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Série des 4

WITHDRAWAL

March 2019

Selected standards in the series Textiles

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Mars 2019

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CAN/CGSB-4.2

Textile test methods

No. 4.5-M86

Retail packages of yarn — Determination of mass (ICS 59.080.20)

No. 5.2-M87

Linear density of yarn in SI units (ICS 59.080.20)

No. 9.2-M90

Breaking strength of fabrics — Grab method — Constant-time-to-break principle (ICS 59.080.30)

No. 9.3-M90

Breaking strength of high-strength fabrics — Constant-time-to-break principle (ICS 59.080.30)

No. 9.4-M91

Breaking strength of yarns — Single strand method (ICS 59.080.20)

No. 9.5-M89

Breaking strength of yarns — Skein method (ICS 59.080.20)

No. 9.6-93

Breaking strength of nonwoven textiles (ICS 59.080.30)

CAN/CGSB-4.2

Méthodes pour épreuves textiles

N° 4.5-M86

Bobines de fil vendues au détail — Détermination de la masse (ICS 59.080.20)

N° 5.2-M87

Masse linéique du fil en unités SI (ICS 59.080.20)

N° 9.2-M90

Résistance à la rupture des tissus — Méthode d'arrachement — Principe de rupture à temps constant (ICS 59.080.30)

N° 9.3-M90

Résistance à la rupture des tissus de haute résistance — Principe de rupture à temps constant (ICS 59.080.30)

N° 9.4-M91

Résistance à la rupture des fils — Méthode à fil simple (ICS 59.080.20)

N° 9.5-M89

Résistance à la rupture des fils — Méthode de l'écheveau (ICS 59.080.20)

N° 9.6-93

Résistance à la rupture des non-tissés (ICS 59.080.30)

No. 10-M87

Elongation (ICS 59.080.30)

No. 23-M90

Colourfastness to perspiration
(ICS 59.080.01)

No. 25.2-M89

Dimensional change of textile fabrics to
open-head steaming (ICS 59.080.30)

No. 26.1-M88

Water resistance — Static head
penetration test (ICS 59.080.01)

No. 26.5-M89

Water resistance — High-pressure
penetration test (ICS 59.080.30)

No. 28.2-M91

Resistance to micro-organisms — Surface-
growing fungus test — Pure culture
(ICS 59.080.01)

No. 28.4-M91

Resistance to micro-organisms — Fungus
damage test — Pure culture — Qualitative
(ICS 59.080.01)

No. 30.1-M89

Effect of solvents on the permanence of
textile finishes (ICS 59.080.01)

No. 32.1-98

Resistance of woven fabrics to seam
slippage (ICS 59.080.01)

N° 10-M87

Allongement (ICS 59.080.30)

N° 23-M90

Solidité de la couleur à la sueur
(ICS 59.080.01)

N° 25.2-M89

Changement dimensionnel des textiles à
l'aide d'une presse à plateau inférieur
vaporisant (ICS 59.080.30)

N° 26.1-M88

Résistance à l'eau — Essai de
pénétration sous pression constante
(ICS 59.080.01)

N° 26.5-M89

Résistance à l'eau — Essai de
pénétration à haute pression
(ICS 59.080.30)

N° 28.2-M91

Résistance aux micro-organismes —
Essai par fungus se propageant en
surface — En culture pure
(ICS 59.080.01)

N° 28.4-M91

Résistance aux micro-organismes —
Évaluation des dommages causés par
fungus — En culture pure — Qualitative
(ICS 59.080.01)

N° 30.1-M89

Effet des solvants sur la permanence des
apprêts textiles (ICS 59.080.01)

N° 32.1-98

Résistance des tissés au glissement de
la couture (ICS 59.080.01)

No. 35.1-M90

Colourfastness to burnt gas fumes
(ICS 59.080.01)

No. 37-2002

Fabric thickness (ICS 59.080.30)

No. 42-M91

Copper content of textiles (ICS 59.080.01)

No. 45-M88

Textile fabrics — Determination of the recovery from creasing of a horizontally folded specimen by measuring the angle-of-recovery (ICS 59.080.01)

No. 49-99

Resistance of materials to water vapour diffusion (ICS 59.080.01)

No. 55-M90

Loss in strength and colour change of fabrics due to retained chlorine (ICS 59.080.01)

No. 56.1-M87

Unidirectional extension and recovery properties of elastic fabrics (ICS 59.080.30)

No. 60-M89

Resistance to snagging — Mace test (ICS 59.080.01)

No. 65-M91

Determination of strength of bonds of bonded, laminated and fused fabrics (ICS 59.080.10)

N° 35.1-M90

Solidité de la couleur aux produits de combustion des gaz (ICS 59.080.01)

N° 37-2002

Épaisseur des tissus (ICS 59.080.30)

N° 42-M91

Teneur en cuivre des textiles (ICS 59.080.01)

N° 45-M88

Étoffes — Détermination de l'auto-défroissabilité d'un spécimen plié horizontalement par mesurage de l'angle rémanent après pliage (ICS 59.080.01)

N° 49-99

Résistance des textiles à la diffusion de vapeur d'eau (ICS 59.080.01)

N° 55-M90

Perte de résistance et changement de couleur des tissus causés par la rétention de chlore (ICS 59.080.01)

N° 56.1-M87

Évaluation de l'extension unidirectionnelle et de la récupération dimensionnelle des tissus élastiques (ICS 59.080.30)

N° 60-M89

Résistance aux accrocs — Essai à la masse (ICS 59.080.01)

N° 65-M91

Détermination de la résistance du liage des tissus contre-collés, stratifiés et thermocollés (ICS 59.080.10)

No. 66-M91

Dimensional change and appearance after dry cleaning of coated, bonded, laminated and fused fabrics (ICS 59.080.40)

No. 69-M91

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CAN/CGSB-4.155-M88

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CAN/CGSB-4.158-75

Designation of yarns (ICS 59.080.20)

CAN/CGSB-4.159-75

Universal system for designating linear density (Tex system) (ICS 59.080.20)

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Integrated conversion table for replacing traditional yarn numbers by rounded values in the Tex system (ICS 59.080.20)

N° 66-M91

Évaluation du changement dimensionnel et de l'aspect des tissus enduits, contre-collés, stratifiés et thermocollés à la suite de nettoyages à sec (ICS 59.080.40)

N° 69-M91

Résistance aux intempéries — Rayonnement d'une lampe à arc au xénon (ICS 59.080.10)

N° 78.1-2001

Évaluation de la protection thermique des matériaux de confection des vêtements (ICS 59.080.01)

CAN/CGSB-4.155-M88

Résistance à l'inflammation des revêtements de sol mous — Plans d'échantillonnage (ICS 59.080.60)

CAN/CGSB-4.158-75

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CAN/CGSB-4.159-75

Système universel de désignation de la masse linéique (système Tex) (ICS 59.080.20)

CAN/CGSB-4.160-75

Table générale de conversion pour le remplacement des titres traditionnels des fils par des valeurs arrondies du système Tex (ICS 59.080.20)



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Determination of strength of bonds of bonded, laminated and fused fabrics

ICS 59.080.10



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NATIONAL STANDARD OF CANADA


**CAN/CGSB-4.2
No. 65-M91**

Extended
April 1997
Reaffirmed
November 2013

Textile test methods
**Determination of strength of bonds of bonded,
laminated and fused fabrics**

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Prepared by the
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Preface to the National Standard of Canada

This National Standard of Canada has been extended and reaffirmed by the CGSB Committee on Textile Test Methods and Terminology. Editorial changes have been made by the addition and correction of the following paragraphs:

FOREWORD

This method is similar to the strength of bond test procedures forming part of ASTM D2724-87, Standard Test Methods for Bonded, Fused, and Laminated Apparel Fabrics. A new edition of ASTM D2724 was published in 2007 and reaffirmed in 2011.

- 9.1 **Source of Referenced Publications** — The publications referred to in par. 3.1.1 may be obtained from the Canadian General Standards Board, Sales Centre, Gatineau, Canada K1A 1G6. Telephone 819-956-0425 or 1-800-665-2472. Fax 819-956-5740. E-mail ncr.cgsb-ongc@tpsgc-pwgsc.gc.ca. Web site www.tpsgc-pwgsc.gc.ca/ongc-cgsb.

 Ottawa Canada K1A 1G6	TEXTILE TEST METHODS	CAN/CGSB-4.2
	Determination of Strength of Bonds of Bonded, Laminated and Fused Fabrics	No. 65-M91

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FOREWORD

This method is similar to the Strength of Bond test procedures forming part of ASTM D 2724-87, Standard Methods of Testing Bonded and Laminated Apparel Fabrics.

1. PURPOSE AND SCOPE

- 1.1 This method determines the durability and strength of the bonds of bonded, laminated and fused fabrics.
- 1.2 This procedure is frequently carried out on fabrics that have been washed or dry-cleaned and/or saturated with water or solvent. Recommended pretreatments before performing this procedure are found in Appendix A of this method.
- 1.3 The testing and evaluation of a product against this method 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 method 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. PRINCIPLE

- 2.1 The layers of bonded fabrics are separated at one end of the test specimens. The separated fabric faces are held in separate clamps and tension is applied to determine the force required to separate the face fabric from the backing fabric.
- 2.2 The face fabric of the laminated fabric is separated from the foam backing at one end of the test specimens. The separated fabric faces are held in separate clamps and tension is applied to determine the force required to separate the face fabric from the foam or the foam from the backing fabric.

3. APPLICABLE PUBLICATIONS

- 3.1 The following publications are applicable to this method:
 - 3.1.1 Canadian General Standards Board (CGSB)
CAN/CGSB-4.2 — Textile Test Methods:
 - No. 1-M — Precision and Accuracy of Measurements
 - No. 2-M — Conditioning Textile Materials for Testing
 - No. 4.1-M — Textile Fabrics — Measurement of Width of Pieces
 - No. 66-M — Dimensional Change and Appearance after Dry Cleaning of Coated, Bonded, Laminated and Fused Fabrics
 - No. 67-M — Dimensional Change and Appearance after Laundering of Coated, Bonded, Laminated and Fused Fabrics.
- 3.2 Reference to the above publications is to the latest issues, unless otherwise specified by the authority applying this method. The source for these publications is shown in the Notes section.

4. DEFINITIONS

For the purpose of this method, the following definitions apply:

- 4.1 **Bonded fabric:** a layered fabric structure wherein a face or shell fabric is joined to a backing fabric, such as tricot, with an adhesive that does not significantly add to the thickness of the combined fabrics.
 - 4.1.1 In this context, a thin layer of foam is considered an adhesive when the cell structure is completely collapsed by a flame.
- 4.2 **Laminated fabric:** a layered fabric structure wherein a face or outer fabric is joined to a continuous sheet material, such as polyurethane foam, in such a way that the identity of the continuous sheet material is retained, either by the flame method or by an adhesive, and this in turn normally but not always, is joined on the back with a backing fabric such as tricot.
- 4.3 **Bond strength:** the tensile force, expressed in newtons per 25 mm of width, required to separate the component layers under specified conditions.
- 4.4 **Foam tear:** a condition wherein the foam portion of a laminated fabric ruptures prior to the failure of the bond.

5. APPARATUS

- 5.1 **Testing machines:** tensile testing machines for use in this method shall have autographic recording devices and shall operate on one of the following principles:
 - a. constant-rate-of-extension (CRE)
 - b. constant-rate-of-traverse (CRT).
- 5.1.1 **Constant-rate-of-extension (CRE) machine:** a testing machine in which one end of the specimen is held by a virtually stationary clamp and the other end is gripped in a clamp that is driven at a constant speed. A suitable system for detecting and recording the force applied is provided.
- 5.1.2 **Constant-rate-of-traverse (CRT) machine:** a testing machine in which one end of the specimen is held by a clamp driven at a constant speed while the other end is gripped in a clamp attached to a weighing mechanism of a type that permits movement of the attached clamp, e.g., as in pendulum machines. The specimen is therefore not extended at a constant rate (Note 1).
- 5.1.3 The tensile testing machines shall have an accuracy of $\pm 2\%$ within the range 0 to 100 N.
- 5.2 **Clamps:** the clamps of the machines shall be capable of holding the specimen without allowing it to slip and shall be so designed that they do not cut or otherwise weaken the specimen. The faces of the jaws shall be plane and parallel (Note 2). When specimens cannot be satisfactorily held in this way, lining materials that will not injure the specimen (e.g., thin cork, adhesive tape) may be used on the gripping surfaces. The gripping surfaces shall be at least 75 mm wide.

6. TEST SPECIMENS

- 6.1 The fabric shall be conditioned in accordance with CAN/CGSB-4.2 No. 2-M.
- 6.2 Prepare three test specimens for each test.

Note 1: Significant errors due to inertia are frequently encountered in testing machines in which the moving parts of the weighing mechanisms are massive (e.g., CRT machines) especially if such machines are used on materials with low extensibilities or are operated at high speeds. Caution should therefore be exercised in testing other than conventional materials and in testing specimens that fail near the lower end of the force range of such machines. The constant rate of extension (CRE) machine is preferred for testing according to this method because of the inherent lower machine-induced error in this type of machine.

Note 2: As a practical method of determining the degree of flatness and parallelism of the gripping surfaces of each clamp, it is recommended that a sheet of thin white paper between two sheets of carbon paper be placed between the gripping surfaces and the surfaces then be brought together with light pressure. Areas of contact will be shown by darkening of the white sheet.

- 6.2.1 If the precision with which bond strength to be measured is specified, refer to CAN/CGSB-4.2 No. 1-M for procedures to determine the number of test specimens required. If this is unknown, the number of specimens indicated in par. 6.2 shall be taken.
- 6.3 Each specimen shall be 75 mm wide and at least 150 mm long; the length of the specimens corresponding to the length direction of the fabric.
- 6.3.1 Samples between 50 and 75 mm wide shall be tested full width and the width determined in accordance with CAN/CGSB-4.2 No. 4.1-M. No specimens less than 50 mm wide should be tested.
- 6.4 Except for narrow fabrics, the test specimen shall not be taken closer to the selvage than a distance equal to 20% of the fabric width.

7. PROCEDURE

7.1 Bonded and Fused Fabrics

- 7.1.1 Manually separate the two layers of fabric along the 75 mm width of each test specimen for a distance of approximately 40 mm in the direction of the specimen length.
- 7.1.2 Set the lower clamp at a distance of 25 mm from the upper clamp. Secure the separated face fabric of a test specimen in the upper clamp of the tensile testing machine in such a way that the longitudinal axis of the specimen forms a right angle with the closed clamping surface. Secure the separated backing fabric in the lower clamp of the machine in such a way that the longitudinal axis of the specimen forms a right angle with the closed jaws of the lower clamp.
- 7.1.3 If the indicating scale on the machine is provided with a pawl and ratchet mechanism, disengage the mechanism to permit readings of variable force when the machine is placed in operation.
- 7.1.4 Operate the machine at pulling speed of 300 ± 10 mm/min.
- 7.1.5 To the nearest 0.1 N, determine the five highest and the five lowest peak forces recorded during 100 mm of delamination. Average these ten values and multiply the average by $\frac{25}{\text{width of specimen (mm)}}$ to obtain the bond strength per 25 mm width.
- 7.1.6 Repeat the operation described in par. 7.1.2 through 7.1.5 for each of the remaining test specimens.
- 7.1.7 Report the bond strength in newtons per 25 mm width as the average strength of the test specimens.

7.2 Laminated Fabrics (Foam Backing)

- 7.2.1 Manually separate the face fabric from the foam along the 75 mm width of each test specimen for a distance of approximately 40 mm in the direction of the specimen length.
- 7.2.2 Set the lower clamp at a distance of 25 mm from the upper clamp. Secure the separated face fabric of a test specimen in the upper clamp of the tensile testing machine in such a way that the longitudinal axis of the specimen forms a right angle with the closed clamping surface. Secure the separated foam, or foam and backing fabric, in the lower clamp of the machine in such a way that the longitudinal axis of the specimen forms a right angle with the closed jaws of the lower clamp.
- 7.2.3 Proceed as specified in par. 7.1.3 through 7.1.7.

7.3 Laminated Fabrics (Foam and Backing Fabric)

- 7.3.1 If foam is laminated to a backing fabric, retain each test specimen from par. 7.2.3 after the bond strength has been determined for face-to-foam.
- 7.3.2 Manually separate the backing fabric from the foam as instructed in par. 7.2.1, except that the manual separation should be made at the opposite end of the test specimens that were separated for the face fabric-to-foam test.

- 7.3.3 Set the lower clamps at a distance of 25 mm from the upper clamp. Secure the separated foam or foam and face fabric of a test specimen in the upper clamp of the tensile testing machine in such a way that the longitudinal axis of the specimen forms a right angle with the closed clamping surface. Secure the separated backing fabric in the lower clamp of the machine in such a way that the longitudinal axis of the specimen forms a right angle with the closed jaws of the lower clamp.
- 7.3.4 Proceed as specified in par. 7.1.3 through 7.1.7.
- 7.3.5 Examine both sides of the foam on the test specimens after testing for bond strength. Determine whether the foam portion ruptured during delamination allowing some foam to adhere to either fabric surface. If this has occurred, make the notation "foam tear" for that test specimen indicating the side or sides where "foam tear" occurred.
- 7.3.6 If "foam tear" occurs on only one side of one test specimen, disregard this result and report the average bond strength for that side of the remaining two specimens.
- 7.3.7 If "foam tear" occurs on the same side of two or three specimens, report the bond strength for that side as "foam tear."
- 7.3.8 In the event that it is impossible to manually separate the foam from either the face or backing fabric as described in par. 7.2.1 or 7.3.2 without rupturing the foam, report the bond strength for the side or sides where this occurs as "foam tear."

8. REPORT

Report the following information:

- 8.1 The average bond strength in newtons per 25 mm width, and for laminated fabrics the average bond strength for both the face and the backing fabrics.
- 8.2 The occurrence of any foam tears.
- 8.3 If fabric has received any of the treatments in Appendix A, report the treatment used and the state of the specimens (conditioned or saturated) at the time of test.
- 8.4 The width of the specimen.
- 8.5 The type of machine and force range used.
- 8.6 The number of this method: CAN/CGSB-4.2 No. 65-M91.

9. NOTES

- 9.1 **Source of Referenced Publications** — The publications referred to in par. 3.1.1 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.

- A1.** As a means of assessing the durability of the bonding in bonded, laminated and fused fabric, it is frequently considered desirable to conduct the bond strength test after the fabric has undergone laundering, dry cleaning and/or saturation processes.
- A2.** The pretreatments used should be as agreed between the interested parties. Some widely accepted pretreatments are as follows:
- A2.1** Dry-clean the fabric three times in accordance with CAN/CGSB-4.2 No. 66-M and test specimens which have been conditioned in accordance with CAN/CGSB-4.2 No. 2-M.
- A2.2** Dry-clean the fabric three times in accordance with CAN/CGSB-4.2 No. 66-M and test specimens which are saturated with tetrachloroethylene (perchloroethylene) (Note A1).
- A2.3** Dry-clean the fabric three times in accordance with CAN/CGSB-4.2 No. 66-M and test specimens which are saturated with water. This procedure is usually used for flame-laminated fabrics.
- A2.4** Launder the fabric five times in accordance with CAN/CGSB-4.2 No. 67-M and test specimens which have been conditioned in accordance with CAN/CGSB-4.2 No. 2-M.
- A2.5** Launder the fabric five times in accordance with CAN/CGSB-4.2 No. 67-M and test specimens which are saturated with water.

Withdrawn

Note A1: Perchloroethylene is toxic and the usual precaution for handling chlorinated solvents should be taken. It should be used only in well-ventilated areas. The solvent is nonflammable.