



उत्पाद मैनुअल
Textiles — Bullet Resistant Jackets — Performance Requirements
IS 17051:2018 के अनुसार

PRODUCT MANUAL
FOR Textiles — Bullet Resistant Jackets — Performance Requirements
ACCORDING TO IS 17051:2018

विभिन्न उत्पादों के लिए भारतीय मानक ब्यूरो (अनुरूपता मूल्यांकन) विनियम, 2018 की योजना- I के तहत प्रमाणन के संचालन में अभ्यास और पारदर्शिता के संचालन में पारदर्शिता सुनिश्चित करने 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 लाइसेंस/प्रमाणपत्र 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 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.	उत्पाद Product	:	IS 17051:2018
	शीर्षक Title	:	Textiles — Bullet Resistant Jackets — Performance Requirements
	संशोधनों की संख्या No. of amendments	:	03
2.	नमूना दिशानिर्देश Sampling Guidelines		
a)	कच्चा माल Raw material	:	Non ballistic materials shall meet the following requirements i. Outer carrier fabric shall meet the requirements of Cl. 5.1.1/Table 2 of IS 17051 ii. Hook and Loop fasteners shall meet the requirements of Cl. 5.1.2/Table 3 of IS 17051 iii. Water resistant covers of SAP and HAPs shall meet the water resistance requirement as per SI No (v) of Table 2 of IS 17051 Conformity of materials to the requirements shall be established through Test certificate of supplier or Test

		report of NABL accredited lab or Test report of third party lab or in house testing
b)	समूहोंकरण दिशानेदेश Grouping Guidelines	: Please refer Annex-A
c)	नमूने का आकार Sample Size	: 12 nos of jacket for performance and operating conditions requirements 3 m fabric and 5 m of hook and loop fastener Sample of one HAP Plate of each size
3.	परीक्षण उपकरणों की सूची List of Test Equipment	: Please refer ANNEX –B
4.	निरीक्षण और परीक्षण की स्कीम Scheme of Inspection and Testing	: Please refer ANNEX –C
5.	एक दिन में संभावित परीक्षण Possible tests in a day	
	(i) Size and construction (cl.4) (ii) Protection area of HAP and SAP (cl. 5.2.2 and cl. 5.2.3) (iii) Areal density (cl. 5.2.4) (iv) Weight of BRJ (cl. 5.2.5) (v) X-ray of HAP (cl. 5.2.6) (vi) Quick release mechanism (cl. 5.1.8) (vii) Pocket with flaps (cl. 5.1.3) (viii) Belt/Kamar bandh (cl. 5.1.4) (ix) Pouches (cl. 5.1.5)	
6.	लाइसेंस का दायरा /Scope of the Licence:	
	“Licence is granted to use Standard Mark as per IS 17051:2018 with the following scope:	
	Name of the product	Textiles — Bullet Resistant Jackets
	Size Designation	XS/S/M/L/XL
	Threat level	1/2/3/4/5/6/Special (In case of special, table 7 details to be specified)
	Maximum Back Face Signature limit	25 mm/44 mm
	Configuration	ICW/Standalone
	Type of protection	Upgrade 2/ Upgrade 1/ standard
	Operating Conditions (Optional)	Extreme Temperatures Suitable/Not Suitable for Low Temperature Fluid Exposure Water Resistant/Not Water Resistant Sea Water Resistant/Not Sea Water Resistant
	Other Optional requirements	With/Without Quick release mechanism, With/Without Dynamic Weight Distribution System With/without high buoyancy With/Without Ballistic Limit

ANNEX-A

GROUPING GUIDELINES

1. For covering sizes (XS,S,M,L,XL), samples of any of the sizes may be tested. **The firm shall declare that for each size, the materials used are the same.**
2. For covering threat level, upto level 5, if sample of higher threat level is tested, lower threat levels may be covered on that basis. However, samples of threat level 6 or special threat level shall be tested separately, if required to be covered.
3. For operating conditions, If extreme temperatures (low temperature) (Cl 8.1) and/or fluid exposure (water resistant and/or sea water resistant) (Cl 8.2) are to be covered, samples shall be tested for the applicable requirements.
4. Similarly, if optional requirements of Quick release mechanism, Dynamic Weight Distribution System, high buoyancy, and ballistic limit are intended to be covered samples shall be tested for these optional requirements.
5. For Behind Armour Blunt Trauma, if sample of 25 mm back face signature (BFS) limit is tested, 44 mm BFS limit may be covered on that basis
6. For maximum possible weights of bullet resistant jackets for different sizes and threat levels as per Annex C, samples shall be tested in each configuration i.e. standalone and ICW and for each type of protection intended to be covered in the scope of licence i.e. Standard, upgrade 1 and upgrade 2, however, if upgrade 2 tested then upgrade 1 and standard protection may be covered, similarly if upgrade 1 tested then standard protection may be covered.
7. The Firm shall declare the varieties of BULLET RESISTANCE JACKET they intend to cover in the Licence. The Scope of Licence may be restricted based on the Manufacturing capability and Testing facilities of the Manufacturer.
8. During the operation of the Licence, BO shall ensure that all the Varieties covered in the Licence are tested in rotation to the extent possible.

ANNEX – B

LIST OF TEST EQUIPMENTS

Major test equipment required to test as per the Indian Standard

Sl.No.	Test Equipment	Test used in with clause reference
1	Weighing balance (accurate to 0.005g), Flask, Water Bath, Oven,	Mass of outer carrier fabric, CI 5.1.1
2	Constant Rate of Extension (CRE) type Tensile Testing machine, equipment for preparing test pieces, distilled/deionized water and, conditioning chamber	Tensile Strength of outer carrier fabric, CI 5.1.1
3	Tear Strength Testing machine, conditioning chamber, equipment for preparing test pieces, ,	Tear Strength of outer carrier fabric, CI 5.1.1
4	Flammability Tester, conditioning chamber, draught free room or enclosure	Flame resistance of outer carrier fabric, CI 5.1.1
5	Open mouthed water penetration test vessel with test head allowing pressure up to 19.6 kPa connected with suitable manometer/pressure gauge	Resistance to water penetration of outer fabric, CI 5.1.1 and Water resistant cover, CI 5.1.6
6	Test chamber consisting of UV light source, humidity and temperature controllers and sensors (black panel thermometer or black standard thermometer to be used), opaque covers, colour matching lamps, assessment cabinet, sample mounting card, assessment mask, grey scales and reference materials (blue wool reference material and humidity test control fabric)	Colour fastness to light of outer carrier fabric, CI 5.1.1
7	Pendulum type tester with cam drive/ any suitable fixture which prevent slipping, constant rate of traverse/loading tensile testing machine, steel roller of diameter of 121 mm and 57 mm wide weighing 5 kg	Shear Strength of Hook and Loop Fasteners, CI 5.1.2
8	Pendulum type tester with cam drive/ any suitable fixture which prevent slipping, constant rate of traverse/loading tensile testing machine, steel roller of diameter of 121 mm and 57 mm wide weighing 5 kg	Peel Strength of Hook and Loop Fasteners, CI 5.1.2
9	Endurance test assembly	Endurance test of Hook and Loop Fasteners, CI 5.1.2
10	Washing Machine	Machine washability of outer carrier 5.1.7
11	3 D Scanner	Area of HAP, CI 5.2.3
12	X Ray machine	X ray examination of HAP, CI 5.2.6
13	Launching systems (test barrels/weapons) and service ammunition	Performance requirements, CI 6
14	Heating chamber (up to 70±5°C) and cooling chamber (up to up to 40±5°C)	Extreme temperatures test, CI 8.1
15	Water vessel (min 160 mm height), sea water, grade 3 water, sodium chloride	Fluid Exposure test, CI 8.2
16	Vibration Test Assembly, package tester, X ray	Vibration Test, CI 8.3.2

	machine	
17	Environmental chamber with tumbling apparatus, b) Environmental chamber with controllable temperature and humidity values, and c) Mechanical durability apparatus	Service Life Assessment, CI 8.4
18	Test layout, Weapon systems, target stand, velocity measurement and other diagnostic systems, Backing material, rollers/striking devices, conditioning chamber, drop test calibration setup, apparatus for measuring depth of indentation and back face signature/digital depth gauge (LC 0.01 mm), Armour Mounting, Strapping arrangement, Hook and loop fasteners (min 50 mm wide)	Ballistic Evaluation, CI 9
19	Weighing machine, measuring tapes, scales, vernier calipers, graph paper, planimeter, thickness gauges, examination tables etc.	Dimensions, Density and weight

The list above is indicative only and may not be considered as exhaustive

ANNEX C

SCHEME OF INSPECTION AND TESTING

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

1.1 The manufacturer shall prepare and implement a calibration plan for the test equipment.

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

3. **PACKING AND MARKING** - The Standard Mark, as given in the Schedule of the licence, shall be marked on each bullet resistant jacket provided always that the jacket so marked conforms to requirements of the specification.

3.1 The 'Bullet resistant jacket' shall be legibly and indelibly marked with the following information on the product itself or on durable and securely attached labels:

- a) Name of the product;
- b) Manufacturer's name, initials or trade-mark;
- c) Size designation;
- d) Instructions for storage and care;
- e) Batch number;
- f) Date of manufacture;
- g) Any other information required by the law in force and/or by the buyers.
- h) BIS Licence Number CM/L—and BIS website details i.e. "For details of BIS certification please visit www.bis.gov.in"

3.2 Labelling of ballistic components shall be done as per Cl 5.3 of IS 17051:2018.

4. **CONTROL UNIT-** For the purpose of this scheme, all the jackets pertaining to a single purchase specification of same size manufactured from the same consignment of non ballistic and ballistic components/material in a single production run shall constitute a control unit.

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

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

6. **REJECTION** - 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
LEVELS OF CONTROL

(1)				(2)	(3)		
Test Details				Test equipment requirement R: required(or) S: Sub-contracting permitted	Levels of Control		
Cl.	Requirement	Test Method			No. of Sample	Frequency	Remarks
		Clause	Reference				
4	Size and Construction (Manufacture)	4	IS 17051:2018	R	Each jacket	-	
5	Physical requirements of non-ballistic components						
5.1.1	Outer carrier fabric						
Table 2 i)	Mass		IS 7016 (Pt.1)	R	One	Each consignment of fabric	See Note 3
Table 2 ii)	Tensile Strength		IS 7016 (Pt.2)	R	-do-	-do-	-do-
Table 2 iii)	Tear Strength		IS 7016 (Pt.3) method A2, Trouser shaped	R	-do-	-do-	-do-

			test piece, single tear method				
Table 2 iii)	Flame Resistance Test		IS 11871, Method A	R	-do-	-do-	-do-
Table 2 iv)	Resistance to water penetration at hydrostatic pressure head of 30 cm water column height for 30 minutes		IS 7016 (Pt.7)	R	-do-	-do-	-do-
Table 2 v)	Colour fastness rating to light (change in colour on blue wool)		IS/ISO 105-B01	S	-do-	-do-	-do-
5.1.2	Hook and Loop Fasteners (general)	5.1.2	IS 17051:2018	R	5	Each consignment of fasteners	
Table 3 i)	Shear Strength, Lengthwise		IS 8156	R	-do-	-do-	See Note 3
Table 3 ii)	Peel Strength		IS 8156	R	-do-	-do-	-do-

Table 3 iii)	Endurance Test of 5000 cycles of closing and opening operations		IS 8156	S	-do-	-do-	-do-
5.1.3	Pocket with flaps	5.1.3	IS 17051:2018	R	Each jacket	-	
5.1.4	Belt/kamarbandh	5.1.4	IS 17051:2018	R	-do-	-	
5.1.5	Pouches	5.1.5	IS 17051:2018	R	-do-	-	
5.1.6	Water resistant covers (general)	5.1.6	IS 17051:2018	R	-do-	-	
5.1.6 Table 2, (v)	Resistance to water penetration for water resistant covers		IS 7016 (Part 7)	R	One	Each consignment of fabric	See Note 3
5.1.7	Outer carrier to be machine washable	5.1.7	IS 17051:2018	R	5	Each control unit	-do-
5.1.8	Quick Release Mechanism (Optional)	5.1.8	IS 17051:2018	R	As agreed between purchaser and manufacturer		
5.1.9	Dynamic Weight Distribution System (Optional)	5.1.9	IS 17051:2018	R	-do-		
5.1.10	High Buoyancy (Optional)	5.1.10	IS 17051:2018	R	-do-		
5.2	Physical requirements of ballistic components						
5.2.1	General	5.2.1	IS 17051:2018	R	5	Each control unit	

5.2.2	Protection Area of SAP	5.2.2	IS 17051:2018	R	01	-do-	
5.2.3	Protection Area of HAP	5.2.3	IS 17051:2018	S	01	-do-	
5.2.4	Areal Densities of Bullet Resistant Panels	5.2.4	IS 17051:2018	R	01	-do-	
5.2.5	Weight of Bullet Resistant Jacket	5.2.5	IS 17051:2018	R	05	-do-	
5.2.6	X-Ray of HAP	5.2.6	IS 17051:2018	R	Each HAP	-	
5.3	Labelling of ballistic components	5.3	IS 17051:2018	R	Each component	-	
6	Performance Requirements						
6.1	Threat levels	9	IS 17051:2018	S	Special inspection level S-4 as given in IS 2500 (Part 1) shall be used for ballistic evaluation. AQL of 2.5 percent shall be considered (see Annex F for sampling plans, AQL and example) for ballistic evaluation. Decision on critical and major defect during lot testing shall be taken based on the criteria specified in 6.5. The firm shall declare that for each lot of jackets, the materials used are the same.		See Note 4
6.2	Behind Armour Blunt Trauma (BFS limit)	9	IS 17051:2018	S			
6.5	Ballistic Limit (optional)	9	IS 17051:2018	S			
6.6	Shelf Life of SAP and HAP ballistic panels	8.4	IS 17051:2018	S			
8	Operating conditions (optional)						
8.1	Extreme Temperatures (optional)						
8.1.1	Low Temperature	8.1.1	IS 17051:2018	S	As agreed between purchaser and manufacture		
8.2	Fluid Exposure (optional)						
8.2.1	Water resistance	8.2.1	IS 17051:2018	S	As agreed between purchaser		See Note 5

					and manufacture	
8.2.2	Sea Water Resistance	8.2.2	IS 17051:2018	S	-do-	See Note 5
8.3	In Transit Conditions (for HAP)					
8.3.1	Vibration Test	8.3.2	IS 17051:2018	S	One	-do-

Note-1: Whether test equipment is required or sub-contracting is permitted in column 2 shall be decided by the Bureau and shall be mandatory. 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 BO Head.

Note-3: For raw materials, No testing is required if material is with Test certificate of supplier or Test report of NABL accredited lab or Test report of third party lab or in house testing

Note 4: Being a product which is meant to ensure the safety of the wearer from bullet injuries, testing of Jacket for ballistic evaluation based on the lot sampling plan given in CI 7.2 and Annex F of IS 17051 : 2018 is specified

Note 5: If the test for sea water resistance (8.2.2) is conducted as per optional parameter, water resistance test (8.2.1) is not required