



UL 969

STANDARD FOR SAFETY

Marking and Labeling Systems

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UL Standard for Safety for Marking and Labeling Systems, UL 969

Fourth Edition, Dated October 3, 1995

Summary of Topics

These revisions to ANSI/UL 969 include the following changes in requirements:

- 1. Correction to the conversion of the adhesion value from lb/in to N/mm in Table 4.1.**
- 2. Correction to the tolerance for standard atmosphere in Table 7.2.**

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The new and revised requirements are substantially in accordance with Proposal(s) on this subject dated July 18, 2014.

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OCTOBER 3, 1995
(Title Page Reprinted: September 19, 2014)



ANSI/UL 969-2014

1

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

This ANSI/UL Standard for Safety consists of the Fourth Edition including revisions through September 19, 2014.

The most recent designation of ANSI/UL 969 as an American National Standard (ANSI) occurred on September 19, 2014. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, Title Page, or effective date information.

Comments or proposals for revisions on any part of the Standard may be submitted to UL at any time. Proposals should be submitted via a Proposal Request in UL's On-Line Collaborative Standards Development System (CSDS) at <http://csds.ul.com>.

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CONTENTS

INTRODUCTION

1 Scope5
 2 General5
 3 Glossary5

PERFORMANCE

4 General6A
 5 Test Surfaces7
 6 Application of Labels to Surfaces8
 7 Exposure Conditions8
 7.1 All marking and labeling systems8
 7.2 Marking and labeling systems exposed to specific agents11
 7.3 Marking and labeling systems for hazardous locations products12
 8 Adhesion Test12

MARKING

9 General13

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INTRODUCTION

1 Scope

1 revised June 30, 2014

1.1 These requirements cover adhesive-attached labels for use as permanent nameplates or markers; bearing information, instructions, or identification in the form of text or pictographs. The adhesive 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:

- a) Unprinted materials used by label converters to produce finished labels, such as blank label stocks, overlaminations, laminating adhesives and screen-printable adhesives;
- b) Specific combinations of label material, ink, and printing process evaluated as a system; and
- c) Labels that are intended to be mechanically affixed or molded into a plastic part.

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

1.4 Marking and labeling systems are evaluated for specific uses and for application to specific surface materials that are essentially smooth, flat, and rigid 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.

3.2.1 FLOOD COAT – A layer of ink that coats an area of the face stock, generally intended to provide background color.

3.2.1 added June 30, 2014

3.2.2 IN-MOLD LABEL – A label intended to be bonded to a plastic enclosure or part during the molding process.

3.2.2 added June 30, 2014

3.3 LABEL – An adhesive-backed construction bearing printing.

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

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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, ink, printing process, and adhesive, where present. A system may also include an overlamination or an overprint coating.

3.6 revised June 30, 2014

3.6.1 MECHANICALLY AFFIXED LABEL – A label intended to be affixed to a device using screws, rivets or other mechanical means of attachment. The means of attachment is not addressed by this standard. Therefore the acceptability of the means of attachment must be determined for each device application.

3.6.1 added June 30, 2014

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

3.8 OVERPRINT COATING – A transparent coating, such as a varnish, applied over printed face stock for protection.

3.8 revised June 30, 2014

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.)

3.10.1 SUBSURFACE PRINTING – Printing on the underside of the face stock.

3.10.1 added June 30, 2014

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.

3.14 TOP-SURFACE PRINTING – Printing on the topside of the face stock.

3.14 added June 30, 2014

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PERFORMANCE

4 General

4.1 Labels or unprinted materials, applied or bonded 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. Labels intended to be mechanically affixed shall be affixed to a device or test surface if such attachment is necessary for the evaluation of the label in accordance with this standard.

4.1 revised June 30, 2014

**Table 4.1
Permanence and legibility**

Table 4.1 revised September 19, 2014

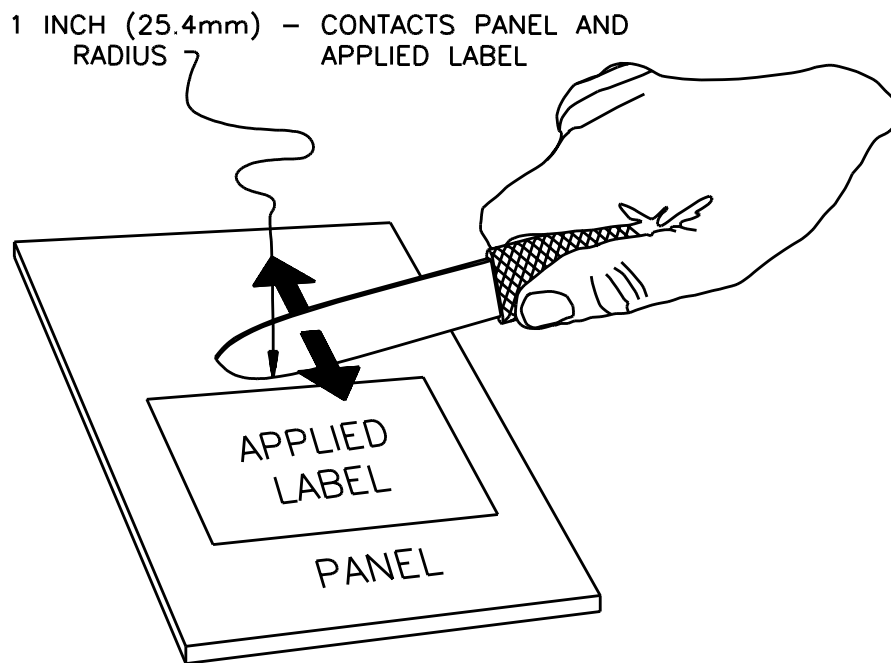
Test	Requirement
<p>Visual Examination – The labels shall be viewed at arm's length [approximately 18 in (457 mm)] by a person with normal or corrected vision.</p>	<p>A label or unprinted material shall adhere to the test surface without any significant curling or loosening around the perimeter greater than 10 percent of the label area, or other indication of loss of adhesion such as wrinkles or bubbles. It shall not excessively craze, shrink more than 10 percent of the label area or slip from its original position on the test panel more than 0.2 in (5.1 mm).</p> <p>Overlamination, if present, shall show no separation, excessive darkening or shrinkage of more than 10 percent of the label area.</p> <p>Printing, if present, shall be legible and there shall be no significant deterioration of legibility such as fading or bleeding. Significant change in print colors shall be noted.</p>
<p>Legibility Test – Printed surfaces of labels are to be rubbed with thumb or finger back and forth ten times with a downward force of approximately 4 lb (18 N) and then examined for legibility as in the Visual Examination.^c</p>	<p>Printing shall be legible and there shall be no significant deterioration or blurring of legibility. The top coating of unprinted label stock, if present, shall not be rubbed off.</p>
<p>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 between 1.6 and 2.0 lb (between 7.2 and 9 N) using the edge of a 0.065- to 0.100-in (1.65- to 2.54-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 1.0 to 1.3 in (25.4 to 33.0 mm) and the edges of the blade shall be rounded to a radius of 0.016 ±0.003 in (0.41 ±0.08 mm).^{a,b,d}</p>	<p>A label or unprinted material, including overlamination or overprint coating, if present, shall remain in place and shall not be torn, uplifted, or otherwise damaged.</p> <p>Scratching or defacement of unprotected printing, either text or background, is not considered a non-compliance.</p>
<p>Adhesion Test (8.2) –</p>	

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Table 4.1 Continued

Test	Requirement
<p>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.^e</p>	<p>The average quantitative adhesion value shall not be less than 0.50 lb/inch (0.088 N/mm) width and the adhesion shall not be less than 0.10 lb/in (0.0175 N/mm) at any point. 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.</p>
<p>^a The back of the blade of a pocket knife conforming to the description indicated has been found suitable for performing this test. Other devices conforming to the description indicated may be used.</p> <p>^b See Figure 4.1 for details of the Defacement Test.</p> <p>^c Subsurface printed labels and labels in which printing is protected by an overlamination are not subject to the Legibility Test.</p> <p>^d Labels intended to be mechanically affixed shall be evaluated by holding the label on a flat test surface for support.</p> <p>^e The adhesion test is not applicable to labels intended to be mechanically affixed.</p>	

Figure 4.1
Defacement test



S3459

4.1.1 If after any exposure condition the test surface excessively warps, bubbles, deteriorates, melts, chips, or otherwise renders it impossible to determine compliance of the label or label material with the requirements of this standard, the evaluation of the sample applied to the test surface is considered to be inconclusive.

4.1.1 added June 30, 2014

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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 top-surface or subsurface printing; top coating; face stock; overlamination or adhesive thickness range; partial adhesive coverage; differing types or colors of similar face stock or adhesive (for example, clear, pigmented, or metallized); and alternative printing processes and inks (including floodcoating for subsurface printed constructions) are to be represented in the samples provided.

4.2 revised June 30, 2014

4.3 The minimum recommended sample size is 2.0 by 2.0 in (50.8 by 50.8 mm) and the maximum recommended height of text is 0.063 in (1.60 mm).

4.3 added June 30, 2014

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, smooth, and rigid, and are to measure approximately 3 by 11 in (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. When samples are to be investigated for use on a textured surface, panels of the specific textured surface are to be provided.

5.1 revised June 30, 2014

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 or isopropanol 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 then allowed to dry in air for at least 1 minute.

5.3 revised June 30, 2014

5.4 If alcohol affects the surface or is not considered the solvent of choice for a particular test surface:

- a) An alternative 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.

5.4 revised June 30, 2014

5.5 Bare wood surfaces, except for textured wood surfaces, may be lightly sanded with a 400 grit silicon carbide paper and then vacuumed to remove loose residual dust.

5.5 revised June 30, 2014

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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 Pressure-sensitive labels – Samples are to be applied to cleaned test surfaces as described below. Alternatively, if the manufacturer provides specific application instructions, the manufacturer's instructions shall be followed. 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 smooth-surfaced cylindrical roller (wood, plastic, or hard rubber) about 1-1/4 in (31.8 mm) in diameter and 1-1/4 in (31.8 mm) wide may be used.

6.2 revised June 30, 2014

6.3 Heat-activated and solvent-activated adhesive label samples are to be activated and applied to the test panels using the specific application instructions provided by the manufacturer, including recommended temperature, pressure, dwell time, solvent, etc., as applicable.

6.3 added June 30, 2014

6.4 In-mold labels are to be molded at combinations of molding parameters representative of the extremes of temperatures, times and pressures at which parts made of the generic plastic may be molded.

6.4 added June 30, 2014

6.5 Samples applied to the test surface panels shall be stored at $23 \pm 5^{\circ}\text{C}$ ($73.4 \pm 9.0^{\circ}\text{F}$) and a relative humidity of 50 ± 20 percent until they are subjected to the applicable exposure conditions.

6.5 added June 30, 2014

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

Table 7.1 revised June 30, 2014

Exposure conditions	Time of evaluation
As Received: At least 72 h in a standard atmosphere. ^a	Following the exposure period.
Water Immersion: At least 24 h in a standard atmosphere ^a followed by immersion in demineralized water for 48 ±0.5 h at 23.0 ±2°C (73.4 ±3.6°F). ^b	While wet immediately after removal from the water, except for the Adhesion Test. ^d The Adhesion Test, Section 8, is to be conducted after drying at least 24 h in a standard atmosphere. ^{a,c, f}
Elevated Temperature: At least 24 h in a standard atmosphere ^a followed by 240 ±1 h in an air-circulating oven at the test temperature corresponding to the maximum temperature rating. ^{e, g} See 7.1.5.	After cooling in a standard atmosphere for at least 4 h. ^a
<p>^a Standard atmosphere: 23 ±2°C (73.4 ±3.6°F) and a relative humidity of 50 ± 10 percent.</p> <p>^b Samples attached to porous surfaces, such as wood, are to be immersed to a depth of approximately 1/8 in (3.2 mm), with the depth of immersion maintained at that level throughout the duration of the exposure.</p> <p>^c Samples attached to porous surfaces, such as wood, are to be dried for 24 ±1 h in an air-circulating oven at 40 ±2°C (104 ±3.6°F) and then placed in the standard atmosphere for at least 4 h prior to being tested.</p> <p>^d Test panels are to be removed one at a time from the exposure condition and tested immediately in the following order: Defacement Test, Visual Examination, Legibility Test (see Table 4.1).</p> <p>^e The test panels shall be placed in a rack in the vertical position in a manner that does not prevent slippage of the label, with the panels oriented parallel to the direction of the air flow. Thermoplastic test panels that require support to prevent distortion resulting from stress relief are permitted to be placed on a horizontal tray. Additionally, to reduce distortion of thermoplastic test panels, preconditioning of plastic test panels at or below the elevated test temperature is permitted before labels are applied.</p> <p>^f Blotting of the water in a manner that does not affect subsequent evaluation is acceptable to aid in drying the test panels.</p> <p>^g A full draft air-circulating oven capable of maintaining the test temperature with a minimum of 5 air changes per hour.</p>	

7.1.3 Humidity Exposure: 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 ±0.5 h in a humidity cabinet at 32 ±2°C (90 ±4°F) and 85 ±5 percent relative humidity. The test panels are to be suspended in a manner that does not prevent slippage of the label. The samples are to be evaluated immediately after removal from the humidity cabinet, in the following order: Defacement Test, Visual Examination, Legibility Test (see Table 4.1). The Adhesion Test, Section 8, is to be conducted as soon as practicable but not later than 1/2 h after removal from the exposure.

7.1.3 revised June 30, 2014

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 September 19, 2014

Exposure conditions	Time of evaluation
Low Temperature: At least 24 h in a standard atmosphere ^a followed by 7 ±0.25 h in a cold box maintained at the temperature (±2°C) corresponding to the minimum temperature rating. ^b	Test panels are to be removed one at a time from the exposure condition and tested immediately in the following order: Defacement Test, Visual Examination, Legibility Test (see Table 4.1). The adhesion test is not conducted after this exposure condition.
Ultraviolet Light and Water: At least 24 h in a standard atmosphere ^a followed by 720 ±2 h of twin enclosed carbon-arc or 750 ±2 h of xenon-arc ultraviolet light and water exposure. See 7.1.6.	Following the exposure period, except that the Adhesion Test, Section 8, is to be conducted after at least 24 h in a standard atmosphere. ^a
^a Standard atmosphere: 23 ±2°C (73.4 ±3.6°F) and a relative humidity of 50 ±10 percent.	
^b The minimum temperature rating for 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

Table 7.3 revised June 30, 2014

Maximum temperature rating,		Test temperature	
°C	(°F)	°C	(°F)
40	(104)	60 ±2	(140 ±3.6)
60	(140)	87 ±2	(189 ±3.6)
80	(176)	105 ±3	(221 ±5.4)
100	(212)	121 ±3	(250 ±5.4)
125	(257)	150 ±4	(302 ±7.2)
150	(302)	180 ±4	(356 ±7.2)
175	(347)	210 ±4	(410 ±7.2)
200	(392)	230 ±4	(446 ±7.2)
225	(437)	250 ±4	(482 ±7.2)
250	(482)	280 ±4	(536 ±7.2)
280	(536)	310 ±4	(590 ±7.2)

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).

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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/m² 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 at least 24 h in a standard atmosphere of 23 ±2°C (73.4 ±3.6°F) and a relative humidity of 50 ±10 percent.

7.2.3 revised June 30, 2014

7.2.4 After being immersed for the time specified in Table 7.4, the samples are to be evaluated in accordance with the water immersion exposure condition in Table 7.1 for compliance with the requirements in Table 4.1 except that label panels removed from cooking oil, fuel oil, kerosene, and lubricating oil are permitted to drain for up to 5 min and those having been subjected to an elevated temperature immersion shall be allowed to cool in a standard atmosphere for at least 1 hour before being evaluated. When exposure to the liquid should be avoided, the Legibility Test (see Table 4.1) is to be conducted using a thin, smooth-surfaced latex or nitrile rubber glove.

7.2.4 revised June 30, 2014

**Table 7.4
Exposure conditions for common agents**

Table 7.4 revised June 30, 2014

Agent	Exposure condition ^a
Cooking oil	Immersion for 48 ±0.5 h in corn oil.
Detergent (dishwasher)	Immersion for 48 ±0.5 h in a solution of 25 ±1 g of granular dishwashing detergent ^b specified in the Standard for Household Dishwashers, UL 749, in 1 L of demineralized water.
Detergent (laundry)	Immersion for 48 ±0.5 h in a solution of 25 ±1 g of granular laundry detergent ^b specified in the Standard for Electric Clothes Washing Machines and Extractors, UL 2157, in 1 L of demineralized water.
Fuel Oil No. 1	Immersion for 48 ±0.5 h in fuel oil No. 1.
Fuel Oil No. 2	Immersion for 48 ±0.5 h in fuel oil No. 2.
Gasoline (splashing)	Immersion for 60 ±5 min in ASTM Reference Fuel C. ^c
Kerosene	Immersion for 48 ±0.5 h in kerosene.
Lubricating oil	Immersion for 48 ±0.5 h 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 dishwashing applications, Cascade may be used; for clothes-washing machine applications, Tide may be used. ^c A 50/50 mixture by volume of isoöctane and toluene.	

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7.3 Marking and labeling systems for hazardous locations products

7.3 revised June 30, 2014

7.3.1 Marking and labeling systems intended to be applied to products for use in Class I, Division 1, Zone 0 or Zone 1 hazardous locations shall be subjected to the applicable exposure conditions specified in 7.1.1 – 7.1.6 and shall be subjected to the conditions specified in 7.3.2 – 7.3.4.

7.3.2 The samples are to be exposed for 168 ± 1 h at a temperature of $23 \pm 2^\circ\text{C}$ ($73.4 \pm 3.6^\circ\text{F}$) to the saturated vapors in air of the following solvents:

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

7.3.3 Applied samples are to be suspended vertically approximately 1 in (25.4 mm) above a small amount of each of the solvents in closed containers.

7.3.4 The samples are to be evaluated in accordance with the water immersion exposure condition in Table 4.1 and Table 7.1. The adhesion test is to be conducted after the samples have been allowed to stand for at least 24 h at $23 \pm 2^\circ\text{C}$ ($73.4 \pm 3.6^\circ\text{F}$) and a relative humidity of 50 ± 10 percent. The Legibility Test is to be conducted using a thin, smooth-surfaced latex or nitrile rubber glove for hand protection.

8 Adhesion Test

8.1 Samples are to be tested as described in 8.2.

8.2 Test strips approximately 0.50 in (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 in (25.4 mm) is then to be pulled from the surface at a 90 ± 5 degree angle and at a rate of 2.0 ± 0.1 in/min (50.8 ± 2.5 mm/min), using a tension machine equipped with an automatic recorder that graphs the adhesion profile of the test strip. The average force required to remove the strip is to be calculated in pounds per inch (N/mm) width rounding to the nearest 0.01 lb/in (0.002 N/mm). The value obtained for two or more samples is to be averaged and taken as the quantitative adhesion value. Notation shall be made if the quantitative adhesion value drops below 0.10 lb/in (0.02 N/mm) at any point during the test.

8.2 revised June 30, 2014

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MARKING

9 General

9 revised June 30, 2014

9.1 Marking and labeling systems and materials shall be marked, as indicated in 9.3, with the following:

- a) The manufacturer's name or identifying symbol.
- b) A distinctive designation.

9.2 Marking and labeling systems or materials produced at more than one factory shall also have a distinctive marking to identify them as the product of a particular factory.

9.3 The marking specified in 9.1 and 9.2 shall be marked on each package, roll core, release liner, the face of the label or another location associated with the product.

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