



PM/ IS 15809/ 2/ Mar 2019

**PRODUCT MANUAL FOR  
High Visibility Warning Clothes  
According to IS 15809:2017**

This Product Manual shall be used as reference material by all Regional/Branch Offices & licensees to ensure coherence of practice and transparency in operation of certification under Scheme-I of Bureau of Indian Standards (Conformity Assessment) Regulations, 2018 for various products. The document may also be used by prospective applicants desirous of obtaining BIS certification licence/certificate.

1.	<b>Product</b>	:	<b>IS 15809:2017</b>
	<b>Title</b>	:	<b>High Visibility Warning Clothes</b>
	<b>No. of amendments</b>	:	<b>Nil</b>
2.	<b>Sampling Guidelines</b>		
a)	<b>Raw material</b>	:	Retroreflective Material, Combined-Performance Material and background material, Shall conform to Cl 5.1.1, Cl. 5.1.2, Cl 5.3, Cl 5.4 and Cl 5.5. (No separate testing on raw material is required since all the tests can be carried out on the cloth received or after stitching)
b)	<b>Grouping Guidelines</b>	:	Please refer <u>Annex - A</u>
c)	<b>Sample Size</b>	:	<b>One piece (Extra 0.5 m material may be required for testing)</b>
3.	<b>List of Test Equipment</b>	:	Please refer <u>Annex – B</u>
4.	<b>Scheme of Inspection and Testing</b>	:	Please refer <u>Annex – C</u>
5.	<b>Possible tests in a day</b>	:	Please refer <u>Annex – D</u>
6.	<b>Scope of the Licence :</b>		
	Licence is granted to use Standard Mark as per IS 15809:2017 with the following scope:		
	<b>Name of the product</b>	<b>High Visibility Warning Clothes</b>	
	<b>Type</b>	<b>Type 1 / Type 2</b>	
	<b>Class</b>	<b>Class 1 / Class 2 / Class 3</b>	

## **Annex – A** **Grouping Guidelines**

Classification : High Visibility Warning Clothes are of two types: Type 1 and Type 2. Each type is classified into Class 1, Class 2 and Class 3.

The most severe class of each type shall be tested to cover the particular type. For example, if Class 3 is tested, Class 1 and Class 2 of the same type can be covered without testing. Similarly, if Class 2 is tested, Class 1 of the same type can be covered without testing.

The design configuration of the cloth can be coveralls, jackets and vests. Any one design may be drawn for testing. Design may not be mentioned in the scope. The background material may be of different type like knitted/woven, coated/uncoated, suitable/not suitable for washing/dry cleaning etc based on which some of the tests may not be applicable. However, these are not mentioned in the classification and hence not considered for grouping or in the scope.

**Annex - B**  
**List of Test Equipment**

**Major test equipment required to test as per requirements of Indian Standard.**

SNo	Test equipment/chemicals	Test used in	Clause reference/test method
1.	Conditioning chamber	Conditioning	C-1.4
2.	Soft cloth, Methylated spirit, kerosene, unleaded gasoline, methanol and naphtha solvent	Material	5.1.2
3.	Measuring tape/Scale, protractor	Dimensions	5.2
4.	Chromaticity test equipment with Spectrometer, Illuminator, dispersive element and detector, Standards - White and Black	Chromaticity	5.3.1.1
5.	Chromaticity test equipment with Spectrometer, Illuminator, dispersive element and detector, Standards - White and Black	Luminance factor	5.3.1.2
6.	Rubbing finger as per 4.1.2 of IS 766, grating of stainless steel wire, grey scale for evaluation of staining, rubbing cotton cloth	Colour fastness to crocking	5.3.2.1
7.	Test device as per IS/ISO 105-E04, Oven, L-histidine monohydrochloride monohydrate, sodium chloride, disodium hydrogen orthophosphate dihydrate, sodium hydroxide, multifibre adjacent fabric complying with ISO 105-F10 or Two single-fibre adjacent fabrics, complying with the relevant document selected from ISO 105-F01 to F07, Grey scale for assessing change in colour	colour fastness to perspiration	5.3.2.2
8.	Laundry device as per IS/ISO 105 C06, stainless steel balls, Adjacent fabrics, AATCC/ECE/IEC Reference detergent, Sodium Hypochlorite, Grade 3 water, Grey scale for assessing change in color and staining	colour fastness- i. when laundered	5.3.2.3
9.	Laundry device, Glass/SS Container, SS Discs, Undyed cotton twill cloth, grey scales, Glass tubes 25mm dia, Perchlorethylene or any other solvent for dry cleaning	ii. dry cleaning	
10.	Container, Grey scale, Sodium Hypochlorite, Hydrogen Peroxide, Soap solution,	iii. Hypochlorite bleaching	
11.	Heating Device as per 4.1 of IS 689/	iv. Hot Pressing	

	Household Iron (in case household iron is used Note 2 under 4.1 of IS 689 to be complied), Smooth Insulating sheet 3-6mm, Wool Flannel, Undyed, bleached and unmercerized cotton cloth, Cotton adjacent fabric, Grey scales		
12.	Test device as per IS/ISO 105-E01, Oven, Adjacent fabric, Grey scales for assessing change in colour (ISO 105 A01) and staining (ISO 105 A03), Analytical balance, Spectrophotometer / Colorimeter, Grade 3 water	v. Water	
13.	Xenon arc lamp, Light Filter, Opaque cardboard, Grey scale, Heat filter, Black panel thermometer, Standard Patterns (5.1,5.2 of IS 2454)	Colour fastness after Xenon Test	5.3.2.4, 5.3.3
14.	Retro reflectometer.	Coefficient of Retro reflection	5.4.1
15.	Martindale abrasion tester, woolen fabric abradant, felt and foam as per IS12673-1	Exposure to : i. Abrasion	5.4.2
16.	Flexing apparatus as per IS 7016-4	ii. Flexing	
17.	Oven, Cooling chamber -30 degree C	iii. Temperature variation	
18.	Type A Washing machine, Ballast, Detergents, Facility to line dry/drip dry/Flat dry/Hot press/Tumble dry, as per IS 15370,	iv. Washing	
19.	washing machine, tetra chloro ethene, sorbiton mono oleate, iron, steam press, mannequin/cabinet	v. Dry cleaning	
20.	Apparatus for wet retroreflection test as per Fig 5, Retro reflectometer	vi. Rainfall	
21.	Constant rate of extension Tensile testing machine, equipment for cutting and fraying specimen, equipment in which test specimens can be immersed in water preparatory to wet testing, grade 3 water, non-ionic wetting agent	Tensile testing	5.5.1
22.	Pendulum testing machine	Tear Resistance	5.5.2
23.	Bursting tester as per IS hydraulic/ pneumatic	Bursting strength	5.5.3

***The above list is indicative only and may not be treated as exhaustive.***

**Annex - C**

**SCHEME OF INSPECTION AND TESTING  
FOR High Visibility Warning Clothes  
According to IS 15809:2017**

**1. LABORATORY** - A laboratory shall be maintained which shall be suitably equipped (as per the requirement given in column 2 of Table 1) and staffed, where different tests given in the specification shall be carried out in accordance with the methods given in the specification.

1.1 The manufacturer shall prepare a calibration plan for the test equipments.

**2. TEST RECORDS** – The manufacturer shall maintain test records for the tests carried out to establish conformity.

**3. PACKING AND MARKING** – The Standard Mark as given in Schedule of the license and Licence Number (i.e. CM/L.....) shall be incorporated, and the packing and marking shall be done as per the provisions of the Indian Standard, provided always that the product thus marked conforms to all the requirements of the specification. In addition, details of BIS website shall be marked as follows: “For details of BIS certification please visit [www.bis.gov.in](http://www.bis.gov.in)”

3.1 In addition, Batch Number indentifying the control unit shall be marked on each product.

**3.2 INSTRUCTIONS FOR USE:** Instructions for use as specified in Clause 7 of IS 15809 shall be supplied together with the garment.

**4. CONTROL UNIT** – All clothes of one type (type 1 or type 2), one class (Class 1 or Class 2 or Class 3) and one design manufactured in a day shall be taken as one control unit.

**5. LEVELS OF CONTROL** - The tests as indicated in column 1 of Table 1 and the levels of control in column 3 of Table 1, shall be carried out on the whole production of the factory which is covered by this plan and appropriate records maintained in accordance with paragraph 2 above.

5.1 All the production which conforms to the Indian Standards and covered by the licence should be marked with Standard Mark.

**6. REJECTIONS** – Disposal of non-conforming product shall be done in such a way so as to ensure that there is no violation of provisions of BIS Act, 2016. Any rejected material which is potentially resalable shall be deformed in such a manner that it cannot be used for any other purpose. A separate record shall be maintained giving information relating to all such rejections/defective/substandard material of the production not conforming to the requirements of the Specification and the method of its disposal. Such material shall in no case be stored together with that conforming to the Specification. The Standard Mark (if already applied) on rejected material should be defaced

**TABLE 1**

(1) Test Details				(2) Test equipment requirement R: required (or) S: Sub-contracting permitted	(3) Levels of Control		
Cl.	Requirement	Test Methods		No. of Sample	Frequency	Remarks	
		Clause	Reference				
5.1.	Material	5.1.1,	IS 15809	S*	1	Each Consignment	*See note 3 and note 4 below
		5.1.2	IS 15809	R	1	Each Consignment	See note 3
5.2	Dimensions	5.2	IS 15809	R	1	Each Control Unit	
5.3.1.1	Chromaticity	C-2	IS 15809	S	1	one garment/cloth for each consignment of raw material	
5.3.1.2	Luminance factor	C-2	IS 15809	S	1	-do-	
5.3.2.1	colour fastness to crocking		IS 766	R	1	-do-	
5.3.2.2	colour fastness to perspiration		IS/ISO 105 E04	R	1	-do-	
5.3.2.3	colour fastness- i. laundry		IS/ISO 105 C06	R	1	-do-	
	ii. dry cleaning		IS 4802	R	1	-do-	
	iii. Hypochlorite bleaching		IS 762	R	1	-do-	
	iv. Hot Pressing		IS 689	R	1	-do-	
	v. Water		IS/ISO 105 E01	R	1	-do-	
5.3.2.4, 5.3.3	Colour fastness after Xenon Test		IS 2454	S	1	-do--	
5.4.1	Coefficient of Retroreflection	C-3	IS 15809	S	1	-do-	* See Note 4
5.4.2	Performance after exposure	C-4.1	IS 15809	S*	1	-do-	*See Note 4

	to :						
	i. Abrasion						
	ii. Flexing	C-4.2	IS 15809	S*	1	-do-	*See Note 4
	iii. Temperature variation	C-4.3		S*	1	-do-	*See Note 4
	iv. Washing	C-4.4		S*	1	-do-	* See Note 4
	v. Dry cleaning	C-4.5		S*	1	-do-	*See Note 4
	vi. Rainfall	C-4.6		S	1	-do-	
5.5.1	Tensile testing		IS 1969-1	R	1	each consignment of raw material	
5.5.2	Tear Resistance		IS 6489-1	S	1	each consignment of raw material	
5.5.3	Bursting strength		IS 1966-1/IS 1966-2	S	1	each consignment of raw material	

Note-1: Sub-contracting is permitted to a laboratory recognized by the Bureau or Government laboratories empanelled by the Bureau.

Note-2: Levels of control given in column 3 are only recommendatory in nature. The manufacturer may define the control unit/batch/lot and submit his own levels of control in column 3 with proper justification for approval by B.O. Head.

Note-3: One consignment of raw material is defined as all material of one defined type and quality, delivered to the manufacturer by one supplier according to one dispatch note.

Note-4: Manufacturer may subcontract the testing of coefficient of retroreflection through retroreflectometer, prior to and after test exposures as per Cl 5.4.1 and 5.4.2. However, the facilities for subjecting samples to the test exposures to abrasion, flexing, temperature variation, washing and dry cleaning (except influence of rainfall) given in Table 6, shall be available with the manufacturer in-house.

**Annex D**  
**Possible tests in a day**

Sr. NO.	Test	Reference	Clause
1	Material	IS 15809:2017	5.1.2
2	Garment design/Dimension	IS 15809:2017	5.2.1.7
3	Colour-Chromaticity	IS 15809:2017	5.3.1.1
4	Colour-Luminance factor	IS 15809:2017	5.3.1.2
	Colour Fastness to:		
5	Crocking (rubbing)	IS 766	5.3.2.1
6	Perspiration	IS/ISO 105 E04	5.3.2.2
7	Laundry	IS/ISO 105 C06	5.3.2.3
8	Hypochlorite bleaching	IS 762	5.3.2.3
9	Hot Pressing	IS 689	5.3.2.3
10	water	IS/ISO 105E01	5.3.2.3
11	Coefficient of Retroreflection	IS 15809:2017	5.4.1
12	Performance after exposure to : i. Abrasion	IS 12673(PART1): 2014	5.4.2
13	ii. Flexing	IS 15809:2017	5.4.2
14	iii. Rainfall	IS 15809:2017	C-4.6

**Note-1:** This is an indicative list of the possible tests that can be carried out in a single day during the inspection.

**Note-2:** The above is considering availability of pre-conditioned samples for the tests where conditioning is applicable.