhesion by Tape Test

D 3363-05 — Standard Test Method for Film Hardness by Pencil Test

D 4060-01 — Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser.

2.1.6 BIFMA International

G1-2002 — Ergonomics Guideline For VDT (Visual Display Terminal) Furniture Used In Office Work Spaces.

2.1.7 International Organization for Standardization (ISO)

ISO/IEC 17025 — General requirements for the competence of testing and calibration laboratories.

2.1.8 U.S. Army NATICK Research, Development and Engineering Center

NATICK/TR-89/044, 1988 — Anthropometric Survey of U.S. Army Personnel: Methods and Summary Statistics.

2.2 A dated reference in this standard is to the issue specified. An undated reference in this standard is to the latest issue, unless otherwise specified by the authority applying this standard. The sources are given in the Notes section.

3. TERMINOLOGY

3.1 The definitions in ANSI/BIFMA X5.5-2008 and X5.9-2004 and the following apply in this standard:

Articulating Keyboard Support Surface (Support articulé pour clavier)

A vertically and horizontally continuously user-adjustable support surface for a computer keyboard, mouse and other input devices where the adjustment is provided by a jointed or segmented arm providing retractability of the support surface complete with keyboard and mouse below the primary work surface to which it is attached.

Roll-out Keyboard Support Surface (Support coulissant pour clavier)

A horizontally user-adjustable work surface or tray that is used to support a computer keyboard and, in some instances, to provide space for a mouse.

4. GENERAL REQUIREMENTS

4.1 **Tolerances** — Unless otherwise specified, the tolerances on test equipment, measuring equipment and loading devices shall be as follows:

a. Test weights, ±5%

b. Forces, velocities and time, ±5%

c. Linear measurements, ±1.5 mm (1/16 in.)

d. Angles, ±5°

e. Levels, within 5 mm per metre (1/16 in. per linear foot)

f. Cycles, all requirements are minimums.

Test weights, forces, dimensions, angles, time, rates and velocities shall be targeted at the nominal values specified.

4.2 **Workmanship** — The assembled components shall be uniform in quality, style, material and workmanship and shall be clean and free from any defects that may affect appearance, serviceability or safety. When assembled in any of the manufacturer's recommended configurations, there shall be no unfinished edges or surfaces other than stainless steel when viewed in normal use positions. Metal edges, corners and parts with which the user is intended to come in contact shall be rounded or covered with protective caps. Lubricated parts, excluding drawer and roll-out keyboard shelf slides, shall be protected against accidental contact with the user, the user's clothes or documents. Wood core surfaces shall have a balanced construction to minimize warping.

4.3 **Finish** — The specified finish (par. 10.1 a.) shall meet the requirements of Table 1. All exposed aluminum components shall be anodized, painted or otherwise treated to prevent oxidation.

4.4 **Welds** — All welds shall be structurally sound, free from cracks and surface voids. They shall be clean, smooth, uniform in appearance and free from scale, flux, trapped foreign matter or any other inclusions that may be detrimental to the application of the primer or final finish.

4.5 **Safety** — Fixed, movable or adjustable parts shall be constructed so that they cannot unintentionally become loose, dislodged or cause personal injury.

4.6 **Clearance Between Adjusting Surfaces** — The clearance between a vertical user-adjustable surface and any adjacent surface shall not be less than 25 mm (1 in.). A clearance less than 8 mm (0.3 in.) is acceptable where the clearance is maintained throughout the travel of the adjusting surface. Articulating keyboard support surfaces are exempt from this requirement.

4.7 **Interchangeability** — When specified (par. 10.1 b.), all components shall be interchangeable, right-to-left and left-to-right.

4.8 **Wood** — All visible solid wood shall be free from open knots.

4.9 **Cord and Cable Management** — When specified (par. 10.1 c.), the system shall provide cord and cable management capability. When specified (par. 10.1 c.), reusable covers shall be provided for each grommet to conceal the openings when not in use.

4.10 **Edges** — All work surface edges that are designed for a user to rest the forearm or wrist shall have a radius of at least 3 mm (0.12 in.).

4.11 **Recycled Material** — No limit is imposed on the amount of recycled material used in the manufacture of new components, and manufacturers are encouraged to use recyclable materials whenever possible and applicable. Where possible, all major plastic components should carry a composition code to facilitate recycling. The finished components shall meet all requirements of this standard.

4.12 **Clearance Under Work Surfaces**

4.12.1 ***Work Surfaces*** — There shall be a clearance envelope under all work surfaces 610 mm (24 in.) in depth or greater, which shall meet the requirements of BIFMA G1-2002 for the 95th percentile male, except that the depth at toe level shall be 584 mm (23 in.).

4.12.1.1 For height-adjustable work surfaces, the range of adjustments shall include the clearance envelope for the 95th percentile male, as specified in par. 4.12.1.

4.12.2 ***Clearance Under Adjacent Work Surfaces*** — Where two work surfaces at least 610 mm (24 in.) in depth are adjacent, the supports shall have a minimum recess of 330 mm (13 in.), measured from the front of the supports closest to the working edge. This measurement shall apply throughout the range of 50 mm (2 in.) and 610 mm (24 in.) from the floor. The glides are to be fully recessed for this measurement. Mobile desk products are exempted from these requirements.

5. DETAILED REQUIREMENTS FOR FINISHES

TABLE 1

Performance Requirements for Finishes[1]

Type of Finish	Gloss Max.	Finish Hardness Min.	Abrasion Resistance Max.	Colour Stability Max.	Paint Adhesion Min.	Impact Resistance
	Par. 5.1	Par. 5.2	Par. 5.3	Par. 5.4	Par. 5.5	Par. 5.6
Horizontal Work Surfaces						
High pressure laminate	45	NA	0.02 g at 500 cycles, 1000 g load	Grey Scale 4	NA	No cracking at 762 mm (30 in.)
Low pressure laminate	45	NA	0.04 g at 500 cycles, 1000 g load	Grey Scale 4	NA	No cracking at 254 mm (10 in.)
Wood veneer	45	NA	NA	NA	NA	NA
Painted wood	45	2H	0.04 g at 500 cycles, 1000 g load	Grey Scale 4	NA	No cracking at 254 mm (10 in.)
Other finishes[2]	45	NA	NA	Grey Scale 4	NA	No cracking at 254 mm (10 in.)
Other Surfaces (excluding fabrics and trim finishes)						
Laminates	45	NA	0.04 g at 500 cycles, 1000 g load	Grey Scale 4	NA	NA
Wood veneer	45	NA	NA	NA	NA	NA
Painted wood	45	H	0.04 g at 500 cycles, 1000 g load	Grey Scale 4	NA	NA
Painted (non-wood)	45	H	0.04 g at 500 cycles, 1000 g load	Grey Scale 4	4B	NA

[1] *NA means the test does not apply to the specified type of finish.*

[2] *Other finishes include, but are not limited to, vinyl- and leather-wrapped surfaces.*

5.1 **Gloss** — Unless otherwise specified (par. 10.1 d.), the 60° specular gloss of work surfaces, when tested in accordance with ASTM D 523-89(1999), shall not exceed the specified requirement.

5.2 **Finish Hardness** — The finish, when tested in accordance with ASTM D 3363-05, "scratch hardness" method, shall not be less than the specified requirement.

5.3 **Abrasion Resistance** — The loss of finish, when tested in accordance with ASTM D 4060-01, using a CS-10 wheel (with a 1000 g load), shall not exceed the specified requirement.

5.4 **Colour Stability** — The finish, after exposure, when tested in accordance with ANSI/NEMA LD 3-2005, section 3, shall not show a change in colour greater than grey scale 4 contrast by reference to AATCC EP 1.

5.5 **Paint Adhesion** — The adhesion rating of the painted metal finish, when tested in accordance with ASTM D 3359-02, Method B, shall be as specified.

5.6 **Impact Resistance** — Impact resistance, when tested in accordance with ANSI/NEMA LD 3-2005, shall comply with the specified requirement, with the following exceptions:

a. The test substrate shall be the material to be used for the manufacturer's work surfaces.

b. Trim and edging that may project onto the work surface are exempt from these requirements.

6. DETAILED REQUIREMENTS FOR COMPONENTS

6.1 **Work Surfaces** — The width and depth dimensions shall be specified (par. 10.1 e.). Work surfaces shall have a fixed height, a continuous adjustment capability or an incremental adjustment capability, as specified (par. 10.1 e.). Fixed work surfaces shall be 730 ± 25 mm (28.7 ± 1.0 in.) when measured from the floor or shall be another height, as specified (par. 10.1 e.). When height adjustment is specified (par. 10.1 e.), work surfaces shall be capable of height adjustment over a range of at least 150 mm (6 in.) and shall be capable of including a height range of 660 to 737 mm (26 to 29 in.) as part of the range. Incremental work surfaces shall be adjustable in increments of no more than 25 mm (1.0 in.)

6.1.1 ***Deflection*** — The work surface, when tested in accordance with par. 8.4, shall deflect no more than its length divided by 180 (L/180).

6.1.2 ***Adhesives*** — The adhesives used to apply plastic laminates shall achieve a tensile strength of 449 kPa (65 psi) when tested in accordance with ASTM C 297-04. The test shall be performed using the core material, adhesive and laminate representative of those that will be used in the finished product.

6.1.3 ***Controls*** — Desk products offering continuous adjustment capability shall be operable from the usual working position and shall not require the use of any unsupplied tools. Controls used to effect continuous adjustments shall have adequate clearance to permit the user to make the adjustment. Hand-crank-adjustable surfaces shall not require more than 50 N (12 lbf.) to operate. This measurement shall be taken with the surfaces loaded as specified in section 15 of ANSI/BIFMA X5.5-2008, both before and after the cycle test specified in section 15.3.

6.2 **Work Station Units with Dual Adjustable Height Surfaces**

6.2.1 ***VDT Support Surface*** — The width and depth dimensions shall be specified (par. 10.1 f.). The VDT support surface shall have continuous adjustment capability or incremental adjustment capability, as specified (par. 10.1 f.). The vertical adjustability range shall be at least 610 to 735 mm (24 to 29 in.).

6.2.1.1 *VDT Support Surface Deflection* — A VDT support surface, when tested in accordance with par. 8.4, shall deflect no more than its length divided by 180 (L/180).

6.2.2 ***Keyboard Support Surface***

6.2.2.1 *Dimensions* — The keyboard support surface shall be as wide as specified (par. 10.1 g.) to support the intended input devices.

6.2.2.2 *Adjustment* — The keyboard support surface shall be capable of being locked into a position where the bottom of the keyboard support surface is even with the bottom surface of the work surface. It shall have a minimum adjustment range of 100 mm (4 in.) downward from that position and shall be lockable throughout its adjustment range. When specified (par. 10.1 h.), other features shall be provided such as tilt adjustment and its specified tilt range, specific size for type of keyboard to be accommodated, and provision for a mouse, resilient palm rest or non-slip surface.

6.3 **Supports for Work Surfaces** — Work surfaces shall be supported with legs, full panels, recessed panels, columns, pedestals, any other suitable method of support or any combination of supports, as specified (par. 10.1 i.). Each support shall have a levelling mechanism with a vertical adjustment of at least 25 mm (1.0 in.).

6.4 **Pedestals**

6.4.1 The pedestals shall be free-standing, work surface supporting, work surface suspended or mobile, as specified (par. 10.1 j.). Counterbalance weights used on mobile or free-standing pedestals shall not be placed on any

exterior surface. Free-standing and mobile pedestals shall be tested in accordance with ANSI/BIFMA X5.9-2004. Work surface supporting and work surface suspended pedestals shall be tested in accordance with ANSI/BIFMA X5.5-2008.

6.4.2 ***Casters for Mobile Pedestals*** — Mobile pedestals shall have a minimum of four carpet casters unless another type of caster is specified (par. 10.1 k.). The two front casters shall have a locking device when specified (par. 10.1 k.).

6.5 **Drawers**

6.5.1 ***Types*** — The drawers shall be either box or file type, as specified (par. 10.1 l.).

6.5.1.1 *File Drawers* — The file drawers shall be designed to accommodate both legal- and letter-size filing systems with minimal adjustment. All file drawers shall have full bottoms unless otherwise specified (par. 10.1 m.). Each file drawer shall be provided with at least two removable dividers, a hanging-file rail system or one compressor, as specified (par. 10.1 m.). The drawer shall fully extend, allowing complete vertical access to usable clear space. The drawer slides shall be corrosion resistant.

6.5.1.2 *Box Drawers* — The drawer slides shall be corrosion resistant. The drawer shall extend at least three quarters of its full length.

6.5.2 ***Pencil Trays*** — When specified (par. 10.1 n.), the top box drawer shall have a movable pencil tray that extends from one side of the inside of the drawer to the other.

6.5.3 ***Usable Space*** — All box and file drawers shall have a usable interior depth of at least 65% of the pedestal exterior depth. Box drawers shall have sides and backs at least 85 mm (3.3 in.) high, measured inside. File drawers shall have sides and backs with a usable height of at least 250 mm (9.8 in.), with an inside height of at least 235 mm (9.2 in.) to the top edge of the file rails.

6.5.4 ***Bumpers*** — All drawer assemblies shall have resilient bumpers to minimize the noise of impact when drawers reach the end of their inward and outward travel.

6.5.5 ***Stops*** — All drawers shall have stops to prevent their accidental removal, but the drawers shall be removable when required.

6.5.6 ***Pulls*** — The pulls shall be designed so that the drawer can be operated effectively. Recessed or extended pulls shall have adequate finger clearance.

6.6 **Storage Units**

6.6.1 ***Surface Deflection (for storage units)*** — The shelf surface, when tested in accordance with par. 8.4, shall deflect no more than its length divided by 180 (L/180).

6.6.2 ***Free-standing Storage Units***

6.6.2.1 The free-standing storage units shall be available in various widths, depths and heights as specified (par. 10.1 o.). The type of door (hinged, sliding [including tambour closures], receding, folding, etc.) or the absence of doors shall be specified (par. 10.1 o.).

6.6.2.2 The free-standing storage units shall be tested in accordance with ANSI/BIFMA X5.9-2004.

6.6.3 ***Overhead Storage Units***

6.6.3.1 The overhead storage units shall be available in various widths and depths, as specified (par. 10.1 p.). The type of door (hinged, sliding [including tambour closures], receding, folding, etc.) or the absence of doors shall be specified (par. 10.1 p.).

6.6.3.2 *Attachment* — The overhead storage units shall be securely but not permanently attached to the top of the supporting surface so that the storage unit, when removed, shall not cause any damage to the top of the supporting surface or the storage unit.

6.6.3.3 Overhead storage units shall be tested in accordance with ANSI/BIFMA X5.5-2008.

6.7 **Task Light Fixtures** — When specified (par. 10.1 q.), task light fixtures shall be provided. They shall be an articulating arm-type fixture or a fixture mounted beneath a shelf or cabinet, as specified (par. 10.1 q.). Light fixtures shall comply with CSA 22.2, No. 9.0 or No. 12, as applicable. They shall be equipped with an on/off switch and a diffusion lens to reduce glare. When specified (par. 10.1 q.), the intensity of the light shall be adjustable.

6.8 **Keyboard Support Surface** — The keyboard support surface shall be articulating or roll-out, as specified (par. 10.1 r.).

6.8.1 ***Articulating Keyboard Support Surface*** — The articulating keyboard support surface shall be capable of being locked into a position where the bottom of the keyboard support surface is even with the bottom surface of the work surface and shall be capable of being adjusted and locked in any position at least 100 mm (4.0 in.) downward from this position. When specified (par. 10.1 s.), other features shall be provided such as a shelf tilt adjustment in the specified range, specific size for type of keyboard to be accommodated and provision for a mouse, resilient palm rest or non-slip surface.

6.8.2 ***Roll-out Keyboard Support Surface*** — The roll-out keyboard support surface shall have a minimum of 55 mm (2.2 in.) clearance under the work surface, or as specified[1] (par. 10.1 t.). It shall self-lock in the fully extended position and be capable of accommodating standard, commercially available keyboards in the extended or the recessed position. When specified (par. 10.1 t.), the roll-out keyboard support surface shall also accommodate a mouse on one side of the keyboard.

6.9 **Locks** — When specified (par. 10.1 u.), combination or key-activated locks shall be supplied for doors and drawers. When specified (par. 10.1 u.), the requested number of different key-lock combinations and quantities shall be provided. Any additional lock requirements shall be specified (par. 10.1 u.). Two keys per lock will be provided. Lock mechanisms shall have adequate clearance to permit the user to operate the lock. The design of key-activated locks shall require a key to activate the locking mechanism.

6.10 **Privacy Screens**

6.10.1 When specified (par. 10.1 v.), privacy screens shall be provided. They shall be attached so that there is no damage to the top of the work surface when the privacy screen is removed.

6.10.2 ***Disengagement*** — Attached privacy screens shall not tip over or shift from their original position when tested in accordance with ANSI/BIFMA X5.9-2004, section 8.1.

6.10.3 ***Force Stability*** — Attached privacy screens shall be tested as specified in section 4.5 of ANSI/BIFMA X5.5-2008.

6.11 **Modesty Panels** — When specified (par. 10.1 w.), work surfaces shall be equipped with a modesty panel. The modesty panel shall be flush with the edge of the work surface or recessed, as specified (par. 10.1 w.).

7. PREPARATION FOR DELIVERY

7.1 Unless otherwise specified (par. 10.1 x.), preparation for delivery shall conform to normal commercial practice.

8. TESTING

8.1 **Sampling** — Sampling for inspection and testing shall be left to the discretion of the inspection authority unless a specific sampling plan is specified (par. 10.1 y.).

8.2 ISO/IEC 17025 requirements for reporting uncertainty do not apply when determining conformance to this standard.

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[1] *Because of the variation in keyboard designs, the minimum clearance of* 55 mm *(2.2 in.) may not accommodate some non-standard keyboards. Therefore, special clearance requirements should be agreed upon between the specifying authority and the manufacturer.*

8.3 Testing shall be in accordance with ANSI/BIFMA X5.5-2008 and with ANSI/BIFMA X5.9-2004 where specified.

8.4 **Horizontal Surface Deflection Test** — Load the surface in accordance with ANSI/BIFMA X5.5-2008 and ANSI/BIFMA X5.9-2004 functional distributed load. Average the height of the end points and subtract the height of the centre. The resulting dimension shall be the deflection.

9. MARKING

9.1 All free-standing office desk products shall be permanently and legibly marked with the manufacturer's name or recognized trademark.

9.2 **Operating Instructions** — User-adjustable products shall be provided with pictorial or written (French and English) instructions or both.

10. NOTES

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

a. Type of finish (par. 4.3)

b. Whether interchangeability right-to-left and left-to-right is required (par. 4.7)

c. Whether cord and cable management shall be provided and if so, whether a reusable cover shall be provided for each grommet (par. 4.9)

d. Whether the specular gloss for surfaces shall be other than as specified (par. 5.1)

e. The width and depth dimensions for work surfaces. Whether the work surface shall have a fixed height, a continuous adjustment or an incremental adjustment capability. If fixed height is specified, indicate if other than 730 ± 25 mm (28.7 ± 1.0 in.) (par. 6.1)

f. The width and depth dimensions for VDT support surfaces. Whether the VDT support surface shall have continuous adjustment or incremental adjustment capability (par. 6.2.1)

g. The width of the keyboard support surface for terminal tables and whether additional features shall be specified (par. 6.2.2.1)

h. Whether the keyboard support surface shall have continuous adjustment, incremental adjustment capability, or tilt adjustment, and shall have additional features (par. 6.2.2.2)

i. Type of supports for work surfaces (par. 6.3)

j. Type of pedestal (par. 6.4.1)

k. Whether mobile pedestals shall have other than a carpet caster and whether the front two casters shall have a locking device (par. 6.4.2)

l. Type of drawer (par. 6.5.1)

m. Whether a file drawer does not require a full bottom. Accessories required for file drawers (par. 6.5.1.1)

n. Whether a movable pencil tray is required for the top box drawer (par. 6.5.2)

o. The width, depth and height of free-standing storage units; type of door or absence of doors (par. 6.6.2.1)

p. The width and depth of overhead storage units; type of door or absence of doors (par. 6.6.3.1)

q. Whether task light fixtures shall be provided and if so, the type (articulating arm-type or mounted) and whether the light intensity shall be adjustable (par. 6.7)

r. Whether keyboard support surface is adjustable or roll-out (par. 6.8)

s. Other features for the adjustable keyboard support surface (par. 6.8.1)

t. Whether the roll-out keyboard support surface shall have a minimum clearance other than 55 mm (2.2 in.) and whether it shall accommodate a mouse on one side of the keyboard (par. 6.8.2)

u. Whether locks shall be supplied for doors and drawers and, if supplied, whether the locking action is a combination or key, the number of different key-lock combinations and quantities, and any additional lock requirements (par. 6.9)

v. Whether privacy screens shall be provided (par. 6.10.1)

w. Whether modesty panels shall be provided and if so, the type (par. 6.11)

x. Preparation for delivery, if other than normal commercial practice (par. 7.1)

y. Sampling plan, if other than as specified (par. 8.1)

10.2 **Sources of Referenced Publications**

10.2.1 The publications referred to in par. 2.1.1 may be obtained from the Canadian Standards Association, Standards Sales, 5060 Spectrum Way, Suite 100, Mississauga, Ontario L4W 5N6, telephone 416-747-4044 or 1-800-463-6727, fax 613-747-2510, e-mail sales@csa.ca, Web site www.csa.ca.

10.2.2 The publication referred to in par. 2.1.2 may be obtained from the American Association of Textile Chemists and Colorists, P.O. Box 12215, 1 Davis Drive, Research Triangle Park, NC 27709, U.S.A., telephone 919-549-8141, fax 919-549-8933, Web site www.aatcc.org.

10.2.3 The publications referred to in par. 2.1.3 may be obtained from the American National Standards Institute, 25 West 43rd Street, New York, NY 10036, U.S.A., telephone 212-642-4980, fax 212-398-0023, Web site www.ansi.org, or from BIFMA International, 2680 Horizon Drive S.E., Suite A-1, Grand Rapids, MI 49546-7500, U.S.A., telephone 616-285-3963, fax 616-285-3765, e-mail email@bifma.org, Web site www.bifma.org.

10.2.4 The publication referred to in par. 2.1.4 may be obtained from the American National Standards Institute, 25 West 43rd Street, New York, NY 10036, U.S.A., telephone 212-642-4980, fax 212-398-0023, Web site www.ansi.org, or from the National Electrical Manufacturers Association, 1300 North 17th Street, Suite 1752, Rosslyn, Virginia, VA 22209, U.S.A., telephone 703-841-3200, fax 703-849-5100, Web site www.nema.org.

10.2.5 The publications referred to in par. 2.1.5 may be obtained from ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, U.S.A., telephone 610-832-9500, Web site www.astm.org, or from IHS Canada, 1 Antares Drive, Suite 200, Ottawa, Ontario K2E 8C4, telephone 613-237-4250 or 1-800-267-8220, fax 613-237-4251, e-mail gic@ihscanada.ca, Web site canada.ihs.com.

10.2.6 The publication referred to in par. 2.1.6 may be obtained from BIFMA International, 2680 Horizon Drive S.E., Suite A-1, Grand Rapids, MI 49546-7500, U.S.A., telephone 616-285-3963, fax 616-285-3765, e-mail email@bifma.org, Web site www.bifma.org.

10.2.7 The publication referred to in par. 2.1.7 may be obtained from IHS Canada, 1 Antares Drive, Suite 200, Ottawa, Ontario K2E 8C4, telephone 613-237-4250 or 1-800-267-8220, fax 613-237-4251, e-mail gic@ihscanada.ca, Web site canada.ihs.com.

10.2.8 The publication referred to in par. 2.1.8 may be obtained from the U.S. Army NATICK Research, Development and Engineering Center, Natick, MA 01760-5000, U.S.A.