

Test Result

**American National Standard for High-Visibility Safety Apparel**  
ANSI/ISEA 107-2020

**Section 6 Design**  
(ANSI/ISEA 107-2020 Section 6)

**Sample A**  
**Size: S**  
**Clause 6.2.1 General**

Table 1. Minimum Areas of Visible Materials

Garment Type	Performance Class	Background Material	Retroreflective or Combined-Performance Materials	Minimum Width Reflective Material
<b>Type O</b> Off-road and Non-Roadway Use	Class 1	0.14 m <sup>2</sup> (217 in <sup>2</sup> )	0.10 m <sup>2</sup> (155 in <sup>2</sup> )	25 mm (1 in.)
<b>Type R</b> Roadway and Temporary Traffic Control Zones	Class 2*	0.50 m <sup>2</sup> (775 in <sup>2</sup> )	0.13 m <sup>2</sup> (201 in <sup>2</sup> )	25 mm (1 in.) ## 35 mm (1.38 in.)
	Class 3**	0.80 m <sup>2</sup> (1240 in <sup>2</sup> )	0.20 m <sup>2</sup> (310 in <sup>2</sup> )	25 mm (1 in.)## 50 mm (2 in.)
*For the smallest size offered in Type R, Performance Class 2, a minimum of 0.35 m <sup>2</sup> (540 in <sup>2</sup> ) of background material may be used to accommodate small-sized workers. All subsequent larger sizes must use 0.50 m <sup>2</sup> (775 in <sup>2</sup> ). **For the smallest size offered in Type R, Performance Class 3, a minimum of 0.65 m <sup>2</sup> (1000 in <sup>2</sup> ) of background material may be used to accommodate small-sized workers. All subsequent larger sizes must use 0.80 m <sup>2</sup> (1240 in <sup>2</sup> ).				
<b>Type P</b> Emergency and Incident Responders and Law Enforcement Personnel	Class 2	0.29 m <sup>2</sup> (450 in <sup>2</sup> )	0.13 m <sup>2</sup> (201 in <sup>2</sup> )	25 mm (1 in.) ## 50 mm (2 in.)
	Class 3	0.50 m <sup>2</sup> (775 in <sup>2</sup> )	0.20 m <sup>2</sup> (310 in <sup>2</sup> )	25 mm (1 in.) ## 50 mm (2 in.)
<b>Supplemental Items#</b> Pants, Overalls, Shorts, Rain Pants and Gaiters	Class E	0.30 m <sup>2</sup> (465 in <sup>2</sup> )	0.07 m <sup>2</sup> (109 in <sup>2</sup> )	25 mm (1 in.) ## 50 mm (2 in.)
# When a Supplemental Class E item is worn with Performance Class 2 or 3, the overall classification for the ensemble shall be Performance Class 3. ## For use with split-trim designs (See Section 6.3.1.2) <b>NOTE:</b> Combined-performance materials can be counted toward the minimum area requirements for background material specified in Table 1.				
<b>Result</b>	Background Material	Retroreflective or Combined- Performance Materials	Minimum Width Reflective Material	
	0.87m <sup>2</sup>	0.23m <sup>2</sup>	50mm	
Recommended classification	Type R Class 3			



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Clause	Requirements	Results	Pass/Fail
<b>6.2.3</b>	<b>Type R HVSA</b>		
	Type R Class 3		
6.2.3.2	Type R Class 3 HVSA shall utilize one or more horizontal bands of retroreflective or combined- performance material around the torso, and shall include one or more encircling bands on the sleeves.	Yes	Pass
<b>6.3</b>	<b>Construction Requirements</b>		
6.3.1	Retroreflective and Combined-Performance Materials		
	<b>Minimum Widths</b>		
6.3.1.1	The width of the retroreflective or combined-performance materials incorporated into the HVSA shall not be less than the dimensions specified in Table 1.	50mm	Pass
	<b>Split-trim designs</b>		
6.3.1.2	Retroreflective or combined-performance material may be utilized in a split-trim design. The split-trim design shall consist of two stripes of retroreflective or combined-performance material with minimum width of 25 mm (1 in.) that are positioned as a parallel pair on compliant fluorescent background material of the same or contrasting color, or on a non-compliant material of any color. The two paired stripes of retroreflective or combined-performance material shall not be separated by more than 50 mm (2 in.).	NA	/
	<b>Spacing between Multiple Bands</b>		
6.3.1.3	Whenever multiple bands are placed on the HVSA, the minimum distance between bands of retroreflective or combined-performance material shall be at least equal to the width of the band.	Yes	Pass
6.3.2	Placement of Retroreflective and Combined-Performance Materials		
	<b>Distance from Bottom Edge of HVSA</b>		
6.3.2.1	Horizontal retroreflective or combined-performance materials shall be placed at least 50 mm (2 in.) above the bottom of the hem of the torso, long sleeve and long pant HVSA styles.	190mm	Pass
	<b>Encircling Arms and Legs</b>		
6.3.2.2	Horizontal retroreflective or combined-performance materials placed on arms or legs shall encircle them in such a manner to provide 360° visibility of the wearer at all viewing angles in a horizontal plane.	Yes	Pass
	<b>Long Sleeves</b>		
6.3.2.3	If upper bands of retroreflective or combined-performance materials are placed on long sleeves, the bands shall be placed between the elbow and the shoulder. Lower bands can be placed between the elbow and wrist but shall be at least 50 mm (2 in.) above the bottom of the sleeve.	190mm	Pass
	<b>Gaps</b>		
6.3.3	Gaps in retroreflective, combined-performance, and background materials shall not be more than 50 mm (2 in.) horizontally to enable fastening or for seam allowance.	17mm	Pass
	<b>360° Visibility</b>		
6.3.4	Retroreflective or combined-performance and background materials for all garment types and performance classes and headwear shall be positioned on items in such a way as to provide 360° visibility of the wearer at all viewing angles in a horizontal plane.	Yes	Pass
	A contiguous band of background or combined-performance material shall fully encircle the wearer. Retroreflective or combined-performance material that intersects this band shall be permitted. This band may be	Yes 19mm	Pass



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	divided by other materials but the gap with the band shall not exceed 50mm (2 in.).		
6.3.4.3	<b>Performance Class 3</b> The band shall fully encircle the torso and each arm and shall be a minimum of 50mm (2 in.) wide.	Yes 50mm	Pass
6.3.5	<b>Material Use and Balance of Design</b>  Garments shall be balanced in design so that not less than 40% of the minimum required amount of retroreflective or combined-performance and background materials specified in Table 1 is present on both the front and the back when laid flat.  Additional retroreflective or combined- performance and background materials may be incorporated into garments as determined by the user.	Background Material Front 42 % Back 67 %  Retroreflective or Combined-Performance Materials Front 58 % Back 58 %	Pass
6.3.6	<b>Shoulder Area</b> HVSA without retroreflective or combined-performance material that encircles the arm shall have a minimum of 150 cm <sup>2</sup> (23.3 in <sup>2</sup> ) of retroreflective material or combined-performance material in the shoulder area to provide 180° visibility of the wearer. See Figure 1. The shoulder area is most easily identified when the HVSA is folded flat with the front of the garment fully exposed and measuring 15 cm (5.9 in.) down from the shoulder high point, front and back.	NA	/

<b>7</b>	<b>Criteria for Optional Features and Testing</b>		
7.1	<b>Pockets</b> Pockets of matching or contrasting compliant high-visibility materials shall not create gaps in retroreflective or combined-performance material of more than 50 mm (1.97 in.) horizontally.	0mm	Pass
7.2	<b>Identification Panels, Lettering and Logos (Type R and P)</b>		
	Identification panels, lettering and logos shall not create gaps in retroreflective or combined-performance material of more than 50 mm (2 in.) horizontally.	NA	/
	Identification panels, lettering and logos of contrasting non-compliant material shall not exceed a total of 465 cm <sup>2</sup> (72 in <sup>2</sup> ) on the front and/or rear of the HVSA and such total amount may contribute to the minimum amount of visible background material specified in Table 1.	NA	/
	Identification panels, lettering and logos of contrasting non-compliant material shall cover no more than 142 cm <sup>2</sup> (22 in <sup>2</sup> ) of the minimum amount of visible retroreflective or combined-performance material specified in Table 1.	NA	/



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**Sample B**  
**Size: M**  
**Clause 6.2.1 General**

Table 1. Minimum Areas of Visible Materials

Garment Type	Performance Class	Background Material	Retroreflective or Combined-Performance Materials	Minimum Width Reflective Material
<b>Type O</b> Off-road and Non-Roadway Use	Class 1	0.14 m <sup>2</sup> (217 in <sup>2</sup> )	0.10 m <sup>2</sup> (155 in <sup>2</sup> )	25 mm (1 in.)
<b>Type R</b> Roadway and Temporary Traffic Control Zones	Class 2*	0.50 m <sup>2</sup> (775 in <sup>2</sup> )	0.13 m <sup>2</sup> (201 in <sup>2</sup> )	25 mm (1 in.) ## 35 mm (1.38 in.)
	Class 3**	0.80 m <sup>2</sup> (1240 in <sup>2</sup> )	0.20 m <sup>2</sup> (310 in <sup>2</sup> )	25 mm (1 in.)## 50 mm (2 in.)
*For the smallest size offered in Type R, Performance Class 2, a minimum of 0.35 m <sup>2</sup> (540 in <sup>2</sup> ) of background material may be used to accommodate small-sized workers. All subsequent larger sizes must use 0.50 m <sup>2</sup> (775 in <sup>2</sup> ). **For the smallest size offered in Type R, Performance Class 3, a minimum of 0.65 m <sup>2</sup> (1000 in <sup>2</sup> ) of background material may be used to accommodate small-sized workers. All subsequent larger sizes must use 0.80 m <sup>2</sup> (1240 in <sup>2</sup> ).				
<b>Type P</b> Emergency and Incident Responders and Law Enforcement Personnel	Class 2	0.29 m <sup>2</sup> (450 in <sup>2</sup> )	0.13 m <sup>2</sup> (201 in <sup>2</sup> )	25 mm (1 in.) ## 50 mm (2 in.)
	Class 3	0.50 m <sup>2</sup> (775 in <sup>2</sup> )	0.20 m <sup>2</sup> (310 in <sup>2</sup> )	25 mm (1 in.) ## 50 mm (2 in.)
<b>Supplemental Items#</b> Pants, Overalls, Shorts, Rain Pants and Gaiters	Class E	0.30 m <sup>2</sup> (465 in <sup>2</sup> )	0.07 m <sup>2</sup> (109 in <sup>2</sup> )	25 mm (1 in.) ## 50 mm (2 in.)
# When a Supplemental Class E item is worn with Performance Class 2 or 3, the overall classification for the ensemble shall be Performance Class 3. ## For use with split-trim designs (See Section 6.3.1.2) <b>NOTE:</b> Combined-performance materials can be counted toward the minimum area requirements for background material specified in Table 1.				
<b>Result</b>	Background Material		Retroreflective or Combined- Performance Materials	Minimum Width Reflective Material
	0.88m <sup>2</sup>		0.23m <sup>2</sup>	50mm
Recommended classification	Type R Class 3			

Clause	Requirements	Results	Pass/Fail
<b>6.2.3</b>	<b>Type R HVSA</b>		
6.2.3.2	Type R Class 3	Yes	Pass
	Type R Class 3 HVSA shall utilize one or more horizontal bands of retroreflective or combined- performance material around the torso, and shall include one or more encircling bands on the sleeves.		
<b>6.3</b>	<b>Construction Requirements</b>		



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6.3.1	<b>Retroreflective and Combined-Performance Materials</b>		
	<b>Minimum Widths</b>		
6.3.1.1	The width of the retroreflective or combined-performance materials incorporated into the HVSA shall not be less than the dimensions specified in Table 1.	50mm	Pass
	<b>Split-trim designs</b>		
6.3.1.2	Retroreflective or combined-performance material may be utilized in a split-trim design. The split-trim design shall consist of two stripes of retroreflective or combined-performance material with minimum width of 25 mm (1 in.) that are positioned as a parallel pair on compliant fluorescent background material of the same or contrasting color, or on a non-compliant material of any color. The two paired stripes of retroreflective or combined-performance material shall not be separated by more than 50 mm (2 in.).	NA	/
	<b>Spacing between Multiple Bands</b>		
6.3.1.3	Whenever multiple bands are placed on the HVSA, the minimum distance between bands of retroreflective or combined-performance material shall be at least equal to the width of the band.	Yes	Pass
6.3.2	<b>Placement of Retroreflective and Combined-Performance Materials</b>		
	<b>Distance from Bottom Edge of HVSA</b>		
6.3.2.1	Horizontal retroreflective or combined-performance materials shall be placed at least 50 mm (2 in.) above the bottom of the hem of the torso, long sleeve and long pant HVSA styles.	192mm	Pass
	<b>Encircling Arms and Legs</b>		
6.3.2.2	Horizontal retroreflective or combined-performance materials placed on arms or legs shall encircle them in such a manner to provide 360° visibility of the wearer at all viewing angles in a horizontal plane.	Yes	Pass
	<b>Long Sleeves</b>		
6.3.2.3	If upper bands of retroreflective or combined-performance materials are placed on long sleeves, the bands shall be placed between the elbow and the shoulder. Lower bands can be placed between the elbow and wrist but shall be at least 50 mm (2 in.) above the bottom of the sleeve.	192mm	Pass
	<b>Gaps</b>		
6.3.3	Gaps in retroreflective, combined-performance, and background materials shall not be more than 50 mm (2 in.) horizontally to enable fastening or for seam allowance.	17mm	Pass
	<b>360° Visibility</b>		
	Retroreflective or combined-performance and background materials for all garment types and performance classes and headwear shall be positioned on items in such a way as to provide 360° visibility of the wearer at all viewing angles in a horizontal plane.	Yes	Pass
6.3.4	A contiguous band of background or combined-performance material shall fully encircle the wearer. Retroreflective or combined-performance material that intersects this band shall be permitted. This band may be divided by other materials but the gap with the band shall not exceed 50mm (2 in.).	Yes 19mm	Pass
	<b>Performance Class 3</b>		
6.3.4.3	The band shall fully encircle the torso and each arm and shall be a minimum of 50mm (2 in.) wide.	Yes 50mm	Pass
	<b>Material Use and Balance of Design</b>		
6.3.5	Garments shall be balanced in design so that not less than 40% of the minimum required amount of retroreflective or combined-performance and	Background Material Front 43 %	Pass



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	background materials specified in Table 1 is present on both the front and the back when laid flat.  Additional retroreflective or combined- performance and background materials may be incorporated into garments as determined by the user.	Back 68 %  Retroreflective or Combined- Performance Materials Front 58 % Back 58 %	
6.3.6	<b>Shoulder Area</b> HVSA without retroreflective or combined-performance material that encircles the arm shall have a minimum of 150 cm <sup>2</sup> (23.3 in <sup>2</sup> ) of retroreflective material or combined-performance material in the shoulder area to provide 180° visibility of the wearer. See Figure 1. The shoulder area is most easily identified when the HVSA is folded flat with the front of the garment fully exposed and measuring 15 cm (5.9 in.) down from the shoulder high point, front and back.	NA	/

<b>7</b>	<b>Criteria for Optional Features and Testing</b>		
	<b>Pockets</b>		
7.1	Pockets of matching or contrasting compliant high-visibility materials shall not create gaps in retroreflective or combined-performance material of more than 50 mm (1.97 in.) horizontally.	0mm	Pass
	<b>Identification Panels, Lettering and Logos (Type R and P)</b>		
	Identification panels, lettering and logos shall not create gaps in retroreflective or combined-performance material of more than 50 mm (2 in.) horizontally.	NA	/
7.2	Identification panels, lettering and logos of contrasting non-compliant material shall not exceed a total of 465 cm <sup>2</sup> (72 in <sup>2</sup> ) on the front and/or rear of the HVSA and such total amount may contribute to the minimum amount of visible background material specified in Table 1.	NA	/
	Identification panels, lettering and logos of contrasting non-compliant material shall cover no more than 142 cm <sup>2</sup> (22 in <sup>2</sup> ) of the minimum amount of visible retroreflective or combined-performance material specified in Table 1.	NA	/



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