



उत्पाद मानुयल
व्यक्तिगत फॉल एरेस्ट प्रणाली - विशिष्टि
भाग 4 खिसकने वाली फॉल एरेस्ट प्रणाली का उपयोग करती लंब रूप रेल
एवं लंब रूप लाईफलाइन IS 3521(भाग 4) : 2021 के अनुसार

PRODUCT MANUAL FOR
Personal Fall Arrest Systems
Part 4 : Vertical Rails and Vertical Lifelines Incorporating a Sliding-type
Fall Arrester According to IS 3521 (Part 4) : 2021

भारतीय मानक ब्यूरो (अनुरूपता मूल्यांकन) विनियम 2018 की स्कीम-I के तहत यह उत्पाद मानुयल प्रमाणीकरण के प्रचलन में रीति और पारदर्शिता के सुसंगत सुनिश्चित करने के लिए सभी क्षेत्रीय/शाखा कार्यालयों एवं लाइसेन्स धारियों द्वारा संदर्भ सामग्री के रूप में उपयोग किया जाएगा। बीआईएस लाइसेन्स/प्रमाण पत्र प्राप्त करने के इच्छुक भावी आवेदकों द्वारा भी इस दस्तावेज़ का उपयोग 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 3521 (Part 4) : 2021
	शीर्षक Title	:	व्यक्तिगत फॉल एरेस्ट प्रणाली-विशिष्टि भाग 4 : खिसकने वाली फॉल एरेस्ट प्रणाली का उपयोग करती लंब रूप रेल एवं लंब रूप लाईफलाइन Personal fall arrest systems - Specification Part 4 : Vertical Rails and Vertical Lifelines Incorporating a Sliding-type Fall Arrester
	संशोधनों की संख्या No. of Amendments	:	0 Nil
2.	नमूनाकरण दिशा निर्देश Sampling Guidelines:		

a)	कच्चा माल Raw material	:	कृपया Annex- A देखें Please see Annex – A
b)	समूहीकरण दिशा निर्देश Grouping guidelines	:	लागू नहीं (प्रत्येक किस्म के नमूने लिए जाएंगे और उनका परीक्षण किया जाएगा) Not Applicable (Samples of Each Variety shall be drawn & Tested)
c)	नमूने का परिमाण Sample Size	:	09 samples of each variety/Design/Configuration
3.	परीक्षण उपकरणों की सूची List of Test Equipment	:	कृपया Annex-B देखें Please see Annex – B
4.	निरीक्षण व परीक्षण स्कीम Scheme of Inspection and Testing	:	कृपया Annex- C देखें Please see Annex – C
5.	एक दिन में संभावित परीक्षण Possible tests in a day :		Since testing facility is not available in any BIS/BIS recognized lab, complete testing has to be carried out in the Factory for certification and during surveillance. 3 days inspection required for complete testing
6.	लाइसेन्स का कार्यक्षेत्र/Scope of the Licence :		
	IS 3521 (PART 4) : 2021 के अनुसार मानक मुहर का उपयोग करने के लिए लाइसेन्स निम्नलिखित कार्यक्षेत्र के लिए प्रदान किया जाता है Licence is granted to use Standard Mark as per 3521 (Part 4) : 2021 with the following scope:		
	उत्पाद का नाम Name of the product		Personal fall arrest systems - Part 4 : Vertical Rails and Vertical Lifelines Incorporating a Sliding-type Fall Arrestor
	प्रकार Types		- Vertical Rail, with/ without Connecting line Energy Absorber - Temporary Vertical Lifeline, with/without Connecting line Energy Absorber, with/without lifeline Energy Absorber - Permanent Vertical Lifeline, with/without Connecting line Energy Absorber, with/without lifeline Energy Absorber
	Lifeline Component		Wire Rope/Webbing/3 Strand Polyamide rope Lifeline/3 Strand Polyester Rope Lifeline/Braided Rope Lifeline

Annex -A
Raw Materials

1. Fibre ropes, webbing and sewing threads for lifelines & Connecting line shall be made from virgin high-tenacity filament or multifilament synthetic fibre or fibres suitable for the intended use. The breaking strength of the synthetic fibres shall be known to be at least 0,6 N/tex.
2. Three Strand Polyamide Rope Shall Comply with IS 4572 & Three Strand Polyester Ropes shall Comply to IS 11066 requirements.
3. If Braided Rope is used in Lanyards, it shall comply with EN 892(Single Rope) or EN 1891 Type A Requirements. Any Equivalent Material is acceptable.
4. The minimum diameter of wire rope material used in the construction of lifelines shall be 8 mm.
5. Where connectors can be removed without the use of a tool, they shall meet the requirements of IS 3521 (part 5). Where connectors require the use of a tool for removal, they shall meet the requirement of 4.3 (static strength) and 4.4 (corrosion resistance) of ISO 3521 (part 5).
6. The Metal Components used as a raw Material in Lifeline shall complies to Corrosion Resistance Test as per ISO 9227.

ANNEX B

LIST OF TEST EQUIPMENTS

Personal Fall Arrest Systems

**Part 4 : Vertical Rails and Vertical Lifelines Incorporating a Sliding-type
Fall Arrester According to IS 3521 (Part 4) : 2021**

Major test equipment required to test as per the Indian Standard

Sr. No.	Test equipment	Tests used in with Clause Reference
1.	• Salt Spray Chamber as per ISO 9227, • Ph Meter, • Sodium Chloride • Distilled or deionized water • Stop Watch • Weighing Scale,	Corrosion Resistance Clause 4.9
2.	• Apparatus for locking-reliability test as per Clause 5.1.4.5, • Minimum Locking Test Masses as per Clause 5.2.2.1 • Steel Scale, • Counter	Locking Reliability Clause 4.11
3.	• Test structure as per Clause A2.2. • Quick-release device as per Clause A2.3, • Torso Test Mass as per clause A2.1, • Steel Scale, measuring Tape or Digital distance meter • Force Measuring Appratus as per Clause A2.4	Dynamic Performance Clause 4.12
4.	• Tensile Test Machine as per Clause 5.1.1, • Stop Watch, • Steel Scale	Tensile Strength of Vertical rails & Vertical Lifeline Clause 4.13 & 4.14
5.	• Hot Air Oven as per Clause 5.1.4.1, • Wet-spray-conditioning apparatus, as per Clause 5.1.4.3, • Refrigerated Chamber as per Clause 5.1.4.2, • Dust-conditioning apparatus as per Clause 5.1.4.4, • Apparatus for locking-reliability test as per Clause 5.1.4.5	Locking Performance after Conditioning Clause 4.10

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

ANNEX-C
SCHEME OF INSPECTION AND TESTING FOR
Personal Fall Arrest Systems
Part 4 : Vertical Rails and Vertical Lifelines Incorporating a Sliding-type
Fall Arrester According to IS 3521 (Part 4) : 2021

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 equipment.

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 the Schedule of the licence, shall be clearly and indelibly marked on each Vertical rails & Vertical lifelines incorporating sliding type fall arresters, provided always that material to which this mark is thus applied, conform to every requirement of the specification.

3.1 Marking – Each Vertical rails & Vertical lifelines incorporating sliding type fall arresters and their packaging shall be clearly and indelibly marked to give the information as per clause 6.2 of IS 3521 (Part 4). In addition, the following details shall be marked legibly and indelibly:

a) BIS Licence No. CM/L..... and

b) BIS website details i.e. – “For details of BIS certification please visit www.bis.gov.in” (in case of space constraints, may be marked only on the package).

3.2 Packing – The material shall be packed as per Cl. 6.3 of IS 3521 (Part 4).

3.3 Instructions for general use, marking, packaging and maintenance shall also be provided as per the provisions of the Indian Standard

4. CONTROL UNIT – For the purpose of this scheme, Vertical Rails & Vertical Lifelines incorporating sliding type fall arresters of the same Design/Variety manufactured from the same consignment of raw material in a day shall constitute 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 Standard 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.

TABLE 1 LEVELS OF CONTROL
(Para 5.0 of the Scheme of Inspection and Testing)

Test Details (1)				(2)		Levels of Control (3)	
Cl.	Requirement	Test Methods		Test equipment requirement R: Required (or) S: Sub Contracting permitted	No. of Samples	Frequency	Remarks
		Clause	Reference				
4.1	General						
4.1.1	Design of Working Parts	4.1.1	IS 3521(Part 4) : 2021	R	All	Each Control Unit	
4.1.2	Finish	4.1.2	IS 3521(Part 4) : 2021	R	All	Each Control Unit	
4.2	Requirement for Vertical rails						
4.2.1	Rail Design	4.2.1	IS 3521(Part 4) : 2021	R	All	Each Control Unit	
4.2.2	Attachment and detachment points for the sliding-type fall arrester	4.2.2	IS 3521(Part 4) : 2021	R	All	Each Control Unit	-
4.3	Requirement for Permanent Vertical Lifeline	4.3	IS 3521(Part 4) : 2021	R	All	Each Control Unit	
4.3.1	Design	4.3.1	IS 3521(Part 4) : 2021	R	All	Each Control Unit	
4.3.2	Attachment and detachment points for the sliding-type fall arrester	4.3.2	IS 3521 (Part 4) : 2021	R	All	Each Control Unit	
4.4	Requirements for temporary vertical lifelines	4.4	IS 3521 (Part 4) : 2021	R	All	Each Control Unit	
4.5	Material & Construction						
4.5.1.1	Material & Breaking Strength of synthetic fibres	4.5.1.1	IS 3521 (Part 4) : 2021	S	All	Each Consignment	If ISI marked or accompanied by TC no further testing is required
4.5.1.2	Fibre Rope	IS 4572/ IS 11066	IS 4572/ IS 11066	S	1 Sample		
4.5.1.3	Braided Rope	EN 892/ EN 1891 Type A	EN 892/EN 1891 Type A	S	1 Sample		
4.5.1.4	Protective means	4.5.1.4	IS 3521 (part 2) : 2021	R	All	Each Control Unit	
4.5.2	Wire Rope	4.5.2	IS 3521 (Part 4) : 2021	R	All	Each Control Unit	

4.5.3	Terminations						
4.5.3.1	Eye Splices	4.5.3.1	IS 3521(Part 4) : 2021	R*	All	Each Control Unit	* If ISI marked no further testing is required
4.5.3.2	Stitched Eye Termination	4.5.3.2	IS 3521(Part 4) : 2021	R*	All	Each Control Unit	
4.5.3.3	Eye Termination	4.5.3.3	IS 3521(Part 4) : 2021	R*	All	Each Control Unit	
4.5.3.4	Selection of Swage	4.5.3.4	IS 3521(Part 4) : 2021	R*	All	Each Control Unit	
4.5.3.5	Wire rope end	4.5.3.5	IS 3521(Part 4) : 2021	R*	All	Each Control Unit	
4.5.3.6	Knots	4.5.3.6	IS 3521(Part 4) : 2021	R*	All	Each Control Unit	
4.6	Vertical Life Energy Absorbers	4.6.1 4.6.2	IS 3521(Part 4) : 2021	R	All	Each Control Unit	-
4.7	Sliding type Fall Arrester Requirement	4.7.1 4.7.2	IS 3521(Part 4) : 2021	R	All	Each Control Unit	-
4.8	Requirement for connectors	IS 3521 Part 5	IS 3521(Part 4) : 2021	S*	1 Sample of each type	Consignment	* If ISI marked no further testing is required
4.9	Corrosion	5.2.1	IS 3521(Part 4) : 2021	R	1 Sample of Each metal parts	Each Control Unit/ Consignment	-
4.10.1	Locking After Heat Conditioning	5.2.2.2 & 5.2.2.7	IS 3521(Part 4) : 2021	R	1 Sample of each Variety	Each 7 th Control unit or every week whichever is earlier	-
4.10.2	Locking After Cold Conditioning	5.2.2.3 & 5.2.2.7	IS 3521(Part 4) : 2021	R	1 Sample of each Variety	Each 7 th Control unit or every week whichever is earlier	-
4.10.3	Locking after wet-spray conditioned	5.2.2.4 & 5.2.2.7	IS 3521(Part 4) : 2021	R	1 Sample of each variety	Each 7 th Control unit or every week whichever is earlier	-
4.10.4	Locking after Dust conditioning	5.2.2.5 & 5.2.2.7	IS 3521(Part 4) : 2021	R	1 Sample of each variety	Each 7 th Control unit or every week whichever is earlier	-
4.10.5	Locking after oil conditionioing	5.2.2.6 & 5.2.2.7	IS 3521(Part 4) : 2021	R	1 Sample of each Variety	Each 7 th Control unit or every week whichever is earlier	-

4.10.6	Repeat tests of 4.10.1 to 4.10.5	4.10.6	IS 3521(Part 4) : 2021	R	1 Sample of each Variety	Each 7th Control unit or every week whichever is earlier	-
4.11	Locking Reliability	5.2.3	IS 3521(Part 4) : 2021	R	1 Sample of each Variety	Each 7 th Control unit or every week whichever is earlier	-
4.12	Dynamic Performance	Annex-A	IS 3521(Part 4) : 2021	R	1 Sample of each Variety	Each Control Unit	-
4.13	Tensile Strength of Vertical rails	5.2.4	IS 3521(Part 4) : 2021	R	1 Sample of each variety	Each Control Unit	-
4.14	Tensile Strength of Vertical lifelines	5.2.4	IS 3521(Part 4) : 2021	R	1 Sample of each variety	Each Control Unit	-

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 empaneled 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 to BO head.

Note-3: Each consignment of material, used in manufacture of Vertical rails & Lifelines has to be accompanied with supplier's test certificate or test report issued by a third party laboratory recognized by the Bureau or Government laboratories empaneled by the Bureau or In house factory testing to be done. No testing is required if the material is ISI marked.