UL 969

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Marking and Labeling Systems

Underwriters Laboratories Inc. (UL)
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UL Standard for Safety for Marking and Labeling Systems, UL 969

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Revisions: This Standard contains revisions through and including November 30, 2001.

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The revisions dated November 30, 2001 include a reprinted title page (page1) for this Standard.

As indicated on the title page (page 1), this UL Standard for Safety is an American National Standard. Attention is directed to the note on the title page of this Standard outlining the procedures to be followed to retain the approved text of this ANSI/UL Standard.

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New product submittals made prior to a specified future effective date will be judged under all of the requirements in this Standard including those requirements with a specified future effective date, unless the applicant specifically requests that the product be judged under the current requirements. However, if the applicant elects this option, it should be noted that compliance with all the requirements in this Standard will be required as a condition of continued Recognition and Follow-Up Services after the effective date, and understanding of this should be signified in writing.

This Standard consists of pages dated as shown in the following checklist:

Page	Date
1-6B	November 30, 2001
7-9	November 17, 1999
10	November 30, 2001
11	November 11, 1997
12	October 3, 1995
CRG1	May 28, 1998
CRG2	November 30, 2001
CRG3-CRG4	May 28, 1998

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OCTOBER 3, 1995 **ANSI/UL 969-2001**

(Title Page Reprinted: November 30, 2001)

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UL 969

Standard for Marking and Labeling Systems

First Edition – October, 1978
Second Edition – November, 1982
Third Edition – June, 1989

Fourth Edition

October 3, 1995

The most recent designation of ANSI/UL 969 as an American National Standard (ANSI) occurred on September 26, 2001.

This ANSI/UL Standard for Safety, which consists of the fourth edition (and revisions dated November 11, 1997; May 28, 1998; November 17, 1999; and November 30, 2001), is under continuous maintenance, whereby each revision is ANSI approved upon publication. Comments or proposals for revisions on any part of the Standard may be submitted to UL at any time. Written comments are to be sent to the UL-Northbrook Standards Department, 333 Pfingsten Road, Northbrook, IL 60062.

An effective date included as a note immediately following certain requirements is one established by Underwriters Laboratories Inc. and is not part of the ANSI Standard.

Revisions of this Standard will be made by issuing revised or additional pages bearing their date of issue. A UL Standard is current only if it incorporates the most recently adopted revisions, all of which are itemized on the transmittal notice that accompanies the latest set of revised requirements.

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FOREWORD

A. This Standard contains basic requirements for products covered by Underwriters Laboratories Inc. (UL) under its Follow-Up Service for this category within the limitations given below and in the Scope section of this Standard. These requirements are based upon sound engineering principles, research, records of tests and field experience, and an appreciation of the problems of manufacture, installation, and use derived from consultation with and information obtained from manufacturers, users, inspection authorities, and others having specialized experience. They are subject to revision as further experience and investigation may show is necessary or desirable.

B. The observance of the requirements of this Standard by a manufacturer is one of the conditions of the continued coverage of the manufacturer's product.

C. A product which complies with the text of this Standard will not necessarily be judged to comply with the Standard if, when examined and tested, it is found to have other features which impair the level of safety contemplated by these requirements.

D. A product that contains features, characteristics, components, materials, or systems new or different from those covered by the requirements in this standard, and that involves a risk of fire or of electric shock or injury to persons shall be evaluated using appropriate additional component and end-product requirements to maintain the level of safety as originally anticipated by the intent of this standard. A product whose features, characteristics, components, materials, or systems conflict with specific requirements or provisions of this standard does not comply with this standard. Revision of requirements shall be proposed and adopted in conformance with the methods employed for development, revision, and implementation of this standard.

E. UL, in performing its functions in accordance with its objectives, does not assume or undertake to discharge any responsibility of the manufacturer or any other party. The opinions and findings of UL represent its professional judgment given with due consideration to the necessary limitations of practical operation and state of the art at the time the Standard is processed. UL shall not be responsible to anyone for the use of or reliance upon this Standard by anyone. UL shall not incur any obligation or liability for damages, including consequential damages, arising out of or in connection with the use, interpretation of, or reliance upon this Standard.

F. Many tests required by the Standards of UL are inherently hazardous and adequate safeguards for personnel and property shall be employed in conducting such tests.

INTRODUCTION

1 Scope

1.1 These requirements cover adhesive attached labels for use as nameplates or markers; bearing information, instructions, or identification. An adhesive for a label may be pressure sensitive, heat activated, or solvent activated. These labels are intended to be used by manufacturers for application to their products at their place of manufacture.

1.2 These requirements also cover unprinted materials, such as face stocks, label stocks, overlaminations, laminating adhesives, and inks used by label printers to produce labels.

1.3 These requirements apply to marking and labeling systems used on complete devices, appliances, or equipment. The acceptability of a system in a particular application is to be judged under the applicable requirements in the standard covering the device, appliance, or equipment on which the system is used.

1.4 Marking and labeling systems are evaluated for application to specific surface materials that are essentially smooth and flat unless another surface configuration is specified by the manufacturer.

2 General

2.1 Values stated without parentheses are the requirement. Values in parentheses are explanatory or approximate information.

2.1 revised November 30, 2001

3 Glossary

3.1 For the purpose of this standard, the following definitions apply.

3.2 FACE STOCK – A polymeric film, metal, paper, fabric, or laminated material capable of receiving printing.

3.3 LABEL – An adhesive-backed construction bearing printing.

3.4 LABEL STOCK – The combination of face stock, adhesive, and release liner.

3.5 LAMINATING ADHESIVE – An adhesive coated on a release liner and intended to be bonded to face stock.

3.6 MARKING AND LABELING SYSTEM – A specific combination of face stock, printing process, and adhesive. A system may also include an overlamination or an overprint coating.

3.7 OVERLAMINATION – A transparent film applied over printed face stock for protection.

3.8 OVERPRINT COATING – A transparent coating applied over printed face stock for protection.

3.9 PRINTING PROCESS – A means by which ink is applied to face stock.

3.10 RELEASE LINER – A removable component of a label or label stock that protects the adhesive prior to application. (Also known as backing.)

3.11 TEMPERATURE RATING, MAXIMUM – The highest surface temperature at which a label or label material is intended to be used.

3.12 TEMPERATURE RATING, MINIMUM – The lowest surface temperature at which a label or label material is intended to be used.

3.13 TOP COATING – A coating applied to face stock to improve ink receptivity.

PERFORMANCE

4 General

4.1 Labels or unprinted materials, applied to representative test surfaces and exposed to the applicable conditions as described in 4.1 – 7.3.4, shall show permanence and legibility as given in Table 4.1.

Table 4.1
Permanence and legibility

Test	Requirement
Examination	A label or unprinted material shall adhere to the test surface without any significant curling or loosening around the perimeter, or other indication of loss of adhesion such as wrinkles or bubbles. It shall not excessively craze or shrink. Overlamination, if present, shall show no separation. Printing, if present, shall be legible.
Legibility Test – Label surfaces are to be rubbed with thumb or finger back and forth ten times with a downward force of approximately 4 pounds (18 N).	Printing shall be legible.
Defacement Test – Labels or unprinted materials are to be scraped back and forth ten times across printed areas and edges, with a downward force of approximately 2 pounds (9 N) using the edge of a 5/64-inch (2.0-mm) thick steel blade held at a right angle to the test surface. The portion of the blade contacting the test surface shall have a radius of curvature of 1.00 inch (25.4 mm) and the edges of the blade shall be rounded to a radius of approximately 1/64 inch (0.4 mm)[a,b].	A label or unprinted material, including overlamination if present, shall remain in place and shall not be torn or otherwise damaged.
Adhesion Test (8.2) – This test is to be conducted if it is possible to remove test strips from surfaces. If removal as described in 8.2 is not possible because of breaking, tearing, or excessive rigidity of the label material, adhesion is to be determined by attempting to remove the entire sample by hand.	The average quantitative adhesion value shall not be less than 0.5 pounds per inch (0.09 N/mm) width. If it is not possible to separate test strips from the surface, the sample shall show good adhesion to the surface when removal by hand is attempted.

[a] The back of the blade of a pocket knife conforming to the description indicated has been found suitable for performing this test.

[b] See Figure 4.1 for details of the Defacement Test.

4.2 Samples are to be representative of the construction of the marking and labeling system or unprinted material to be tested. Significant construction variables such as a face stock thickness range, differing types of similar face stock or adhesive (for example, clear, pigmented, or metallized), or alternative printing processes are to be represented in the samples provided.

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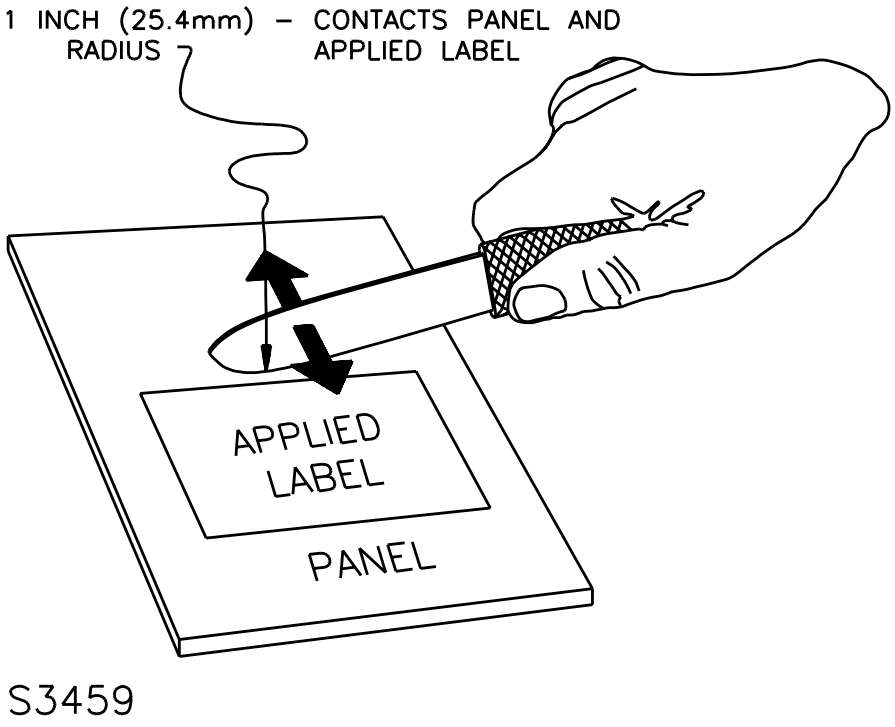
Figure 4.1
Defacement test



5 Test Surfaces

5.1 Test surface panels are to be provided for each material on which the samples are to be tested. Panels are to be essentially flat and smooth, and are to measure approximately 3 by 11 inches (76.2 by 279.4 mm). Larger panels that can be cut, or smaller panels, if sufficient in number, may be used. If samples are to be investigated for use on a curved surface, curved surfaces or tubing of representative radius are to be provided.

5.1 revised November 17, 1999

5.2 Test surfaces are to be cleaned as described in 5.3 – 5.5 before the samples are applied.

5.3 A test panel, except for wood, is to be repeatedly wiped with cheesecloth (bleached cotton gauze) dampened with denatured ethyl alcohol until it appears clean. The surface is then to be wiped once more, with the dampened cheesecloth turned to expose a clean area, and is to dry in air for at least 5 minutes.

5.4 If alcohol affects the surface:

a) A solvent that does not affect the surface or leave a film is to be used; or

b) A detergent and water solution is to be used, after which the surface is to be thoroughly rinsed with demineralized water, wiped with clean dry cheesecloth, and allowed to dry in air for 1 hour.

5.5 A bare wood surface may be lightly sanded with a 400 grit silicon carbide paper and then vacuumed to remove loose residual dust.

6 Application of Labels to Surfaces

6.1 Two or more samples of a particular construction are to be applied to one or more panels of a test surface material for each exposure. Separate panels are to be used for each exposure. The number of samples applied to a panel may vary, depending upon sample size, and panel size.

6.2 Samples are to be applied to cleaned test surfaces following the manufacturer's instructions. If specific instructions are not provided, the release liner is to be removed from the construction, and the sample is to be held by the edges only and placed on the test surface with care to avoid bending and entrapment of air. To attach the sample uniformly, including edges and corners, a roller is to be rolled back and forth across the surface in each direction with manual pressure sufficient to provide uniform and complete contact with the test surface. A cylindrical roller (wood, plastic, or hard rubber) about 1-1/4 inch (31.8 mm) in diameter and 1-1/4 inch (31.8 mm) wide may be used.

6.2 revised November 17, 1999

7 Exposure Conditions

7.1 All marking and labeling systems

7.1.1 Marking and labeling systems intended for use indoors where exposed to high humidity or occasionally to water and at ambient air temperatures of 0°C (32°F) or higher are to be subjected to each of the conditions given in Table 7.1.

7.1.2 Marking and labeling systems intended for indoor use at ambient air temperatures lower than 0°C (32°F) are to be additionally subjected to the low temperature exposure described in Table 7.2.

Table 7.1
Exposure conditions for indoor use

Exposure conditions	Time of evaluation
At least 72 hours in a standard atmosphere.[a]	Following the exposure period.
At least 24 hours in a standard atmosphere[a] followed by immersion in demineralized water for 48 hours at 23°C (73°F).[b]	While wet after removal from the water, except that the Adhesion Test is to be conducted after drying at least 24 hours in a standard atmosphere.[a,c]
At least 24 hours in a standard atmosphere[a] followed by 10 days in an air-circulating oven at the test temperature corresponding to the maximum temperature rating. See 7.1.5.	After cooling in a standard atmosphere for at least 4 hours.[a]

[a] Standard atmosphere: 23 ±2°C (73.4 ±3.6°F) and a relative humidity of 50 ±5 percent.
[b] Samples attached to porous surfaces, such as wood, are to be immersed to a depth of 1/8 inch (3.2 mm).
[c] Samples attached to porous surfaces, such as wood, are to be dried at 40°C (104°F).

7.1.3 Marking and labeling systems intended only for use in indoor dry locations are to be subjected to each of the conditions specified in Table 7.1, except that immersion in water is to be replaced by suspension for 72 hours in a humidity cabinet at 32 ±2°C (90 ±4°F) and 85 ±5 percent relative humidity. The samples are to be evaluated immediately after removal from the humidity cabinet. The adhesion test is to be conducted as soon as practicable but not later than 1/2 hour after removal from the exposure.

7.1.4 Marking and labeling systems intended for use both indoor and outdoor where exposed to high humidity or occasionally to water are to be subjected to each of the conditions given in Tables 7.1 and 7.2.

Table 7.2
Additional exposure conditions for indoor use and outdoor use

Table 7.2 revised November 17, 1999

Exposure conditions	Time of evaluation
At least 24 hours in a standard atmosphere[a] followed by 7 hours in a cold box at the lowest temperature of intended use.[b]	Immediately upon removal from the cold box, avoiding warming as much as possible. The adhesion test is not conducted after this exposure condition.
At least 24 hours in a standard atmosphere[a] followed by 720 hours of twin enclosed carbon-arc or 750 hours of xenon-arc ultraviolet light and water exposure. See 7.1.6.	Following the exposure period, except that the Adhesion Test is to be conducted after at least 24 hours in a standard atmosphere.[a]

[a] Standard atmosphere: 23 ±2°C (73.4 ±3.6°F) and a relative humidity of 50 ±5 percent.

[b] The low temperature for indoor or outdoor use shall be minus 23°C (minus 10°F) or lower.

7.1.5 Test temperatures applicable to maximum temperature rating are given in Table 7.3.

Table 7.3
Ten-day oven test temperatures

Maximum temperature rating,		Test temperature	
°C	(°F)	°C	(°F)
40	(104)	60	(140)
60	(140)	87	(189)
80	(176)	105	(221)
100	(212)	121	(250)
125	(257)	150	(302)
150	(302)	180	(356)
175	(347)	210	(410)
200	(392)	230	(446)
225	(437)	250	(482)
250	(482)	280	(536)
280	(536)	310	(590)

7.1.6 Specimens are to be exposed to ultraviolet light and water spray by using either of the following apparatus:

a) Twin enclosed carbon-arc in accordance with the Standard Practice for Exposing Nonmetallic Materials in Accelerated Test Devices That Use Laboratory Light Sources, ASTM G151, and the Standard Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials, ASTM G153. The spectral power distribution of the enclosed carbon-arc shall conform to the requirements in ASTM G153 for enclosed carbon-arc with borosilicate glass globes. A programmed cycle of 20 minutes consisting of a 17-minute light exposure and a 3-minute exposure to water spray with light shall be used. The apparatus shall operate with a black-panel temperature of 63 ±3°C (145 ±5°F).

b) Xenon-arc in accordance with the Standard Practice for Exposing Nonmetallic Materials in Accelerated Test Devices That Use Laboratory Light Sources, ASTM G151, and the Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Nonmetallic Materials, ASTM G155. The spectral power distribution of the xenon lamp shall conform to the requirement in Table 1 in ASTM G155 for a xenon lamp with daylight filters. A programmed cycle of 120 minutes consisting of a 102-minute light exposure and an 18-minute exposure to water spray with light shall be used. The apparatus shall operate with a spectral irradiance of 0.35 W/m^2 nm at 340 nm and a black-panel temperature of 63 ±3°C (145 ±5°F).

7.1.6 revised November 17, 1999

7.2 Marking and labeling systems exposed to specific agents

7.2.1 Additional exposure conditions may be required, depending on the product for which the marking and labeling system is intended and on the conditions that the particular product may encounter in service.

7.2.2 Exposure conditions for marking and labeling systems intended to be used on products that are occasionally exposed to specific common agents are given in Table 7.4.

7.2.3 Before being immersed in the appropriate solution, the samples are to be conditioned for 24 hours in a controlled atmosphere maintained at 23 ±2°C (73.4 ±3.6°F).

7.2.3 revised November 30, 2001

7.2.4 After being immersed for the time specified in Table 7.4, the samples are to be evaluated in accordance with Table 4.1. The evaluation is to be made while the samples are wet after removal from the liquids except that the adhesion test is to be conducted after drying for at least 24 hours at 23 ±2°C (73.4 ±3.6°F) and a relative humidity of 50 ±5 percent.

Table 7.4
Exposure conditions for common agents

Table 7.4 revised November 11, 1997

Agent	Exposure condition[a]
Cooking oil	Immersion for 48 hours in corn oil.
Detergent	Immersion for 48 hours in a solution of 25 grams of granular detergent[b] in 1 liter of demineralized water.
Fuel Oil No. 1	Immersion for 48 hours in fuel oil No. 1.
Fuel Oil No. 2	Immersion for 48 hours in fuel oil No. 2.
Gasoline (splashing)	Immersion for 1 hour in ASTM Reference Fuel C.[c]
Kerosene	Immersion for 48 hours in kerosene.
Lubricating oil	Immersion for 48 hours in IRM903 Oil.

[a] The liquid for the immersion test is to be maintained at the temperature the liquid will attain in service, but not less than 23 ±2°C (73.4 ±3.6°F).

[b] For dishwashers, Cascade is to be used; for clothes-washing equipment, Tide is to be used. Other detergents having equivalent properties may be used.

[c] A 50/50 mixture by volume of iso-octane and toluene.

7.3 Marking and labeling systems for hazardous locations products

7.3.1 Marking and labeling systems intended to be applied to products for use in Class I hazardous locations shall be subjected to the applicable exposure conditions specified in 7.1.1 – 7.1.6. ln addition, marking and labeling systems intended to be used on products for Class I, Division 1, Group C, Group D, or Groups C and D shall be subjected to each of the conditions specified in 7.3.2 – 7.3.4.

7.3.2 The samples are to be exposed for 168 hours at a temperature of 23 ±2°C (73.4 ±3.6°F) to the vapors of the following solvents:

Acetone	Diethyl ether
Methyl ethyl ketone	Ammonium hydroxide (20 percent by weight)
Benzene	ASTM Reference Fuel C
Methanol	2-Nitropropane
n-Hexane	Acetic acid (glacial)
Ethyl acetate	Furfural
Ethylene dichloride	

7.3.2 revised November 11, 1997

7.3.3 Applied samples are to be suspended vertically approximately 1 inch above a small amount of each of the solvents in a closed container.

7.3.4 The samples are to be evaluated in accordance with Table 4.1 immediately upon removal from the solvent vapor except for the adhesion test. The adhesion test is to be conducted after the samples have been allowed to stand for at least 24 hours at 23 ±2°C (73.4 ±3.6°F) and a relative humidity of 50 ±5 percent.

8 Adhesion Test

8.1 Samples are to be tested as described in 8.2.

8.2 Test strips approximately 1/2 inch (12.7 mm) wide are to be prepared by making two parallel cuts through the sample to the test surface, using a sharp instrument such as a razor blade. Strips are to be cut parallel to the length and width of the sample if the size and configuration of samples allows. One end of each strip shall be separated from the surface for attachment to the apparatus for test. The remainder of each strip, at least 1.0 inch (25.4 mm) is then to be pulled from the surface at a 90 degree angle and at a rate of 2 inches (50.8 mm) per minute, using a tension machine equipped with an automatic recorder. The average force required to remove the strip is to be calculated in pounds per inch (N/mm) width. The value obtained for two or more samples is to be averaged and taken as the quantitative adhesion value.

MARKING

9 General

9.1 Each marking and labeling system shall be marked, as indicated in 9.3, with the following:

a) The manufacturer’s name or identifying symbol.

b) A distinctive marking and labeling system designation.

9.2 If a manufacturer produces a marking and labeling system at more than one factory, the system shall also have a distinctive marking to identify it as the product of a particular factory.

9.3 The marking specified in 9.1 and 9.2 may be marked on each package, roll core, release liner, or the face of the label.

CANADIAN REQUIREMENTS COMPARISON GUIDE CRG 969

UL AND CANADIAN STANDARDS FOR MARKING AND LABELING SYSTEMS

c UL Underwriters Laboratories Inc.®

Product Category: Marking and Labeling Systems
UL Category Control Number: PGDQ2, PGGU2, PGIS2, PGJI2

UL Standard:

Standard for Marking and Labeling Systems
UL 969
Fourth Edition

Canadian Standard:

Standard for Adhesive Labels
CAN/CSA-C22.2 No. 0.15-95
Second Edition

This Canadian Requirement Comparison Guide is only intended to identify Canadian requirements that must be applied in addition to the requirements in the UL Standard to obtain a C-UL Mark. The guide is not intended to replace a thorough review and comparison of the requirements applicable to the product category as contained in the applicable UL and Canadian Standards. Where requirements are not specifically addressed, compliance with the requirements in the UL Standard satisfy the requirements in the Canadian Standard.

The actual requirements applied for a C-UL product investigation may differ from those identified in this guide based on the specific features, characteristics, components, materials, or systems used in the product.

CRG: 969
Issue No.: 1
Issue Date: May 28, 1998

Revisions of this guide will be made by issuing revised or additional pages bearing their date of issue. A Canadian Requirement Comparison Guide is current only if it incorporates the most recently adopted revisions, all of which are itemized on the transmittal notice that accompanies the latest set of revision pages for the Guide.

The following outlines the requirements contained in CSA-C22.2 No. 0.15-95 that are in addition to the requirements in UL 969 that must be met in order for a product to bear the appropriate UL Marking. UL provides a certification program for products that meet the Canadian requirements. The c-UL Mark provides assurance that the product as evaluated by UL complies with the appropriate Canadian requirements.

Requirements Topics	CSA Clause	Comparison
Definitions	2.1	Verify that the label performs as required by the Type requested (Type A, B and C are defined).
Legibility After Abrasion	4.2.2	Labels must be subjected to abrasion according to Clause 6.3.
Legibility After Solvent Abrasion	4.2.3	Labels must be subjected to solvent abrasion according to Clause 6.4.
Exposure Conditions		
-Indoor Use	4.3.2	Fading exposure (Clause 6.2.6) is required for labels affixed to aluminum. If the label is intended for wet locations the Fading exposure is replaced with the Fading Wet Location exposure (Clause 6.2.7).
-Outdoor Use	4.3.2	Weatherometer exposure (Clause 6.2.10) is required for labels affixed to aluminum.
-Plastic Substrates	4.3.2	If labels are also to be suitable for use on plastic substrates the Heat-Cold-Humidity Cycling (Clause 6.2.8) is required for the label affixed to a representative substrate for each plastic group to be included.
-Heavy Duty Use	4.3.2	If the label is intended for Heavy Duty Use the label affixed to aluminum must be subjected to the Oil exposure (Clause 6.2.9).
Peel Test	4.3.3	Labels shall be tested for adhesion (Clause 6.5) after exposures. The adhesion value shall not be less than 0.20 N/mm (1.1 lbs/inch) width.
Adhesion After Solvent Immersion	4.3.4	Labels affixed to aluminum shall be subjected to this exposure and test.

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