

Sign Sheeting Products and Regulations

Rumors, Myths, and the Straight Facts

What is Sign Sheeting?



FACT:

A variety of sheeting materials can be used on traffic signs in order to provide appropriate visibility. They are retroflective and show the same color day and night. Each sheeting material has its own set of performance characteristics.

FACT:

For each of the last 25 years, 50 percent or more of the fatal crashes have occurred at night despite the lower volumes of traffic at night.



This document is intended as a brief reference to dispel misinformation that has become commonplace. By its nature, it does not contain all the information that may be needed to make appropriate decisions. Further information can be found in the FHWA July 20, 2006, memorandum entitled "*Guidelines for Public Interest Findings and Certifications for Retroreflective Sign Sheeting*" and the "Retro 101" presentation. Both of these are available from your local FHWA Division Office Safety Engineer.

The brochure is sponsored by:

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www.fhwa.dot.gov/resourcecenter

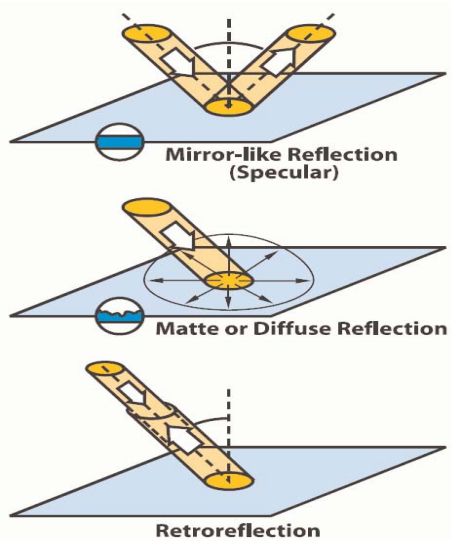
FHWA National Retroreflectivity Team

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FHWA Mid-Atlantic Safety Team

Reflection

The vast majority of roads are unlit. At night, drivers must rely heavily on what is revealed by their headlights. Retroreflective traffic control devices, such as pavement markings and signs, assist the driver by reflecting most of the light back toward the vehicle.



Sign sheeting should be retroreflective. The percentage of light returned is dependent not only on the sheeting material, but also the distance and angles between the headlamps, sign, and driver.

Rumor: A higher number ASTM Type means that type of sheeting is brighter than lower number ASTM types.

Answer: Myth

Some higher number Types are brighter than lower number Types. However, the type designation in ASTM D4956, Standard Specification for Retroreflective Sheeting for Traffic Control, is usually an indication of the order which it was added to the specification (e.g., Type III came along after Type II). However, there are exceptions; for instance, Types VII, VIII, and IX were introduced simultaneously.

Rumor: If a specification references an ASTM Type, that specification automatically provides for competition because any company would be able to manufacture it if they wished.

Answer: Myth

ASTM specifications by themselves do not ensure competition. If a company's new sheeting product meets a current ASTM D4956 Type, the company may market it as that particular ASTM Type, or they may try to convince ASTM to create a new Type that more narrowly defines their new product. In the past, newly added ASTM types were so narrowly defined that only one product could initially meet the criteria. Over time, other products were eventually developed to provide competition. As of publication, all sheeting types listed in ASTM D4956 (except Type VII) have multiple products that provide competition. See the FHWA Sheeting ID Guide at www.fhwa.dot.gov/retro.

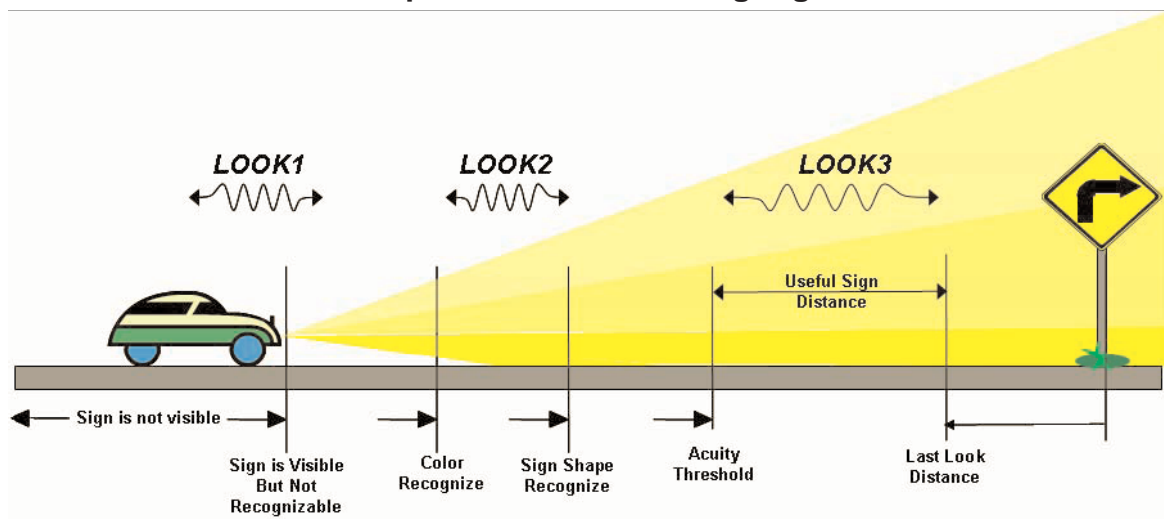
It should be noted that a contract specification may further limit competition by requiring that a product also be on their approved product list or that the product have a certain number of years of testing under NTPEP (National Transportation Product Evaluation Program).

Rumor: The latest ASTM sheeting type specification is Type XI.

Answer: Myth

As of publication, the latest type designation added to ASTM D4956 was Type X. In 2006, a proposal was balloted to add a Type XI, but the proposal failed the ASTM balloting process.

Conceptual Model for Seeing Signs



Lengths and distances of looks 1, 2, & 3 will vary based on sheeting type, sign placement, and other factors such as letter size.

LOOK 1 => recognition of a target possibly related to the driving task (position of vehicle as shown)

LOOK 2 => driver assesses the target to determine if it is related to the driving task

LOOK 3 => the driver actually acquires the information on the sign

Between looks at the sign, the driver will look to the roadway for lane keeping and other obviously important driving tasks



Sign visibility is a general expression encompassing two specific terms: **detection** and **legibility**. For signs to be visible, they first need to be “detected.” Once they are detected, then they need to be “legible.”



Retroreflectometers are used to measure sign retroreflectivity.

Rumor: The voting members of ASTM are primarily government officials, and therefore, specifications are developed without industry influence.

Answer: Myth

Fifty percent of voting members of ASTM Committee D04.38 on Highway Traffic Control Materials are currently commercial interests (manufacturers, sign shops, contractors, etc.). The other fifty percent is composed of government officials, researchers, independent contractors and others. New specifications are developed by a subcommittee and brought to the full committee for approval by consensus.

Rumor: A brand name may be used in a specification on a Federal-aid project.

Answer: Fact

Using brand names on Federal-aid projects is acceptable and a simple way of stating what product is specified, as long as the proper procedures have been followed. Sometimes this is necessary, such as when a specific product is needed for synchronization with existing facilities or when an agency is willing to perform research that can be used to improve the state of the practice, or when only proprietary products meet specification requirements (e.g. a few years ago, only proprietary guardrail end treatments met NCHRP Report 350 requirements). These and other reasons are allowed for within the federal regulations. See the *FHWA Construction Program Guide* page regarding *Patented and Proprietary Products* at www.fhwa.dot.gov/construction/cqit/propriet.cfm.

Rumor: On a Federal-aid project, use of a specification that only one manufacturer currently meets still provides for competition as long as the specification is written such that other manufacturers have the opportunity to manufacture a product that would fall within that criteria.

Answer: Myth

If the product of only one manufacturer meets the specification, it is considered a proprietary specification and therefore compliance with 23CFR 635.411 must be assured. See the *FHWA Construction Program Guide* page regarding *Patented and Proprietary Products* at www.fhwa.dot.gov/construction/cqit/propriet.cfm.



Visual inspections made during daylight hours (as shown on the left) cannot accurately determine the nighttime performance (as shown on the right) of signs.





This photo illustrates differences in retroreflectivity between sheeting types.

FACT:

The driving population is aging and visual performance may decrease as a person ages. Drivers with decreased visual performance are less able to see the road, traffic control devices, and other traffic at night.

WHERE CAN I GET MORE INFORMATION?

www.fhwa.dot.gov/retro

Rumor: For projects without Federal-aid funding, use of a specification that only one manufacturer meets is acceptable.

Answer: Perhaps

As long as all State laws and those of appropriate agencies associated with the funding source are met, this is acceptable.

Rumor: If one FHWA Division approves a public interest finding (PIF) for a proprietary sheeting material, other Divisions should follow their lead.

Answer: Myth

An FHWA Division may approve a PIF for a variety of reasons, which may or may not exist in other States. For instance, research may indicate a high percentage of older drivers or some other unique driver or environmental characteristics in a particular State. As a result, there may be good reasons for consistent responses in some cases, and there may be very valid reasons for different responses in other cases. In some rare cases, FHWA may make a determination on a PIF at the agency level rather than delegate that responsibility to the Division.

Rumor: When two identical signs are viewed side by side at night, and one sign appears brighter than the other, drivers will be able to read the brighter sign from a farther distance.

Answer: Sometimes

Generally, brighter signs provide longer legibility distances, but the gains in legibility distance decrease as brightness increases. When side-by-side comparisons of signs are made during the nighttime, the differences in sign brightness can be clearly seen but the observed difference is not a good indication of sign performance or legibility, especially if the signs are fairly bright.

Rumor: Brighter is better for sign sheeting.

Answer: Usually

It is generally true that brighter signs are more conspicuous and legible (up to a certain point). However, in terms of conspicuity and legibility, incremental increases in brightness become less and less beneficial as the relative sign brightness increases.

Rumor: The minimum sign retroreflectivity Final Rule prohibits the use of *Engineer Grade* sheeting for STOP signs.

Answer: Myth

Engineer Grade (or Type I) may be used for all signs except:

- the white legend on guide signs,
- the white legend on street name signs, and
- all warning (yellow and orange) signs.

Even though a particular type of sheeting may initially meet the minimum retroreflectivity levels when new, it might quickly degrade to below the minimum retroreflectivity levels. The use of higher performance sheeting, even though it has a higher initial cost, might provide a better life-cycle cost for the agency.