

TABLE 1 OF SUBPART B—MINIMUM COEFFICIENT OF RETROREFLECTION ( $R_A$ ) (IN CANDELA/LUX/METER<sup>2</sup>) REQUIREMENT FOR RETROREFLECTIVE SHEETING (MINIMUM PHOTOMETRIC PERFORMANCE REQUIREMENTS)

Entrance angle	Observation angle			
	0.2 Degree		0.5 Degree	
	Yellow or fluorescent yellow	White	Yellow or fluorescent yellow	White
-4° .....	400	600	100	160
30° .....	220	350	45	75

(d) *Certification.* The characters “FRA-224”, constituting the manufacturer’s certification that the retroreflective sheeting conforms to the requirements of paragraphs (a) through (c) of this section, shall appear at least once on the exposed surface of each piece of sheeting in the final application. The characters shall be a minimum of three millimeters high, and shall be permanently stamped, etched, molded, or printed within the product and each certification shall be spaced no more than four inches apart.

(e) *Alternative standards.* Upon petition by a freight rolling stock owner or railroad under §224.15, the Associate Administrator may approve an alternative technology as providing equivalent safety. Any such petition shall provide data and analysis sufficient to establish that the technology will result in conspicuity and durability at least equal to sheeting described in paragraphs (a) through (c) applied in accordance with this part and will present a recognizable visual target that is suitably consistent with freight rolling stock equipped with retroreflective sheeting meeting the

technical requirements of this part to provide the intended warning to motorists.

**§ 224.105 Sheeting dimensions and quantity.**

Retroreflective sheeting shall be applied along the length of each railroad freight car and locomotive side as described in §224.106. Unless otherwise specified, retroreflective sheeting applied under this part shall be applied in strips 4 inches wide and 18 or 36 inches long, as practicable. The amount of retroreflective sheeting to be applied to each car or locomotive subject to this part is dependent on the length of the car or locomotive and the color of the sheeting. For purposes of this part, the length of a railroad freight car or locomotive is measured from endsill to endsill, exclusive of the coupler and draft gear. Each side of a railroad freight car subject to this part, including each unit of multi-unit cars, and each side of a locomotive subject to this part must be equipped with at least the minimum amount of retroreflective sheeting specified in Table 2 of this subpart.

TABLE 2 OF SUBPART B—MINIMUM QUANTITY REQUIREMENT FOR RETROREFLECTIVE SHEETING ON FREIGHT ROLLING STOCK

Freight car or locomotive length	Minimum area of retroreflective sheeting required (per car/locomotive side)—yellow sheeting (ft <sup>2</sup> )	Minimum area of retroreflective sheeting required (per car/locomotive side)—white sheeting (ft <sup>2</sup> )
Less than 50 ft.	3.5	4.0
Over 50 ft. to 60 ft.	4.0	5.0
Over 60 ft. to 70 ft.	4.5	5.5
Over 70 ft. to 80 ft.	5.0	6.0
Over 80 ft. to 90 ft.	5.5	7.0
Over 90 ft. to 100 ft. <sup>1</sup> .....	6.0	7.5

<sup>1</sup>Freight cars or locomotives over 100 ft. in length must be equipped with an additional one-half a square foot of sheeting on each side for every additional 10 feet of length.