**MH10.8.13 – 201?**

**Draft version 2012-07-16**

***Test procedures for labels incorporating linear bar codes and two-dimensional (2D) symbols***

**Approved: XX Xxxxxx 201x**

**Abstract**

This standard is an application standard for the testing of labels used to identify products and packages and shipping containers with linear bar codes and two-dimensional symbols. It defines minimum requirements and methods of testing for labels in these applications.

**Developed by:**

**MH10 Committee, Unit-Loads and Transport-Packages Subcommittee 8, Coding & Labeling of Unit-Loads**

**Published by MH10 Secretariat:**

**Material Handling Industry of America**

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**Published by MH10 Secretariat:**

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Suite 201 Charlotte, NC 28217

**Approved Xxxxxx XX, 200x**

American National Standards Institute, Inc.

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**AMERICAN NATIONAL STANDARD ANS MH10.8.13 – 200X**

TEST PROCEDURES FOR LABELS INCORPORATING LINEAR BAR CODES AND   
TWO-DIMENSIONAL (2D) SYMBOLS

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Foreword

This standard is an application standard for test procedures for products, product packages, transport loads, returnable containers and freight containers with linear bar code and two-dimensional symbol labels. It defines minimum requirements for performing the tests to meet requirements in application standards for these labels or tags. It specifies the test procedures and requirements for performing the tests and references appropriate standards and guidelines to assist in producing labels that will meet national and global standards.

**At the time of approval, the MH10/SC 8 committee consisted of the following members:**

This listing will be updated at time of issuance (update list)

A & N Associates Allan Gilligan

Allied AIDC Inc. Joe Lemieux

Automotive Industry Action Group Morris Brown

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CDO Technologies Richard Lafferty

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Introduction

This American National Standard was prepared by Subcommittee 8 of the MH10 (Unit-Loads and Transport-Packages) ANSI Accredited Standards Committee (ASC). This standard was established in response to a growing need for a single comprehensive label testing standard that could be referenced by multiple application standards.

This standard was developed using industry specifications as primary references.

Committee approval of this standard does not necessarily imply that all committee or subcommittee members voted for its approval. At the time of MH10.8.13 approval, MH10 committee membership consisted of the following organizations:

This data will be updated by MHIA at time of issue

AIM USA

American Trucking Associations

American Wood Packaging Association

APA – The Engineered Wood Association

Association of American Railroads

Assn. of Professional Material Handling Consultants

ASTM

Automotive Industry Action Group

Containerization & Intermodal Institute, Inc.

Fibre Box Association

Flexible Intermediate Bulk Container Assoc.

Glass Packaging Institute

GS1 US

IDEAlliance

Institute of Packaging Professionals

Integrated Business Communications Alliance

Intermec Technologies Corporation

International Cargo Handling Coordination Assoc.

International Foodservice Distributors Association

International Safe Transit Association

Material Handling Industry

Material Handling & Management Society

National Wooden Pallet & Container Association

Packaging Machinery Manufacturers Institute

Paper Shipping Sack Manufacturers Association

Plastic Drum Institute

Q.E.D. Systems

Rack Manufacturers Institute

Reusable Industrial Packaging Association

Steel Shipping Container Institute

The Soap & Detergent Association

United Fresh Fruit & Vegetable Association

United Parcel Service

US Air Force

US Dept. of Agriculture

US Department of Defense Logistics AIT Office

US Forest Products Laboratory

Virginia Tech - Center for Unit Load Design

# Scope

This American National Standard:

* Provides detailed test procedures for linear bar codes, two-dimensional symbols, and labels used to identify products, packages, and shipping containers;
* Is intended for applications which include, but are not limited to, support of systems that automate the control of items during the processes of:
  + production,
  + inventory,
  + distribution,
  + field service,
  + point of sale and
  + repair.
* Is intended to include, but it is not limited to, multiple industries including:
  + automotive,
  + aerospace,
  + chemical,
  + consumer items,
  + electronics,
  + health care,
  + marine,
  + rail, and
  + telecommunications.

In this document, the word "shall" indicates a requirement and the word "should" indicates a recommendation. This standard does not supersede or replace any applicable safety or regulatory marking or labeling requirements. This standard is intended to satisfy the minimum item marking requirements of numerous applications and industry groups. As such, its applicability is to a wide range of industries, each of which may have specific implementation guidelines for this standard. This standard is to be applied in addition to any other mandated labeling and/or direct marking requirements.

Before implementing this specification, suppliers and manufacturers should review and mutually agree on specific labeling and direct marking details with their trading partners. The labeling requirement of this standard and other standards may be combined into one label area or appear as separate labels.

In this document the terms “part marking” and “item marking” are used interchangeably.

This standard provides a means for items, parts, and components to be marked and read in either fixtured or handheld scanning environments at any manufacturer’s facility and then read by customers purchasing items for subsequent manufacturing operations or for final end use. Intended applications include, but are not limited to, supply chain applications, e.g., inventory, distribution, manufacturing, quality control, acquisition, transportation, supply, repair, and disposal.

The figures contained herein are illustrative and not necessarily to scale or to the quality requirements in this document.

# Normative References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 15415 Bar Code Symbol Print Quality Test Specification - Two Dimensional Symbols

ISO/IEC 15416 Bar Code Print Quality Test Specification - Linear symbols

ISO/IEC 19762 Information Technology Automatic Identification and Data Capture Techniques - Harmonized Vocabulary

ASTM D1000-93 Pressure-Sensitive Adhesive-Coated Tapes Used for Electrical and Electronic Applications

ASTM E29-93a Using Significant Digits in Test Data to Determine Conformance with Specifications

ASTM B 117 Standard Practice for Operating Salt Spray (Fog) Apparatus

ASTM D 518 Standard Test Method for Abrasion Resistance of Printed Matter by the GA-CAT Comprehensive Abrasion Tester

ASTM G 154 Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials

MIL-PRF-131 Barrier Materials, Watervaporproof, Greaseproof, Flexible, Heat-Sealable

MIL-PRF-61002B Pressure-Sensitive Adhesive Labels for Bar Coding

# Terms and Definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 19762 and ISO 21067 as well as the following apply. (),

## American National Standards Institute (ANSI)

A non-governmental organization responsible for the coordination of voluntary national (United States) standards. ANSI, 25 West 43rd Street, New York, NY 10036, Telephone: (212) 642-4900 Telefax: (212) 302-1286

## ANSI/MH 10

An ANSI accredited committee responsible for the development of American national standards on unit-load and transport-package sizes, package testing standard, definitions and terminology, standardization of unit-load height, sacks and multi-wall bag standards, and coding and labeling of unit-loads. ANSI MH10 serves as the U.S. Technical Advisory Group (TAG) to ISO TC 122.

## ANSI/MH 10/SC 8

An ANSI accredited committee responsible for the development of American national standards on the coding and labeling of transport packages and unit loads, product packaging, and Radio Frequency Identification (RFID) for returnable containers.

## Bar Code

For the purposes of this document, symbologies including linear bar codes and two dimensional symbols are collectively referred to as “bar codes.”

## Components

For the purposes of this document, parts (e.g., bare printed circuit board, integrated circuits, capacitor, diodes, switch, valve, spring, bearing, bracket, bolt) of a first level/modular assembly.

## First Level/Modular Assembly

For the purposes of this document, a manufactured item (e.g., populated printed circuit board, hydraulic pump, starter, dashboard assembly, door assembly) made up of components.

## Intrusive or Subtractive Marking

A method of forming markings by altering material of a surface. This includes, but is not limited to, markings by devices that abrade, burn, corrode, cut, deform, dissolve, etch, melt, oxidize or vaporize a material surface. Intrusive marking methods include laser etch, chemical etch, dot peen, and micro-sandblast.

## Item

A first level or higher assembly that is sold in a complete end-usable configuration.

## Label

For the purposes of this document, the term label refers to an adhesive backed media capable of being marked with information in machine-readable and/or human-readable form. Both labels and direct marking methods are referred to in this standard under the term “label”.

## Manufacturer

The producer or fabricator of an item; not necessarily the supplier in a transaction.

## Non-Intrusive or Additive Marking

A method of forming markings by adding material to a surface. Non-intrusive marking methods include ink jet, laser bonding, liquid metal jet, silk screen, stencil, and thin film deposition.

## Product

A first level or higher assembly that is sold in a complete end-usable configuration.

## Supplier

In a transaction, the party that produces, provides, or furnishes an item or service.

# Product Labeling Applications

## Product Labels for Usage in Controlled Environments

The following requirements and tests are intended to ensure that labels and marks can withstand exposure to a variety of controlled environments, which could include an assembly process; remain affixed to products; and are scannable for the intended life of the product.

NOTE-- Additional tests may be required for specific exports to specific countries.

This clause covers the manufacturing and printing requirements for adhesive backed labels intended primarily to automate product tracking, inventory control, and serialized warranty systems in controlled environments.

It is the responsibility of the trading partners to agree upon specifications of labels covered by this standard and to test the label in their operating environment prior to acceptance.

Where reference is made to an American Society for Testing and Materials (ASTM) designation in this standard, the issue listed in the latest published ASTM index to standards shall apply unless otherwise specified.

Observed or calculated values obtained from analysis, measurement, or test shall be rounded off in accordance with the Rounding Off Method per ASTM E 29 to the nearest unit in the last right-hand place of figures used in expressing the specified limit.

Generation of voltage levels significant enough to cause electrostatic discharge (ESD) and damage to sensitive components can occur when using labels. If meeting the requirements for ESD, protected areas outlined in JESD625-A are required, using static control measures such as static dissipative labels or air ionization may be necessary. For additional information on programs for the protection of electronic equipment, see ANSI/ESD S20.20, available from <http://www.esda.org/>.

### Tests for Labels Used in Controlled Environments

#### Label Preliminary Evaluation

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Examine labels to validate they are easily separable from the release liner without damage and are smudge-resistant. Examine the labels to ensure there is no evidence of adhesive migration, delamination, blistered areas, or chipped edges. The bar code symbol and all alphanumeric characters printed on each label shall show no evidence of degraded image quality. Bar codes shall be scannable and reasonably free from scratches, marks, voids, dots or misplaced color. All labels should have minimum outside corner radii of 0.03 inch (0.76 mm) unless otherwise specified.

Labels not meeting the preliminary evaluation criteria shall be designated as not meeting the minimum requirements for product labels.

#### Bar Code Print Quality

The labels shall meet the bar code print quality requirements defined in clause 5.2. ANS MH10.8.7 contains requirements for bar codes on products.

#### Label Thickness

Measure the thickness of the label in accordance with clause 5.1.

#### Nature of the Adhesive

Ensure the adhesive complies with clause 5.3.

#### Adhesion Strength

Determine the adhesion strength of the labels by selecting tests from the test procedures in clause 5.6 relevant to the expected conditions the label may be subjected to over its lifecycle. An item marked with intrusive markings may not require tests for adhesion strength.

See clauses 5.6.3 and 5.6.4 or consult the application standard for recommended or required minimum adhesive strength values.

Although the test requirements specify stainless steel test panels, these adhesion tests should also be conducted using the target substrate to ensure appropriate performance. For example, rough or textured surfaces may require increases in adhesive thickness.

#### Additional Testing

Table 6‑1 identifies suggested additional tests.

## Product Labels for Usage in Outdoor Applications

In addition to meeting all requirements of clause 4.1, the labels shall be subjected to the tests relevant to their expected lifecycle found in clauses 5.6, 5.7, and 5.8. Conformance to application requirements shall be determined by the user and referenced application standard(s). Table 6‑1 identifies suggested tests.

# Test Procedures

## Label Thickness

Conformance to the overall label thickness requirements shall use ASTM D 374, Method C as referenced and modified in ASTM D 1000. Measure the thickness of the label plus the release liner, the release liner alone, and obtain the label thickness by subtraction.

## Bar Code Verification

Using a verifier conforming to ISO/IEC 15426-1 (linear symbols) or ISO/IEC 15426-2 (two-dimensional symbols) determine conformance to symbol print quality application requirements. Symbol print quality shall be determined in accordance with ISO/IEC 15416 (linear symbols) or ISO/IEC 15415 (two-dimensional symbols). For symbols marked directly on substrates, the ISO/IEC 29158 Information technology – Automatic identification and data capture techniques – Direct Part Marked (DPM) Quality Guideline shall be used.

## Nature of Adhesive

The adhesive shall be free from bubbles, voids, and foreign matter. The adhesive shall be water insoluble and shall require no moisture, heat, or other preparation prior to, or after application to, clean, dry surfaces. Any other surface conditions or method of application shall be specified. There shall be no excessive bleeding of adhesive from the edges of the labels.

## Standard Test Conditions

Standard test conditions shall be a temperature of 73.5 degrees F, +/- 2 degrees F and a relative humidity at that temperature of 50 +/- 4 percent.

## Application Temperature

The application temperature is the temperature of the substrate to which the label is applied. The labels shall be applied at standard test conditions (see clause 5.4) but should be capable of being applied at temperatures between 40 degrees F and 110 degrees F per manufacturer specification. If the labels are to be applied at temperatures lower than 40 degrees F or higher than 110 degrees F, the procuring activity will specify the application, surface, and overall environmental temperatures as to meet the performance objectives of this specification.

## Adhesive Strength

The determination of the adhesive strength of test labels consists of the test label size, test panel material, panel preparation, and panel conditioning for the appropriate application. An item marked with intrusive markings may not require tests for adhesion strength.

### Test Label Size

A minimum label size of 10 mm (0.25 inch) by 25.4 mm (1.0 inch) shall be used for adhesion measurements. When possible, it is recommended to use the actual label size intended for the application if it is larger than the minimum size.

### Label Test Panel Preparation

Stainless steel test panelsTest panels made of other materials of interest may be cleaned using the method described for stainless steel test panels, but shall at a minimumpanel

Remove labels from the release liner and apply at least four labels to stainless steel test panels, as specified in ASTM D 3330 or other test panels of interest, and roll per ASTM D 1000 Section 42, taking care to leave approximately 3 mm (0.125 inch) of release liner on each label for clamping purposes. Prior to testing, the test labels shall be conditioned for a minimum of 24 hours in an atmosphere maintained at standard conditions (see clause 5.4).

Although the test requirements specify stainless steel test panels, these adhesion tests should also be conducted using the target substrate to ensure appropriate performance. For example, rough or textured surfaces may require increases in adhesive thickness.

### Initial Adhesion Strength

Prepare labels for adhesion testing as specified in clause 5.6.2. Condition the prepared test panels for 2 hours ±10 minutes at standard conditions as specified in clause 5.4. Measure the adhesion strength using a crosshead tensile tester making a 90 degree peel (see Figure 5.6.4‑1) at a rate of 50 mm (2 inches) per minute using a wire length of approximately 762 mm (30 inches). Calculate the average value of adhesion. The average value of adhesion should meet or exceed the value specified for the application or 0.23 Newton/mm. (25.0 oz/inch) if no value is specified. An item marked with intrusive markings may not require tests for adhesion strength.

### Adhesion Strength

Prepare labels for adhesion testing as specified in clause 5.6.2. Condition the prepared panels for a minimum of 24 hours at standard conditions as specified in clause 5.4. Measure the adhesion strength using a crosshead tensile tester making a 90 degree peel (see Figure 5.6.4‑1) at a rate of 50 mm (2 inches) per minute using a wire length of approximately 762 mm (30 inches). Calculate the average value of adhesion. The average value of adhesion strength should meet or exceed the value specified for the application or 0.44 Newton/mm (40.0 oz/inch) if no value is specified.



Figure 5.6.4‑1 - 90 Degree Peel Test Apparatus

### Elevated Temperature Adhesion Strength

Determine the maximum expected temperature the label will be exposed to. For reference, MIL-STD-810G PART ONE ANNEX C Table C-I indicates storage temperatures in a hot dry (type A1) environment can reach 160 degrees F. At the elevated temperature, perform the adhesion test specified in clause 5.6.3. At the end of the test, perform verification of the test labels as stated in clause 5.2 to determine any degradation of the bar code. Examine the label to determine compliance to clause 4.1.1.1.

### Low Temperature Adhesion Strength

Determine the minimum expected temperature the label will be exposed to. For reference, MIL-STD-810G PART ONE ANNEX C Table C-I indicates storage temperatures in a severe cold (type C3) environment can reach -60 degrees F. At the low temperature, perform the adhesion test specified in clause 5.6.3. At the end of the test, perform verification of the test labels as stated in clause 5.2 to determine any degradation of the bar code. Examine the label to determine compliance to clause 4.1.1.1.

### Adhesion Tests for Labels Exposed to Chemicals

Labels shall be affixed to test panels in accordance with clause 5.6.2 Determine the chemicals a label is expected to be exposed to during its lifecycle. MIL-STD-810G Method 504.1 may be useful in determining militarily relevant chemicals. Three labels affixed to test panels shall be immersed for 15 minutes +/- 1 minute in each of the chemicals. Labels shall only be used for testing one chemical unless cumulative effects of sequential chemical exposure are of interest. At the end of the soaking period, the labels shall be removed from the chemical. If the label may be exposed to such, wipe the label with a lint free cloth after removing it from the chemical. Rinse chemical residue from the label. Examine the label to determine compliance to clause 4.1.1.1. After the chemical exposure, perform verification of the test labels as stated in clause 5.2 to determine any degradation of the bar code. Determine the adhesion strength as stated in clause 5.6.3. If a test panel has not been specified, smooth plate glass panels may be used. Labels affixed to microscope slides placed in slide staining jars allow for immersion in a chemical where the jar can be capped.

## Additional Label Conditioning Tests for Labels Required to Withstand the Printed Circuit Board Process

The tests described in the subsections below represent a baseline to approximate the performance of labels in a variety of application processes. These tests are not intended to precisely duplicate the processes encountered in a manufacturing environment. To precisely predict the performance of the label it is recommended to test the process used in the intended manufacturing application. At the end of the test, perform verification of the test labels as stated in clause 5.2 to determine any degradation of the bar code. Examine the label to determine compliance to clause 4.1.1.1. Adhesion strength may also be measured as described in clause 5.6.3.

### Short Term 500 Degrees F –High Temp - for Bottom Side Labels for Printed Circuit Boards

This test applies only to labels applied to the bottom side of printed circuit boards intended to withstand wavesolder processes. Place six labeled, printed ASTM D1000 test panels in an oven maintained at 500 degrees F. After seven minutes, remove the printed test panels and allow them to cool to room temperature. At the end of the test, perform verification of the test labels as stated in clause 5.2 to determine any degradation of the bar code. Examine the label to determine compliance to clause 4.1.1.1. Adhesion strength may also be measured as described in clause 5.6.3.

### Initial Cleaning

Apply at least four labels to sample printed circuited boards. Subject the circuit board to an aqueous water cleaning process and then proceed to submit the labels to the IR Reflow test described in clause 5.7.3. The substitution of other cleaners for the aqueous water cleaner may adversely affect the adhesive and/or bar code print quality of the labels. At the end of the test, perform verification of the test labels as stated in clause 5.2 to determine any degradation of the bar code. Examine the label to determine compliance to clause 4.1.1.1. Adhesion strength may also be measured as described in clause 5.6.3.

### IR Reflow

Subject the labels to an IR reflow process test that meets the conditions in Table 5‑5‑1. The temperatures in the table are the actual board temperatures.

|  |  |  |
| --- | --- | --- |
| **Conditions** | **Temperature** | |
|  | **Equivalent Degrees F** |
| Preheat Temperature |  | 302 +/- 8 |
| Peak Temperature |  | 450 +/- 4.5 |
| Maximum  Temperature Rise |  | 4 degrees per second |
| Time Above  302 degrees F | 120 seconds +/- 5 seconds | |

Table 5‑5‑1 IR Reflow Conditions and Temperatures

### Post IR Reflow Cleaning

Within one hour of completing the IR Reflow test, subject the labels to an aqueous water cleaning process and proceed to subject the labels to the wavesolder test described in clause 5.7.5. The substitution of other cleaners for the aqueous water cleaner may adversely affect the adhesive and/or bar code print quality of the labels. At the end of the test, perform verification of the test labels as stated in clause 5.2 to determine any degradation of the bar code. Examine the label to determine compliance to clause 4.1.1.1. Adhesion strength may also be measured as described in clause 5.6.3.

### Wavesolder

Subject the labels to a wavesolder process at the conditions indicated in Table 5‑5‑2. Within one hour of the completion of the wavesolder test, subject the labels to post-wavesolder cleaning as described in clause 5.7.6. At the end of the test, perform verification of the test labels as stated in clause 5.2 to determine any degradation of the bar code. Examine the label to determine compliance to clause 4.1.1.1. Adhesion strength may also be measured as described in clause 5.6.3.

|  |  |  |
| --- | --- | --- |
| **Conditions** | **Temperature** | |
|  | **Equivalent Degrees F** |
| Preheat Temperature |  | 194 |
| Maximum Preheat Temperature Rise |  | 4 degrees per second |
| Solder Temperature |  | 500 |
| Conveyor Angle | 7 degree angle from the horizontal plane | |
| Process Time | 4 to 9 minutes | |

Table 5‑5‑2 Wavesolder Conditions

### Post-Wavesolder Cleaning

Subject the labels to an aqueous water cleaning process. The substitution of other cleaners for the aqueous water cleaner may adversely affect the adhesive and/or bar code print quality of the labels. At the end of the test, perform verification of the test labels as stated in clause 5.2 to determine any degradation of the bar code. Examine the label to determine compliance to clause 4.1.1.1. Adhesion strength may also be measured as described in clause 5.6.3.

## Method of Test for Labels Requiring Outdoor Exposure

### Chipping Test

Labels shall be affixed to test panels in accordance with clause 5.6.2. Labels shall be exposed to 500 millilitres of pea gravel (1/8 inch to 3/4 inch size) accelerated to approximately 35 miles per hour. At the end of the test, perform verification of the test labels as stated in clause 5.2 to determine any degradation of the bar code. Examine the label to determine compliance to clause 4.1.1.1. Adhesion strength may also be measured as described in clause 5.6.3. Pea gravel dropped from a height of 50 feet attains the required velocity and can be contained in a pipe or channel to minimize scatter at the bottom.

### Ultraviolet (UV) Light Condensation

Labels shall be affixed to test panels in accordance with clause 5.6.2. The labels shall be tested in an Ultraviolet (UV) Light Condensation cabinet as described in ASTM G154, or equivalent. Porous test panels, such as wood and fiberboard, shall be backed with MIL-PRF-131 barrier material. The test labels shall be positioned in the test chamber and tested in accordance with the procedure specified in ASTM G 53. The minimum exposure time used shall be that necessary to produce a substantial change in the material being evaluated. An exposure time that produces a significant change in one type of material cannot be assumed applicable to other types of materials. At the end of the test, perform verification of the test labels as stated in clause 5.2 to determine any degradation of the bar code. Examine the label to determine compliance to clause 4.1.1.1. Adhesion strength may also be measured as described in clause 5.6.3.

### Moisture/Rain Resistance

Test labels shall be prepared as specified in clause 5.6.2

#### Moisture

The test specimens shall be immersed for 30 minutes, +/- one minute in plain tap water. The water shall be maintained at a temperature of 120 degrees F, +/- 10 degrees F during the soaking period. At the end of the test, perform verification of the test labels as stated in clause 5.2 to determine any degradation of the bar code. Examine the label to determine compliance to clause 4.1.1.1. Adhesion strength may also be measured as described in clause 5.6.3.

#### Rain and Blowing Rain

Labels likely exposed to rain during their lifecycle should be tested according to MIL-STD810G Method 506.5 Procedure II. The test described in MIL-STD810G Method 506.5 Procedure II section 4.1.2 shall be performed for a minimum of 30 minutes. At the end of the test, perform verification of the test labels as stated in clause 5.2 to determine any degradation of the bar code. Examine the label to determine compliance to clause 4.1.1.1. Adhesion strength may also be measured as described in clause 5.6.3.

### Salt Fog

If corrosion of a bar code or label is of concern during the lifecycle of the label, test the label according to MIL-STD810G Method 509.5. Corrosion is generally not an issue for plastic or polymer based label materials. Perform at least one 24 hour salt fog exposure followed by 24 hours drying time. Rinse the sample free of salt residue. At the end of the test, perform verification of the test labels as stated in clause 5.2 to determine any degradation of the bar code. Examine the label to determine compliance to clause 4.1.1.1. Adhesion strength may also be measured as described in clause 5.6.3.



# Tests Required for an Application

|  |  |  |
| --- | --- | --- |
| Test | 4.1 Controlled  Environment | 4.2 Outdoor Application |
| 5.1 Label Thickness | X | X |
| 5.2 Bar Code and Two-dimensional Symbology Verification | X | X |
| 5.3 Nature of Adhesive | X | X |
| 5.5 Application Temperature | X | X |
| 5.6.3 Initial Adhesion Strength | X | X |
| 5.6.4 Adhesion Strength | X | X |
| 5.6.5 Elevated Temperature Adhesion Strength | X if applicable | X |
| 5.6.6 Low Temperature Adhesion Strength | X if applicable | X |
| 5.6.7 to 5.7 Adhesion and Circuit Board Tests | X if applicable | X if applicable |
| 5.8 Tests for labels used in outdoor applications |  | X if applicable |

Table 6‑1 Tests for Product Labels



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[4] ISO 1000, SI units and recommendations for the use of their multiples and of certain other units

[5] ISO 10241, *International terminology standards — Preparation and layout*

[6] ISO 128-30, *Technical drawings — General principles of presentation — Part 30: Basic conventions for views*

[7] ISO 128-34, *Technical drawings — General principles of presentation — Part 34: Views on mechanical engineering drawings*

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[10] ISO 31 (all parts), *Quantities and units*

[11] ISO 690, *Documentation — Bibliographic references — Content, form and structure*

[12] ISO 690‑2, *Information and documentation — Bibliographic references — Part 2: Electronic documents or parts thereof*.

[13] ISOPDTR 19782 (2006) *Information Technology- Automatic identification and data capture techniques - Effects of gloss and low substrate opacity on reading of bar code symbols*

A **Bibliography**, if present, shall appear after the last annex. The drafting rules set out in ISO 690[11] shall be followed.

The bibliography may include

— documents that are not publicly available,

— documents which are only cited in an informative manner, and

— documents which have merely served as bibliographic or background material in the preparation of the document.

For online referenced documents, information sufficient to identify and locate the source shall be provided. Preferably, the primary source of the referenced document should be cited, in order to ensure traceability. Furthermore, the reference should, as far as possible, remain valid for the expected life of the document. The reference shall include the method of access to the referenced document and the full network address, with the same punctuation and use of upper case and lower case letters as given in the source (see ISO 690-2[12]).