

**PRODUCT MANUAL FOR
ALUMINIUM CONDUCTORS FOR OVERHEAD
TRANSMISSION PURPOSES — PART 4
ALUMINIUM ALLOY STRANDED CONDUCTORS
(ALUMINIUM-MAGNESIUM-SILICON TYPE)
ACCORDING TO IS 398 (Part 4):1994**

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 license/certificate.

1.	Product	:	IS 398 (Part 4):1994
	Title	:	Aluminium Alloy Stranded Conductors Aluminium-Magnesium-Silicon type) for Overhead Transmission purposes.
	No. of Amendments	:	1
2.	Sampling Guidelines:		
a)	Raw material	:	-
b)	Grouping guidelines	:	Please refer ANNEX – A
c)	Sample Size	:	Before stranding- 5m
		:	After stranding- 5m
3.	List of Test Equipment	:	Please refer ANNEX – B .
4.	Scheme of Inspection and Testing	:	Please refer ANNEX – C .
5.	Possible tests in a day :	:	Please refer ANNEX-D
6.	Scope of the Licence :		
	<p>“Licence is granted to use Standard Mark as per IS 398 (Part 4):1994 with the following scope: “Aluminium Alloy Stranded Conductors of the Aluminium-Magnesium-Silicon type for overhead power transmission purposes for sizes up to and including _____mm² (Actual Aluminium Area).”</p>		

ANNEX A

Grouping Guidelines

1. IS 398 (Part 4) covers the requirements and tests for Aluminium Alloy Stranded Conductors of the Aluminium-Magnesium-Silicon type for overhead power transmission purposes with Actual area of stranded conductor up to and including 767 mm².
2. For considering GoL/CSoL, conductor of any size (Actual Area), preferably the largest, intended to be covered in the license may be drawn for testing.
3. The Firm shall declare the sizes of conductors they intend to cover in the License. The scope of the License may be restricted based on the manufacturing capability and availability of testing facilities of the Manufacturer.
4. During the operation of the License, BO shall ensure that all the varieties covered in the License are tested in rotation, to the extent possible.

ANNEX B**List Of Test Equipment***Major test equipment required to test as per the Indian Standard*

Sl. No.	Test Equipment	Tests used in with Clause Reference	
		Cl. Ref.	Tests
1	Micrometer	7.1.1, 7.2.1	Measurement of diameter
2.	Tensile Testing Machine	12.2, 12.3	Breaking load test, Elongation test
3.	Steel Scale		
4.	Vernier Calipers		
5.	Kelvin Double Bridge / Micro-Ohm Meter	12.4	Resistance test
6.	Thermometer		

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

ANNEX C

Scheme Of Inspection And Testing

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. LABELLING AND MARKING – As per the requirements of IS 398 (Part 4):1994.

4. CONTROL UNIT – Every production length of Stranded conductor shall constitute a 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

(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				
Aluminium Alloy Wire							
6	Freedom from defects	6.1	IS 398 (Part 4)	-	-	Every bobbin of Aluminium alloy wire drawn/ received	If any sample fails in respect of any requirement, two more samples from the same bobbin shall be tested for that requirement and if there is any further failure in retesting the bobbin shall be rejected
7.1.1	Diameter	7.1.1		R	One		
5.1, 12.2	Breaking load	12.2.1		R			
5.1, 12.3	Elongation test	12.3.1		R			
5.1, 12.4	Resistance	7.2.2		R			
Stranded Aluminium Alloy Conductor							
7.2	Size	7.2.1	IS 398 (Part 4)	R	One	Each Control Unit	
Stranding							
8	Joints in Wires	8	IS 398 (Part 4)	-	Complete length of stranded wire		
9	Lay Ratio	9.2 - 9.4		R	One	Each Control Unit	
12.2	Breaking Load test	12.2.1	IS 398 (Part 4)	R	One	Each coil of stranded Conductor	If any sample fails in respect of any requirement, two more samples from the same coil shall be tested for that requirement and if there is any further failure in retesting the coil shall be rejected
12.3	Elongation test	12.3.1		R	One		
12.4	Resistance test	12.4		R	One		

Note-1: 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.

ANNEX D

Possible Tests in a day

1. Aluminium Alloy Wire

- (i) Freedom from defects
- (ii) Diameter
- (iii) Breaking load
- (iv) Elongation test
- (v) Resistance

2. Stranding

- (i) Lay Ratio
- (ii) Joints in Wires

3. Stranded Aluminium Alloy Conductor

- (i) Visual Examination
- (ii) Size
- (iii) Resistance
- (iv) Breaking load test
- (v) Elongation test