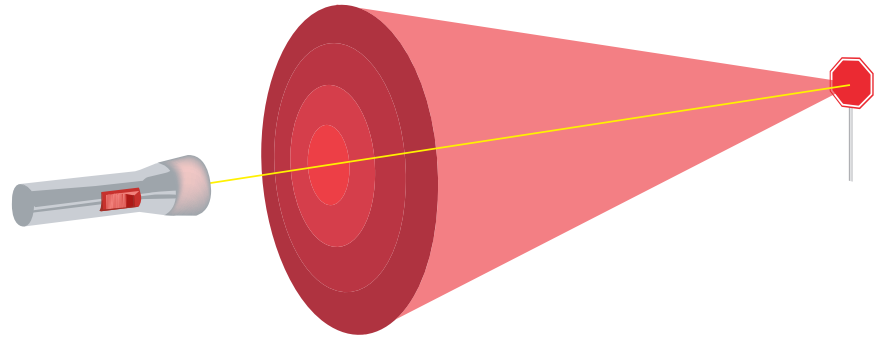


Benefits of Full Cube Sheeting



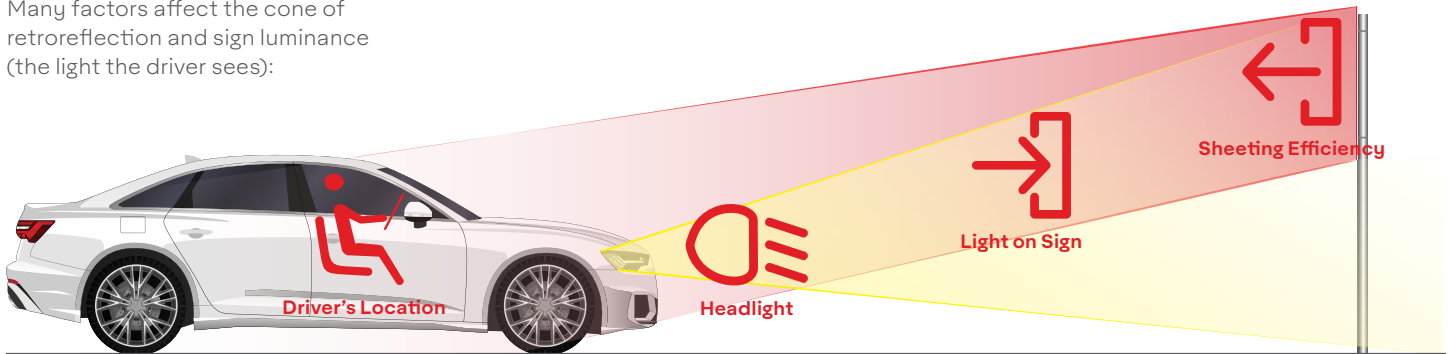
In traffic sign applications, retroreflective sheeting is used to return a cone of light, known as the “cone of retroreflection”, back towards a vehicle’s headlights.



Cone of Retroreflection

Note how the light from the flashlight is returned, with the light source at the centre of the cone.

Many factors affect the cone of retroreflection and sign luminance (the light the driver sees):



Headlight

Because headlights have a finite amount of energy, car manufacturers focus as much of the light down on the road to illuminate greater distances, and to reduce glare for oncoming traffic.

With less light reaching the sign, retroreflective sheeting needs to be as efficient as possible at returning any light it receives.

Light on Sign

In addition to the headlight, the amount of light that falls on a sign is impacted by sign position in relation to the headlight.

Shoulder clearance, overhead gantry designs, number of lanes, and road geometry are a few examples that engineers need to consider.

Sheeting Efficiency

The sheeting efficiency dictates how much of the light that actually reaches the sign is effectively returned.

Sheeting efficiency is predominantly dependant on the technology used to retroreflect light:

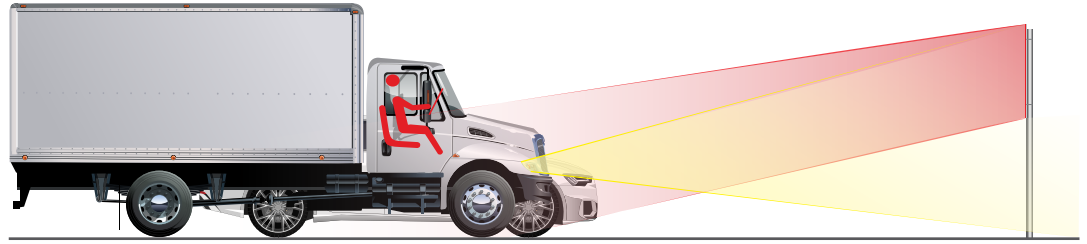
Sheeting Technology	Approx. Efficiency
Glass beads	40%
Truncated prisms	67%
Full cube prisms	100%

Driver's Location

The final factor is the driver's location in relation to the cone of retroreflection.

Similar to the headlight, since the amount of light coming back from the sign is finite, the cone of retroreflection needs to maintain a relatively narrow shape to return light to distances that give drivers time to read and react.

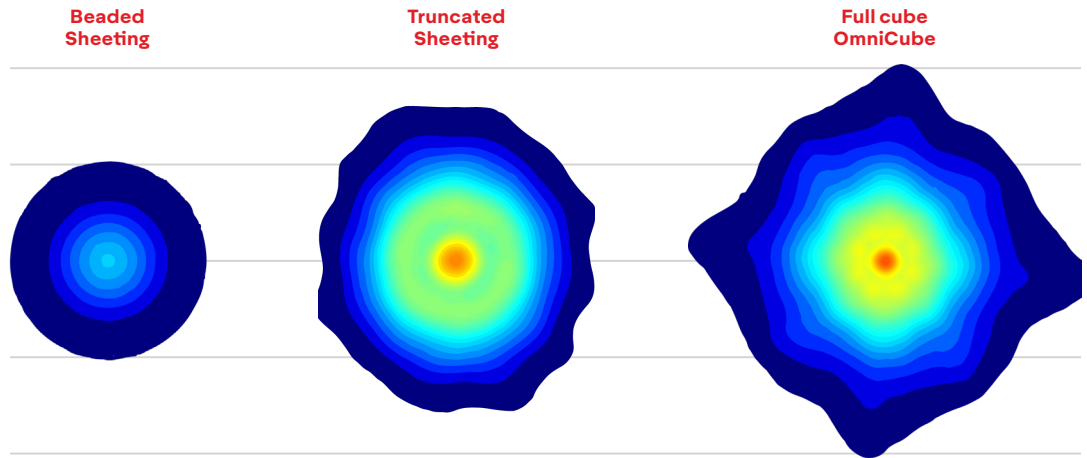
The challenge is that drivers of larger vehicles, such as trucks, buses, and SUVs, requires larger cones of retroreflection because they sit further up from the headlight (larger observation angle). But, a larger cone of retroreflection requires a greater volume of light to maintain the same brightness.



Larger Vehicles

A larger cone of retroreflection is needed to serve the needs of larger vehicles.

Avery Dennison OmniCube™ sheeting uses full cube prisms to retroreflect a larger cone of light, allowing more light to reach larger observation angles.



Head-on view of cone of retroreflection

Full cube sheeting provides a larger cone of retroreflection without sacrificing brightness.

A larger cone of retroreflection means OmniCube is capable of providing drivers of larger vehicles with 10 cd/m² of luminance at about 150m to 180m (500ft to 600ft). “This level [of brightness] will accommodate the majority of drivers at the appropriate distance.”¹ Additionally, full cube sheeting is much more capable of achieving the desirable luminance levels of 30 cd/m² for other vehicles.



¹Paulus, Susan Christine: “A Retroreflective Sheeting Selection Technique for Nighttime Drivers’ Needs:” Master’s Thesis: University of Wisconsin at Milwaukee: May 2010

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