UL 969

STANDARD FOR SAFETY

Marking and Labeling Systems

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

Fifth Edition, Dated May 30, 2017

Summary of Topics

This revision of ANSI/UL 969 dated May 9, 2023 is being issued to update the title page to reflect the most recent designation as a Reaffirmed American National Standard (ANS). No technical changes have been made.

Text that has been changed in any manner or impacted by ULSE's electronic publishing system is marked with a vertical line in the margin.

The requirements are substantially in accordance with Proposal(s) on this subject dated March 17, 2023.

No Text on This Page

MAY 30, 2017
(Title Page Reprinted: May 9, 2023)

ANSI/UL 969-2018 (R2023)

UL 969

Standard for Marking and Labeling Systems

First Edition – October, 1978
Second Edition – November, 1982
Third Edition – June, 1989
Fourth Edition – October, 1995

Fifth Edition

May 30, 2017

This ANSI/UL Standard for Safety consists of the Fifth Edition including revisions through May 9, 2023.

The most recent designation of ANSI/UL 969 as a Reaffirmed American National Standard (ANS) occurred on May 9, 2023. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, and Title Page.

Comments or proposals for revisions on any part of the Standard may be submitted to ULSE at any time. Proposals should be submitted via a Proposal Request in the Collaborative Standards Development System (CSDS) at https://csds.ul.com.

No Text on This Page

CONTENTS

INTRODUCTION

PERFORMANCE

MARKING

No Text on This Page

INTRODUCTION

1 Scope

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.

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

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

3.5 LABEL – An adhesive-backed construction bearing printing.

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

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

3.8 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.

3.9 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.

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

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

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

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

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

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

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

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

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

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.

Table 4.1
Permanence and legibility

Test	Requirement
Visual Examination – The labels shall be viewed at arm's length [approximately 18 in (457 mm)] by a person with normal or corrected vision.	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). Overlamination, if present, shall show no separation, excessive darkening or shrinkage of more than 10 percent of the label area. 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.

Table 4.1 Continued on Next Page

Table 4.1 Continued

Test	Requirement
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.[a]	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.
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).[b]	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. Scratching or defacement of unprotected printing, either text or background, is not considered a non-compliance.
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.[c]	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.

[a] Subsurface printed labels and labels in which printing is protected by an overlamination are not subject to the Legibility Test.

[b] Labels intended to be mechanically affixed shall be evaluated by holding the label on a flat test surface for support.

[c] The adhesion test is not applicable to labels intended to be mechanically affixed.

4.2 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.

4.3 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.

4.4 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).

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.

5.2 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.

5.4 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.

5.5 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.

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.

6.3 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.

6.4 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.

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

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
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.[eg] See 7.1.5.	After cooling in a standard atmosphere for at least 4 h.[a]

[a] Standard atmosphere: 23 ±2°C (73.4 ±3.6°F) and a relative humidity of 50 ± 10 percent.

[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.

[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.

[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).

[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.

[f] Blotting of the water in a manner that does not affect subsequent evaluation is acceptable to aid in drying the test panels.

[g] A full draft air-circulating oven capable of maintaining the test temperature with a minimum of 5 air changes per hour.

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.

7.1.4 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 Table 7.1 and Table 7.2.

Table 7.2
Additional exposure conditions for indoor use and outdoor use

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.