



Government
of Canada

Gouvernement
du Canada

Canadian General
Standards Board

Office des normes
générales du Canada

Series 148
Série des 148

WITHDRAWAL

June 2016

Standards in series Geosynthetics

These National Standards of Canada are hereby withdrawn due to limited use and support for their revision. This withdrawal notice removes all remaining standards in the series.

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.

The information contained in these Standards was originally developed pursuant to a voluntary standards development initiative of the CGSB. The information contained therein may no longer represent the most current, reliable, and/or available information on these subjects. CGSB hereby disclaims any and all claims, representation or warranty of scientific validity, or technical accuracy implied or expressed respecting the information therein contained. The CGSB shall not take responsibility nor be held liable for any errors, omissions, inaccuracies or any other liabilities that may arise from the provision or subsequent use

RETRAIT

Juin 2016

Normes de la série Géosynthétiques

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. Cet avis de retrait supprime toutes les normes restantes de la présente série.

Le Conseil canadien des normes exige que les organismes accrédités d'élaboration de normes, tel que l'ONGC, effectue régulièrement un examen des normes consensuelles afin de déterminer s'il y a lieu d'en renouveler l'approbation, de les réviser ou de les retirer. Le cycle d'examen d'une norme est généralement de cinq ans à partir de la date de publication de la dernière édition de celle-ci.

L'information contenue dans ces normes a été élaborée initialement en vertu d'une initiative volontaire d'élaboration de normes de l'ONGC. Elle peut ne plus représenter l'information disponible et/ou l'information la plus actuelle ou la plus fiable à ce sujet. L'ONGC décline par la présente toute responsabilité à l'égard de toute affirmation, déclaration ou garantie de validité scientifique ou d'exactitude technique implicite ou explicite relative à l'information contenue dans ces normes. L'ONGC n'assumera aucune responsabilité et ne sera pas tenu responsable quant à toute erreur, omission, inexactitude ou autre conséquence pouvant découler de la fourniture ou de l'utilisation subséquente de

of such information.

Copies of withdrawn standards are available from the CGSB Sales Centre by telephone at 819-956-0425 or 1-800-665-2472, by fax at 819-956-5740, by Internet at www.tpsgc-pwgsc.gc.ca/ongc-cgsb/index-eng.html, by e-mail at ncr.CGSB-ONGC@tpsgc-pwgsc.gc.ca or by mail at Sales Centre, Canadian General Standards Board, 11 Laurier Street, Gatineau, Canada K1A 1G6.

CAN/CGSB-148.1

Methods of testing geosynthetics

No. 1-94/ISO 9862:1990

Geotextiles — Sampling and preparation of test specimens (ICS 59.080.70)

No. 2-M85

Mass per unit area (ICS 59.080.70)

No. 3-M85

Thickness of geotextiles (ICS 59.080.70)

No. 4-94

Geotextiles — Normal water permeability under no compressive load (ICS 59.080.70)

No. 6.1-93

Bursting strength of geotextiles under no compressive load (ICS 59.080.70)

No. 7.3-92

Grab tensile test for geotextiles (ICS 59.080.70)

No. 10-94

Geotextiles — Filtration opening size (ICS 59.080.70)

cette information.

Des copies des normes retirées peuvent être obtenues auprès du Centre des ventes de l'ONGC. Il suffit d'en faire la demande par téléphone au 819-956-0425 ou 1-800-665-2472, par télécopieur au 819-956-5740, par Internet à : www.tpsgc-pwgsc.gc.ca/ongc-cgsb/index-fra.html, par courriel à ncr.CGSB-ONGC@tpsgc-pwgsc.gc.ca, ou par courrier adressé au Centre des ventes, Office des normes générales du Canada, 11, rue Laurier, Gatineau, Canada K1A 1G6.

CAN/CGSB-148.1

Méthodes d'essai des géosynthétiques

N° 1-94/ISO 9862 :1990

Géotextiles — Échantillonnage et préparation des spécimens d'essai (ICS 59.080.70)

N° 2-M85

Masse surfacique (ICS 59.080.70)

N° 3-M85

Épaisseur des géotextiles (ICS 59.080.70)

N° 4-94

Géotextiles — Perméabilité à l'eau dans un sens normal sans charge de compression (ICS 59.080.70)

N° 6.1-93

Résistance à l'éclatement des géotextiles non sollicités en compression (ICS 59.080.70)

N° 7.3-92

Essai de résistance à la rupture des géotextiles — Essai d'arrachement (ICS 59.080.70)

N° 10-94

Géotextiles — Détermination du diamètre d'ouverture de filtration (ICS 59.080.70)

No. 14-93

Stiffness of geotextiles (ICS 59.080.70)

No. 100-95

Conditioning geosynthetics for testing
(ICS 59.080.70)

CAN/CGSB-148.2-M89

Geotextiles and geomembranes —
Definitions (ICS 59.080.70)

N° 14-93

Rigidité des géotextiles (ICS 59.080.70)

N° 100-95

Conditionnement des géosynthétiques
pour fins d'essais (ICS 59.080.70)

CAN/CGSB-148.2-M89

Géotextiles et géomembranes — Définitions
(ICS 59.080.70)

NATIONAL STANDARD OF CANADA

CAN/CGSB-148.1

No. 7.3-92

Methods of Testing Geotextiles and Geomembranes

Grab Tensile Test for Geotextiles



QUALITY

Withdrawn/Retiré

Canadian General Standards Board

CGSB

The CANADIAN GENERAL STANDARDS BOARD (CGSB), under whose auspices this standard has been developed is a government agency within the Federal Department of Supply and Services. CGSB is engaged in the production of voluntary standards in a wide range of subject areas through the media of standards committees and the consensus process. The standards committees are composed of representatives of relevant interests including producers, consumers and other users, retailers, governments, educational institutions, technical, professional and trade societies, and research and testing organizations. Any given standard is developed on the consensus of views expressed by such representatives. The Minister's Advisory Council on CGSB reviews the results of the consensus process.

CGSB has been accredited by the Standards Council of Canada as a national standards-writing organization. The standards that it develops and offers as National Standards of Canada conform to the criteria and procedures established for this purpose by the Standards Council of Canada. In addition to standards it publishes as national standards, CGSB produces standards to meet particular needs, in response to requests from a variety of sources in both the public and private sectors. Both CGSB standards and national standards developed by CGSB are developed in conformance with the policies described in the Policy Manual for the Development and Maintenance of Standards by CGSB.

CGSB standards are subject to review and revision at any time, so as to ensure that they keep abreast of technological progress. Suggestions for their improvement, which are always welcome, should be brought to the notice of the standards committees concerned. Changes to standards are issued either as separate amendment sheets or in new editions of standards.

An up-to-date listing of CGSB standards, including details on latest issues and amendments, and ordering instructions, will be found in the CGSB Catalogue, which is published annually and is available without charge upon request.

Although the intended primary application of this standard is stated in its Scope, it is important to note that it remains the responsibility of the users of the standard to judge its suitability for their particular purpose.

Many tests required by CGSB standards are inherently hazardous. CGSB neither assumes nor accepts any responsibility for any injury or damage that may occur during or as the result of tests, wherever performed.

CGSB takes no position respecting the validity of any patent rights asserted with any item connected with this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights are entirely their own responsibility.

Further information on CGSB and its services and standards may be obtained from:

The Director
Marketing and Corporate Services Branch
Canadian General Standards Board
Ottawa, Canada
K1A 1G6

The STANDARDS COUNCIL OF CANADA is the co-ordinating body of the National Standards System, a federation of independent, autonomous organizations working towards the further development and improvement of voluntary standardization in the national interest.

The principal objectives of the Council are to foster and promote voluntary standardization as a means of advancing the national economy, benefiting the health, safety and welfare of the public, assisting and protecting the consumer, facilitating domestic and international trade, and furthering international co-operation in the field of standards.

A National Standard of Canada is a standard which has been approved by the Standards Council of Canada and one which reflects a reasonable agreement among the views of a number of capable individuals whose collective interests provide, to the greatest practicable extent, a balance of representation of producers, users, consumers and others with relevant interests, as may be appropriate to the subject in hand. It normally is a standard that is capable of making a significant and timely contribution to the national interest.

Approval of a standard as a National Standard of Canada indicates that a standard conforms to the criteria and procedures established by the Standards Council of Canada. Approval does not refer to the technical content of the standard; this remains the continuing responsibility of the accredited standards-writing organization.

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.

The responsibility for approving National Standards of Canada rests with the:

Standards Council of Canada
45 O'Connor Street
Suite 1200
Ottawa, Ontario
K1P 6N7

How to order **CGSB** Publications:

- by Telephone — (613) 941-8703 or
— (613) 941-8704
- by Fax — (613) 941-8705
- by Mail — CGSB Sales Centre
Ottawa, Canada
K1A 1G6
- in Person — Suite 1500
222 Queen Street
Ottawa, Ontario

METHODS OF TESTING GEOTEXTILES AND GEOMEMBRANES

GRAB TENSILE TEST FOR GEOTEXTILES

Prepared by the
Canadian General Standards Board 

Approved by the
Standards Council of Canada 

Published November 1992 by the
Canadian General Standards Board
Ottawa, Canada K1A 1G6

©Minister of Supply and Services Canada — 1992

No part of this publication may be reproduced in any form without the prior permission of the publisher.

CANADIAN GENERAL STANDARDS BOARD
COMMITTEE ON GEOSYNTHETICS

(Membership at date of approval)

Rollin, A.L. *Chairman*

Baldwin, R.C.

Bertok, J.

Burwash, W.J.

Colbourne, D.

Cragg, C.B.H.

Crowe, R.E.

Dascal, O.

Dixon, P.

Doering, W.

Evans, B.

Flon, P.

Gagnon, J.W.

Gervais, F.A.

Grondin, P.

Gualdieri, J.

Hanks, A.J.

Hewitt, D.

Hudson, D.

Hughes, J.F.J.

Jarrett, P.M.

Kerr, J.R.

King, M.W.

Klassen, M.J.

Lussier, P.

Mirza, C.

Mitton, M.T.

Ransom, R.R.

Ratle, R.

Richards, E.

Robertson, J.M.

Rodier, C.E.

Rowe, R.K.

Sarafinchin, M.G.

Scheubel, G.

Scott, J.D.

Snow, M.

Tessier, H.G.

Vogan, R.W.

Weil, C.

Woolstencroft, J.

Worth, A.W.

Gaucher, M.L. *Secretary*

École Polytechnique

Albarrie Canada Ltd.

Department of Transport

Golder Associates

Geoservices Inc.

Ontario Hydro

Associated Geotechnical Systems Inc.

Quebec Hydro

Hanson Materials Engineering

Department of National Defence

Dominion Textile Ltd.

Ministry of Transport, Quebec

Plastalene Corporation Ltd.

Department of Transportation and Communications, Nova Scotia

Fabrene Inc.

Fiberglas Canada Inc.

Ministry of Transportation, Ontario

Terrafix Filter Fabrics Ltd.

Celanese Canada Inc.

Polymer International (Nova Scotia) Ltd.

Department of National Defence

The Tensar Corporation

The University of Manitoba

Railway Association of Canada

Canadian General-Tower Ltd.

Strata Engineering Corporation

Consultant

Quality Monitoring Services Ltd.

Membrex Ltd.

The University of Alberta

Canadian Textiles Institute

City of Calgary

University of Western Ontario

Franklin Sarafinchin Ltd.

Texel Inc.

The University of Alberta

Labo S.M. Inc.

Du Pont Canada Ltd.

Department of Public Works

Alfred College of Agriculture and Food Technology

Bay Mills Ltd.

Railway Association of Canada

Canadian General Standards Board

Acknowledgment is made for the French translation of this National Standard of Canada by the Translation Bureau of the Department of the Secretary of State.

 Ottawa Canada K1A 1G6	METHODS OF TESTING GEOTEXTILES AND GEOMEMBRANES	CAN/CGSB-148.1
	Grab Tensile Test for Geotextiles	No. 7.3-92

1. PURPOSE AND SCOPE

- 1.1 This method is intended for use in determining the breaking load and elongation at rupture of both woven and non-woven geotextiles by the grab method.
- 1.2 The procedure is applicable to geotextiles either in the conditioned state or when wet.
- 1.3 The procedure is to be used with constant-rate-of-extension type tensile testing machines.
- 1.4 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 A geotextile specimen is held between two clamps and tension applied until rupture of the specimen occurs.

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 — Precision and Accuracy of Measurements
 - No. 2 — Conditioning Textile Materials for Testing.
- 3.2 Reference to the above publications is to the latest issues, unless otherwise specified by the authority applying this method. The source of these publications is shown in the Notes section.

4. DEFINITIONS

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

- 4.1 **Breaking load:** the maximum tensile force observed during a test in which the specimen is stretched until it breaks.
- 4.2 **Elongation at rupture:** the increase in the length of the geotextile between the clamps at maximum tensile force expressed as a percentage of the original length.

5. APPARATUS

- 5.1 **Machines** — Tensile testing machines for use in this method shall operate on the principle of constant-rate-of-extension (CRE).
 - 5.1.1 In this machine, one end of the specimen is held by a virtually stationary clamp and the other end of the specimen is gripped in a clamp that is driven at a constant speed. A suitable system for detecting and recording the force applied is provided. The maximum error of the indicated force at any point in the range shall not exceed 2% of the true force.

- 5.2 **Clamps** — The clamps of the machine 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 (Note 1 and Figure 1). 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 dimensions of the gripping surfaces shall be as shown in Table 1.

TABLE 1
Dimensions of Clamp Gripping Surfaces (mm)

	Front Face	Back Face
In direction of application of the force	25 (min.)	25 (min.)
Perpendicular to direction of application of the force	25	50 (min.)

5.3 **Stop Watch.**

6. **TEST SPECIMENS**

6.1 **Conditioned Specimens**

- 6.1.1 The geotextile shall be conditioned in accordance with CAN/CGSB-4.2 No. 2.
- 6.1.2 For woven geotextiles, at least five randomly selected specimens shall be tested in both the warp and the weft directions. If a higher degree of precision is required, more randomly selected specimens shall be tested (Note 3). No two specimens for machine breaking strength shall contain the same warp direction yarns, or for cross breaking strength the same weft direction yarns.
- 6.1.3 For non-woven geotextiles, at least five randomly selected specimens shall be tested in both the machine and cross directions. If a higher degree of precision is required, more randomly selected specimens shall be tested (Note 3). If data is required for directions other than machine and cross, at least three randomly selected specimens shall be tested in the selected direction. If a higher degree of precision is required, more specimens shall be tested (Note 3).
- 6.1.4 Unless otherwise specified, no specimen shall be taken within 50 mm of the edge of the geotextile.
- 6.1.5 Each specimen shall be cut 100 mm wide and 150 mm long, with the longer dimension parallel to the direction in which the breaking strength is to be determined. The length may be adjusted to suit various jaw sizes.
- 6.1.6 A line parallel to the long dimension, and 38 mm from the edge, shall be drawn on each test specimen with a soft marking pencil, to aid in placing the specimen in the testing machine. For woven geotextiles, the same lengthwise yarns shall be gripped in both clamps.

6.2 **Wet Specimens**

- 6.2.1 Specimens to be tested in the wet condition shall be prepared according to the procedure given in par. 6.1.1 to 6.1.6 inclusive, and then immersed and thoroughly wetted in water at room temperature to which has been added 0.2 to 0.4 g/L of a neutral nonionic wetting agent (Note 4).
- 6.2.2 Commence the test of the thoroughly wetted specimen within 1 min after being withdrawn from the water.

Note 1: The applied force must be uniformly distributed across the clamped width of the specimen.

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 brought together with light pressure. Areas of contact will show dark.

Note 3: The average result for the specimens tested is an estimate of the true value for the material under test. A measure of the reliability of this estimate can be obtained by determining the confidence interval (CAN/CGSB-4.2 No. 1, par. 6.2) within which the true mean will lie for any given probability.

Note 4: The only conclusive evidence that the time of immersion has been sufficient to wet the geotextile thoroughly is that further immersion does not produce any additional change in breaking strength. This method of determination must be used in case of dispute. For routine testing, however, it may be sufficient to immerse the material for 1 h. This minimum time should be used with caution when testing geotextiles which do not wet up readily because of protective coatings or water repellents.

7. PROCEDURE

- 7.1 The distance between the clamps at the start of the test (no slack in specimen) shall be 75 ± 1 mm.
- 7.2 Secure the specimen centrally in the clamps of the testing machine so that the long dimension is parallel to the direction of application of the force, and the line drawn on the specimen coincides with the corresponding side edge of the two clamps. Care must be taken to ensure that the tension in the specimen is uniform across the clamped width.
- 7.3 Select a force range of the testing machine such that the specimens will break between 20 and 85% of the full-scale force. Apply the load at a constant-rate-of-extension of 300 ± 10 mm/min.
- 7.4 If a specimen slips in the clamps or breaks within the clamps, or if there is any reason to suspect faulty operation of the machine, the results obtained shall be discarded. If a specimen breaks near the edge of the clamps, the break shall be examined to determine whether or not it could be due to damage by the clamps. If no evidence of this can be found, the value shall be included (Note 5).

8. REPORT

- 8.1 For woven geotextiles, calculate and report the average and the standard deviation from the individual values for breaking force and elongation at failure for both the machine and cross directions.
 - 8.1.1 Report the breaking force values in newtons and the elongation at rupture as a percentage of the original length of the geotextile between the clamps (Note 3).
- 8.2 For non-woven geotextiles, calculate and report the average and the standard deviation of breaking strength and elongation at failure for each set of specimens that have the same angle between the longer dimension of the specimen and the finished edge of the geotextile.
 - 8.2.1 Report the breaking force values in newtons and the elongation at failure as a percentage of the original length of geotextile between the clamps (Note 3).
- 8.3 Also report the following additional information:
 - 8.3.1 Size of the jaw faces used.
 - 8.3.2 Type of clamp liner used, if any.
 - 8.3.3 State of the specimens (conditioned or wet).
 - 8.3.4 The number of this test method: CAN/CGSB-148.1 No. 7.3-92.

9. NOTES

9.1 Related Publications

- 9.1.1 CGSB
CAN/CGSB-4.2 — Textile Test Methods:
 - No. 9.2 — Breaking Strength of Fabrics — Grab Method — Constant-time-to-break Principle.
- 9.1.2 ASTM
D 4632 — Standard Test Method for Breaking Load and Elongation of Geotextiles (Grab Method).

Note 5: It is often difficult to determine the reason why certain specimens break near the edge of the clamps. If this breakage is due to the specimen being damaged by the clamp, the result should be discarded. If it is simply due to randomly distributed weak places in the material, the test result is valid. "Jaw breaks" may be caused by a concentration of stress near the clamps, because they prevent the specimen from contracting in width as the force is applied. In such cases, a break near the edge of the clamps is inevitable and must be accepted as a characteristic of the particular method of test. This is often the case when testing geotextiles by the grab method.

9.2 Sources of Referenced Publications

- 9.2.1 The publications referred to in par. 3.1.1 and 9.1.1 may be obtained from the Canadian General Standards Board, Sales Centre, Ottawa, Canada K1A 1G6. Telephone (613) 941-8703 or 941-8704. Fax (613) 941-8705.
- 9.2.2 The publication referred to in par. 9.1.2 may be obtained from ASTM, 1916 Race Street, Philadelphia, PA 19103, U.S.A. or from the Standards Council of Canada, Standards Sales Branch, 45 O'Connor Street, Suite 1200, Ottawa, Ontario K1P 6N7.

Withdrawn/Retirée

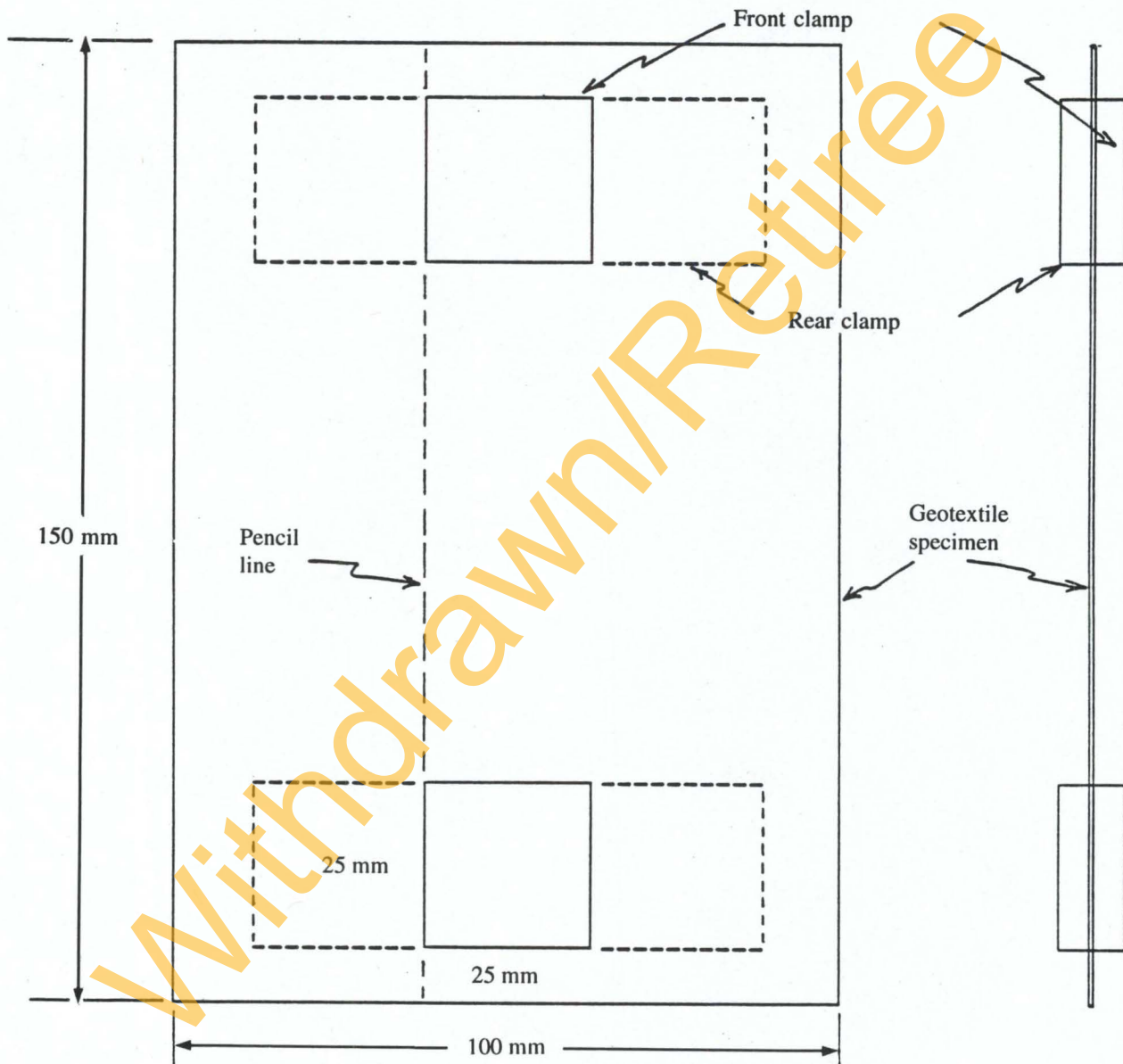


FIGURE 1
Specimen and Clamp Layout



Withdrawn/Retirée