



SAFER ROADS SAVE LIVES

The American Traffic Safety Services Association (ATSSA)

# *Digitally Printed Traffic Sign Guide*

Language for adopting robust requirements for  
digitally printed traffic signs and sign faces



Revision 1.0  
September 30, 2019

Copyright © November 2019



## 1. DESCRIPTION

This guide covers the requirements for digitally printed finished retroreflective traffic control signs on flat sheet aluminum and digitally printed traffic sign faces intended to be applied to a sign substrate.

## 2. MATERIALS

### 2.1. Digitally Printed Ink Systems

- 2.1.1. Traffic signs must be produced using components, and processes that comply with the retroreflective sheeting manufacturer's recommendations.
- 2.1.2. Digital printed ink systems used to print traffic signs must meet and comply with daytime and nighttime chromaticity (color standards) as recognized in ASTM D4956 "Standard Specification for Retroreflective Sheeting for Traffic Control."
- 2.1.3. Digital printed ink systems must meet 70% of the initial retroreflectivity specifications of each respective reflective film color as found in ASTM D4956 "Standard Specification for Retroreflective Sheeting for Traffic Control."

### 2.2. Retroreflective Sheeting

- 2.2.1. Retroreflective sheeting shall consist of white or colored sheeting having a smooth outer surface and that essentially has the property of a retroreflector over its entire surface.
- 2.2.2. Retroreflective sheeting shall conform to all requirements of the current version of ASTM D4956 "Standard Specification for Retroreflective Sheeting for Traffic Control." The retroreflective sheeting shall be designated by ASTM D4956 classification type.

*Note: There are several ASTM sheeting types that may be specified. Type designation within ASTM D4956 is provided as a means of differentiating functionality. The type sequence is not always indicative of performance level. You must determine and specify the best type for your applications.*

- 2.2.3. The retroreflective sheeting shall have a Class 1 pressure-sensitive adhesive, as defined by ASTM D4956 "Standard Specification for Retroreflective Sheeting for Traffic Control," protected by an easily removable liner. Finished traffic signs and traffic sign faces shall be fabricated using retroreflective sheeting of the Type specified.

### 2.3. Protective Overlay Film

- 2.3.1. Permanent traffic signs printed with digital ink systems will be fabricated with a full sign protective overlay film designed to provide a smooth surface needed for retroreflectivity, and to protect the sign from fading and UV degradation. The overlamine shall comply with the retroreflective sheeting manufacturer's recommendations to ensure proper adhesion and transparency and will also meet the reflective film durability as identified in Table 1.



Table 1: Retroreflective Film Minimum Durability Requirements

ASTM D4956 Type	Full Sign Replacement Term (years)	Sheeting Replacement Term (years)
I	0	7
III	7	10
IV	7	10
VIII	7	10
IX	7	12
XI	7	12

2.3.2. Temporary signs printed with black ink only will not require a protective overlay film as long as the finished sign is warranted for a minimum outdoor durability of three years by the sheeting manufacturer.

**2.4. Aluminum**

2.4.1. Blanks shall conform to ASTM B-209. Alloy shall be 5052-H38 (virgin alloy), or recycled alloy. Size, shape, thickness and weight shall be in accordance with the current edition of the MUTCD Standard Highway Signs book, Section 7.

**2.5. Chemical Conversion Coating**

2.5.1. Aluminum sign blanks shall be conversion coated to comply with the requirements of ASTM B-921 or ASTM B-449. All procedures used in the conversion coating process must comply with the recommendations of the manufacturers of retroreflective sheeting materials to assure proper adhesion.

**2.6. Aluminum Fabrication**

- 2.6.1. Blanks shall be a continuous section of length, width and thickness, with required mounting holes as shown in the sign design drawings.
- 2.6.2. They shall conform to commercial tolerances of length, width, thickness, flatness, hole spacing, hole diameter, corners and corner radii in accordance with ANSI-H35-2 (tables 2.1, 3.1, 3.2, 3.3, 7.1 and 7.6 through 7.14).
- 2.6.3. Blanks shall be free of buckles, dents and burrs prior to the application of the chemical conversion treatment. All shearing shall be from the same side of the blanks.
- 2.6.4. After application of the retroreflective sheeting, sign blanks shall be stacked and packaged face to face, back to back, and protected in accordance with the sheeting manufacturer's recommendations.



## 3. FABRICATION

### 3.1. Sign Fabrication

- 3.1.1. Retroreflective sheeting shall be applied to a properly cleaned and prepared aluminum sign blank in accordance with the retroreflective sheeting manufacturer's recommendations.
- 3.1.2. Unless otherwise specified by the agency, sign legend shall be applied using digital print technologies and systems in accordance with the retroreflective sheeting manufacturer's recommendations and the requirements of this document.
- 3.1.3. Finished signs shall be free of ragged edges and must be supplied clean and free of scratches, grease, oil, lubricants or other contaminants. Minor blemishes (dirt speck, dust, etc.) may settle on the fresh ink surface or become entrapped between the sheeting surface and transparent overlay film due to static charge within the sign shop environment. Any blemish must be minor and not interfere with the communication of the sign message to the motorist. The blemish must not be visible to the naked eye when viewed from 30 feet or greater.
- 3.1.4. Finished signs shall be securely packaged to prevent damage during transit or storage according to the sheeting manufacturer's recommendations.

### 3.2. Pre-printed Faces

- 3.2.1. The sign legend shall be produced using digital print technologies and ink systems, products and processes that comply with the reflective sheeting manufacturer's recommendation.
- 3.2.2. After processing, sign faces shall be packaged, stored and shipped according to the sheeting manufacturer's recommendations.
- 3.2.3. The width and length of sign faces shall be oversized 1/32" to 9/16" to allow for trimming after application to the substrate.
- 3.2.4. All sign faces must be clean and free of scratches, grease, oil, lubricants or other contaminants. Minor blemishes (dirt speck, dust, etc.) may settle on the fresh ink surface or become entrapped between the sheeting surface and transparent overlay film due to static charge within the sign shop environment. Any blemish must be minor and not interfere with the communication of the sign message to the motorist. The blemish must not be visible to the naked eye when viewed from 30 feet or greater.
- 3.2.5. Preprinted sign faces shall be securely packaged to prevent damage during transit or storage according to the sheeting manufacturer's recommendations.

## 4. INSPECTION

During fabrication, the contractor shall provide sufficient testing and quality control throughout fabrication to insure good workmanship. Once the material has been received, it may be subject to random testing to ensure compliance with all requirements. If any test samples do not conform to the requirements, the entire order may be returned at the vendor's expense.



## 5. TRAFFIC SIGN PERFORMANCE WARRANTY PROVISIONS

Based on the ASTM Type of sheeting specified, traffic control signs shall be warranted for the duration shown in Table 1. Full product terms and conditions are as established by each sheeting manufacturer and may contain certain limitations based on sheeting and ink colors, and geographic exposure of the sign. Bidder shall supply a copy of the warranty document with complete details of terms and conditions upon request of the agency.

## 6. CERTIFIED DIGITAL SIGN FABRICATOR

Sign fabricators using digital imaging methods to produce regulated traffic signs must be certified by the reflective sheeting manufacturer whose materials are used to produce the delivered signs. Certified sign fabricators must undergo an audit process by the sheeting manufacturer to ensure they have the proper equipment, manufacturing capabilities, manufacturing application processes and the materials required to fulfill the sheeting manufacturer's warranty obligations. Sign fabricators must re-certify annually with reflective sheeting manufacturers or utilize a 3rd party certifier approved by the reflective sheeting manufacturer. Purchasing agency shall require proof of Sign Fabricator Certification with the execution of a purchase order (P.O.) or construction contract for signs.

## 7. DATE TAGGING SIGNS WITH PERTINENT INFORMATION

The agency purchasing a traffic sign (via P.O. or construction contract) shall require that all signs be date-tagged with the following 2 components:

### 7.1. Date Tags on back of sign

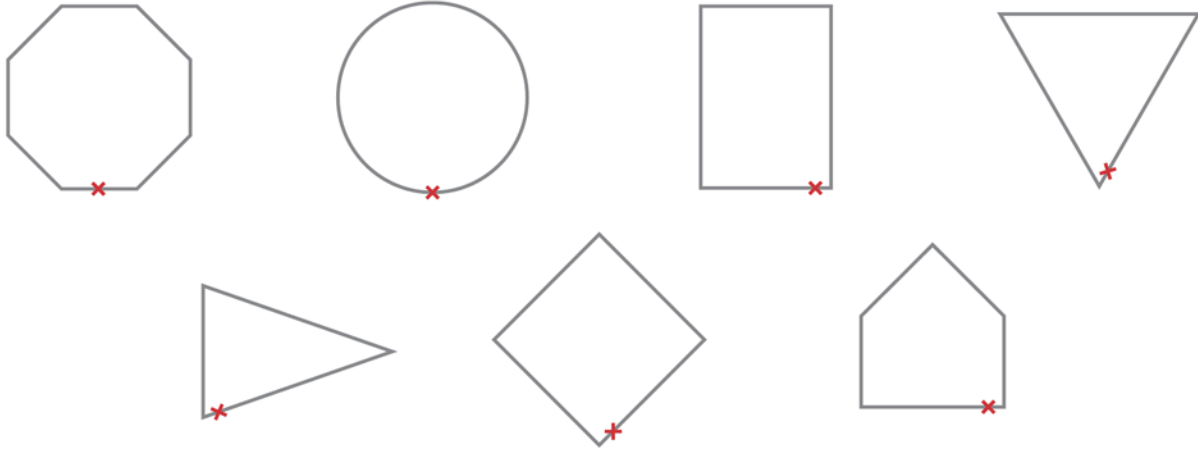
7.1.1. Tags shall have the following information and be fabricated with material and printing system that are as durable as the warranted sign.

- Name of Sign Fabricator
- Date the sign was fabricated (month and year)
- Process that was used for sign fabrication (screen printed, digital printed, cut vinyl)
- Supplier of sheeting that was used for fabricating the sign.

### 7.2. Border Date

7.2.1. The month and year (mm/yyyy) of sign fabrication shall be printed in the border of the sign in 3/8" sans serif font.

7.2.2. Border date shall be printed with the same warranted printed system as the sign face. The date should be printed in the locations indicated below unless otherwise specified.



## 8. ADDITIONAL AGENCY REQUIREMENTS

(Insert additional information below, if applicable.)