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उत्पाद मैन्युअल
उच्च दृश्यता के चेतावनी वस्त्र - विशिष्टता
IS 15809: 2017 के अनुसार

PRODUCT MANUAL
FOR High Visibility Warning Clothes — Specification
ACCORDING TO IS 15809: 2017

विभिन्न उत्पादों के लिए भारतीय मानक ब्यूरो (अनुरूपता मूल्यांकन) विनियम, 2018 की योजना -I के तहत प्रमाणन के संचालन में एकरूपता और पारदर्शिता के लिए इस उत्पाद मैनुअल का उपयोग सभी क्षेत्रीय / शाखा कार्यालयों और लाइसेंसधारियों द्वारा संदर्भ सामग्री के रूप में किया जाएगा। दस्तावेज़ का उपयोग बीआईएस प्रमाणन प्राप्त करने के इच्छुक संभावित आवेदकों द्वारा भी किया जा सकता है।

This Product Manual shall be used as reference material by all Regional/Branch Offices & licensees to ensure uniformity 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.

1.	मानक संख्या **IS No.**	:	**IS 15809:2017**
	शीर्षक **Title**	:	**High Visibility Warning Clothes — Specification**
	संशोधनों की संख्या **No. of amendments**	:	02
2.	नमूना दिशानिर्देश **Sampling Guidelines**		
a)	कच्चा माल **Raw material**	:	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) *Compliance to the above may be established through supplier test certificate/test report from BIS recognized lab/empanelled lab or any other lab having accreditation as per IS/ISO/IEC17025 or in-house testing/combination thereof.* Note: This section indicates the requirements for raw material(if specified in the IS)for which compliance is to be

			established during Grant of Licence/Change in Scope of Licence/Factory Surveillance.
b)	**समूहीकरण दिशानिर्देश** **Grouping Guidelines**	:	*Please refer to Annex-A*
c)	**नमूने का परिमाण** **Sample Quantity**	:	**One piece (Extra 0.5 m material may be required for testing)** Note: This section indicates the quantity of the sample of the product and/or the raw material (if applicable), required to be sent to the laboratory for testing, for the purpose of Grant of Licence/Change in Scope of Licence/ Factory Surveillance (in case of market surveillance, effort may be made to procure the required quantity of product sample, as far as possible since raw material sample may not be available in market)
3.	**परीक्षण उपकरणों की सूची** **List of Test Equipment**	:	Please refer to Annex-B
4.	**निरीक्षण और परीक्षण की स्कीम** **Scheme of Inspection and Testing**	:	Please refer to Annex-C
5.	**एक दिन में संभावित परीक्षण** **Possible tests in a day**		
	Following tests are possible to be carried out in a day, provided that conditioned samples are available, where required: i. Material (5.1.2) ii. Garment Design (5.2.1) iii. Colour-Chromaticity (5.3.1.1) iv. Colour-Luminance factor (5.3.1.2) v. Colour fastness to crocking (5.3.2.1) vi. Colour fastness to perspiration (5.3.2.2) vii. Colour fastness — When laundered, hypochlorite bleached and hot pressed (5.3.2.3) viii. Coefficient of Retroreflection (5.4.1) ix. Performance after test exposure to: (5.4.2) a) Abrasion b) Flexing c) Influence of rainfall x. Tensile Test (5.5.1) xi. Tear Resistance (5.5.2) xii. Bursting Strength (5.5.3) Note: This section is for the guidance of BIS Certification Officers/Technical Auditors of BIS Authorized Outside Surveillance Agencies(OSAs) during factory inspection to provide ready reference regarding the tests which can be witnessed during the inspection in the factory by the officer/auditor.		
6.	**लाइसेंस का दायरा/Scope of the Licence:**		
	"Licence is granted to use Standard Mark as per IS 15809:2017 with the following scope:		
	Name of the product		**High Visibility Warning Clothes**
	Type		Type 1/Type 2
	Class		Class 1/Class 2/Class 3
	Design configuration		Coveralls/Jackets/Vests
	Background Material		1) Knitted/woven fabric

		a) Coated/Uncoated b) Laminated/Non-laminated
	Optional requirement	Suitable/not suitable for dry cleaning

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ANNEX-A

GROUPING GUIDELINES

1. **High visibility warning clothes are of two types depending on the colour for background and combined performance materials:**
   a) Type 1 – Fluorescent yellow – Green, and
   b) Type 2 – Fluorescent orange – Red

2. **Each type of high visibility warning clothing are classified based on the level of conspicuity as follows:**
   a) Class 1 — For use in occupational activities that permit full and undivided attention to approaching traffic;
   b) Class 2 — For use in occupational activities where users require greater visibility for inclement weather conditions, activities on or near roadways with higher traffic levels; and
   c) Class 3 — For use in high-risk occupations when workers are exposed to high-speed traffic, or a wide range of weather conditions.
3. **The design configuration of the cloth that has been covered under this Indian Standard are:**
   a) coveralls
   b) jackets
   c) vests
4. **Following background materials have been mentioned in this Indian Standard:**
   a) Knitted/woven fabric:
      i. Coated/Uncoated
      ii. Laminated/Non-laminated

5. **Based on the above, following grouping guidelines for GOL/Change in scope of licence have been developed:**

   i. Highest class from each type shall be tested to cover that particular class and all the lower classes of that type in the scope of licence (Class 3 being the highest Class and Class 1 being the lowest).

   ii. Any one of the design configurations may be drawn for testing to cover all the designs in the scope of licence.

   iii. Each category of background material (knitted/woven: coated/uncoated, laminated/non-laminated) shall be tested to cover that particular material in the scope of licence.

   iv. If High Visibility Warning Clothes is suitable for dry cleaning, the product shall be tested for the same separately.

   v. Scope of licence shall be restricted based on the manufacturing and testing facilities available.

   vi. During operation of licence, samples of each variety covered in the scope of licence, shall be tested in rotation, to the extent possible.

ANNEX–B

LIST OF TEST EQUIPMENTS

(INDICATIVE LIST, FOR GUIDANCE ONLY)

Sl. No.	Tests used in With Clause Reference	Test equipment/chemicals
1.	Conditioning, clause C-1.4	Conditioning chamber
2.	Material, clause 5.1.2	Soft cloth, Methylated spirit, kerosene, unleaded gasoline, methanol and naphtha solvent
3.	Dimensions, clause 5.2	Measuring tape/Scale, protractor
4.	Chromaticity, clause 5.3.1.1	Chromaticity test equipment with Spectrometer, Illuminator, dispersive element and detector, Standards - White and Black
5.	Luminance factor, clause 5.3.1.2	Chromaticity test equipment with Spectrometer, Illuminator, dispersive element and detector, Standards - White and Black
6.	Colour fastness to crocking, clause 5.3.2.1	Rubbing finger as per 4.1.2 of IS 766, grating of stainless steel wire, grey scale for evaluation of staining, rubbing cotton cloth
7.	colour fastness to perspiration, clause 5.3.2.2	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
8.	colour fastness- i. when laundered, clause 5.3.2.3	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
9.	ii. dry cleaning, clause	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
10	iii. Hypochlorite bleaching, clause	Container, Grey scale, Sodium Hypochlorite, Hydrogen Peroxide, Soap solution,
11	iv. Hot Pressing, clause	Heating Device as per 4.1 of IS 689/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	v. Water, clause	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

13	Colour fastness after Xenon Test, clause 5.3.2.4, 5.3.3	Xenon arc lamp, Light Filter, Opaque cardboard, Grey scale, Heat filter, Black panel thermometer, Standard Patterns (5.1,5.2 of IS 2454)
14	Coefficient of Retro reflection, clause 5.4.1	Retro reflectometer.
15	Exposure to : i. Abrasion, clause 5.4.2	Martindale abrasion tester, woolen fabric abradant, felt and foam as per IS12673-1
16	ii. Flexing, clause	Flexing apparatus as per IS 7016-4
17	iii. Temperature variation, clause	Oven, Cooling chamber -30 degree C
18	iv. Washing, clause	Type A Washing machine, Ballast, Detergents, Facility to line dry/drip dry/Flat dry/Hot press/Tumble dry, as per IS 15370,
19	v. Dry cleaning, clause	washing machine, tetra chloro ethene, sorbiton mono oleate, iron, steam press, mannequin/cabinet
20	vi. Rainfall, clause	Apparatus for wet retroreflection test as per Fig 5, Retro reflectometer
21	Tensile testing, clause 5.5.1	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
22	Tear Resistance, clause 5.5.2	Pendulum testing machine
23	Bursting strength, clause 5.5.3	Bursting tester as per IS 1966 (Part 1)/IS 1966 (Part 2) by hydraulic method/pneumatic method

ANNEX C

SCHEME OF INSPECTION AND TESTING

1. QUALITY ASSURANCE PLAN

1.1 It is expected that manufacturers (licensees/applicants) will implement a Quality Assurance Plan i.e. a plan of regular testing and in-process controls, designed to ensure that the product bearing the Standard Mark conforms to all requirements of the Indian Standard.

1.2 The manufacturers shall define a Quality Assurance Plan defining the control unit (i.e. lot/batch etc.) and the levels of control (i.e. the frequency and number of samples for conducting the different tests as per the Indian Standard) and submit the same to BIS Branch Office for information. The manufacturer shall comply with the same and maintain test records in accordance with para 2.4.

1.3 **RECOMMENDED LEVELS OF CONTROL/CONTROL UNIT**:

1.3.1 For the guidance of manufacturers, the recommended definition of control unit is: All clothes of same type (type 1 or type 2), same class (Class 1 or Class 2 or Class 3) and same design manufactured from same raw material under similar condition of manufacturing in a day.

1.3.2 For the guidance of manufacturers in preparing the Quality Assurance Plan, recommended levels of control are given in **Table 1**.

1.3.3 The manufacturer shall ensure inspection and testing as per the Quality Assurance Plan submitted by them on the whole production of the factory which is covered by this plan. Alternatively, the manufacturer has the option of adherence to the quality plan as per levels of control recommended in column 3 of Table 1.

1.4 However, all manufacturers shall ensure compliance of their products to all the requirements of the Indian Standard.

2. ENSURING COMPLIANCE THROUGH TESTING- It is expected that manufacturers (licensees/applicants) will establish a suitably equipped and staffed in house laboratory (In house testing facility) for testing at least those parameters of the Indian Standard which require routine testing for ensuring quality of the product. This includes in-process controls as may be defined and put in place by the manufacturer and testing parameters/requirements which can only be performed in the factory.

2.1 For the guidance of manufacturers, Table 1 giving the recommended levels of control is given below. Column 2 of Table 1 indicates routine tests where test equipment is required in house as “R” or other tests which can be subcontracted as “S”. Subcontracting is permitted to BIS recognized/empanelled laboratory or any other laboratory having valid NABL accreditation as per IS/ISO/IEC 17025.

2.2 For MSME manufacturers, the requirement of maintaining a laboratory/in-house testing facility for routine tests (indicated as “R” in Column 2 of Table 1) is also optional.

2.2.1 MSME manufacturers may utilize common cluster based facilities as per guidelines for the utilization of cluster based test facilities by MSMEs or the provisions of Sharing of testing facilities or get testing done from BIS recognized/empaneled laboratory or any other laboratory having valid NABL accreditation as per IS/ISO/IEC 17025.

2.3 **Large Scale manufacturers shall maintain an in-house laboratory equipped at least with test facilities for routine tests (indicated as "R" in Column 2 of Table 1)**, where different tests given in the specification shall be carried out in accordance with the method given in the specification**.** They shall also implement a calibration plan for the in-house test equipment.

2.3.1 Alternatively, in lieu of an in-house laboratory, large scale manufacturers can also utilize the provisions of Sharing of testing facilities as per the Guidelines for Grant of Licence available on BIS website www.bis.gov.in. (Under Conformity Assessment>Product Certification Process). Even for subcontracted tests, provisions for sharing of testing facilities can be utilized.

2.4 **TEST RECORDS**- The manufacturers maintaining an in-house laboratory or utilizing common cluster based facilities or shared test facilities shall maintain test records for the tests carried out to establish conformity. For the tests being subcontracted to BIS recognized/empanelled laboratory or any other laboratory having valid NABL accreditation as per IS/ISO/IEC 17025, test reports issued by the laboratories shall be available for inspection by BIS.

3. PACKING AND MARKING - The Standard Mark as given in the Schedule of the licence shall be incorporated legibly and indelibly on each piece of warning cloth, provided always that the material so marked conforms to each requirement of the specification.

3.1 Packing and Marking shall be done as per the Indian Standard.

3.2 **Additional Marking requirements**: The material shall also be marked with the following additional requirement on each piece of warning cloth:

a) "For BIS certification details please visit www.bis.gov.in"

4. REJECTION - All the production which conforms to the Indian Standard and covered under the scope of this licence shall be marked with the Standard Mark. 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.

TABLE 1
(ONLY FOR GUIDANCE PURPOSE)

(1)				(2)	(3)		
Test Details				**Test equipment requirement** R: required (or) S: Sub-contracting permitted	**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	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.
		5.1.2	IS 15809	R	1	Each Consignment	
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-	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.
5.4.2	Performance after exposure to: i. Abrasion	C-4.1	IS 15809	S*	1	–do-	
	ii. Flexing	C-4.2	IS 15809	S*	1	-do-	
	iii. Temperature variation	C-4.3		S*	1	-do-	
	iv. Washing	C-4.4		S*	1	-do-	
	v. Dry cleaning	C-4.5		S*	1	-do-	
	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	