



उत्पाद मैनुअल
संरचना इस्पात की गैस परिरक्षित आर्क वेल्डिंग केलिये वेल्डिंग छड़े
और अनावृत्त इलेक्ट्रोड — विशिष्टि
IS 6419: 1996 के अनुसार

PRODUCT MANUAL FOR
Welding Rods and Bare Electrodes for Gas Shielding Arc Welding of Structural Steels
Specification ACCORDING TO IS 6419: 1996

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। दस्तावेज 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 6419:1996
	शीर्षक Title	:	Welding Rods and Bare Electrodes for Gas Shielding Arc Welding of Structural Steels- Specification
	संशोधनों की संख्या No. of amendments	:	02
2.	नमूना दिशानिर्देश Sampling Guidelines	:	
a)	कच्चा माल Raw material	:	No specific raw material requirement 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 Annex – A
c)	नमूने का परिमाण Sample Quantity	:	2 spools for each size/variety 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)
d)	परीक्षण अनुरोध में घोषित किए जाने वाले पैरामीटर Parameters to be Declared in Test Request		1) Class (Code of Classification of Electrode as per cl.11.such as S5-M 504) 2) Size (Nominal Diameter of Electrode) Note: Apart from the above, any other requirements/parameters may also be declared as per the standard, as applicable.
3.	परीक्षण उपकरणों की सूची List of Test Equipment	:	Please refer to Annex- B देखें
4.	निरीक्षण और परीक्षण की स्कीम Scheme of Inspection and Testing	:	Please refer to Annex- C देखें
5.	एक दिन में संभावित परीक्षण Possible tests in a day		
	All Tests except All Weld Metal Mechanical Tests as per cl.14.3 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 readyreference 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:		
	6419:1996 के अनुसार मानक मुहर का उपयोग करने के लिए लाइसेंस निम्नलिखित कार्यक्षेत्र के लिए प्रदान किया जाता है “ Licence is granted to use Standard Mark as per IS 6419:1996 with the following scope:		
7.	उत्पाद का नाम Name of the product		Welding Rods and Bare Electrodes for Gas Shielding Arc Welding of Structural Steels- Specification
	Class		Code of classification of electrode as per cl.11. for e.g. S5-M 504
	Size (Nominal Diameter)		0.6 mm, 0.8 mm,, 5.0 mm

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN,9, BAHADUR SHAH ZAFAR MARG,
NEW DELHI-110002

ANNEXURE A
TO PRODUCT MANUAL FOR
GROUPING GUIDELINES

- 1) IS 6419:1996 covers the requirements of solid filler rods and wires for welding structural steels by TIG Welding, MIG Welding or CO₂ welding processes. Fillers Rods and Wires of Nominal Diameter 0.6 mm to **5.0 mm** are covered under the standard.
- 2) The Filler Rods and Wires have been classified based upon their chemical composition and mechanical properties of the weld deposits.
- 3) In view of above, the following grouping guidelines shall be considered for the purpose of GoL/CSoL:-
 - a) **Sample of each class/unique code of classification of electrode as per cl.11. of the smallest size (nominal diameter) shall be drawn to cover all sizes for that class of electrode.**
- 4) **Scope of licence shall be restricted based on the manufacturing and testing facilities available.**
- 5) **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 and Identification Numbers (Where applicable)
1.	Chemical Composition, cl.12, 14.1., Table 7 (C,Si, Mn, Ni, Cr, Mo, S,P, Cu, Al, Ti Zr, V)	Instrumental methods Spectrometer: atomic-absorption spectrometry, inductively coupled plasma atomic emission, inductively coupled plasma mass spectrometry techniques, spark source optical emission spectrometry, Spectrophotometer, XRF All sample preparation facilities including cutting, grinding polishing etc. Standard Reference Materials with Certificate
2.	Dimensions and Tolerances of Wires and Rods (cl.5.), Reeling Conditions (cl.7.), Dimensions of the Spools, Rims and Coils (cl.8.), Length of Rods (cl.9.), Cast (10.2.2), Helix (10.2.3)	Vernier Calipers, Micrometer, Scale, Measuring Tape, Flat bench
4.	Soundness Test, cl.14.2	Radiography setup, weld assembly and radioactivity protection arrangements
5.	Temper, cl.10.2, Table 5	Universal Tensile testing machine
5.	All Weld Metal Mechanical Test, cl.14.3	For Tensile Test Universal Tensile testing machine with extensometer Heat treatment furnace For Impact Test Charpy Impact Testing Machine Dry Ice bath For Weld Assembly DC Rectifier, GMAW/GTAW Welding Setup, Sample preparation facility

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: For the purpose of this scheme, entire quantity of electrodes of the same classification and size manufactured on the same line in one go shall be taken as one control unit.

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/empaneled 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 license and Licence Number (i.e. CM/L.....) shall be suitably incorporated on each Package of Rods/Reel of Wire and on the test certificate issued along with each consignment, provided always that the product thus marked and packed conforms to all the requirement of the specification.

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

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)		(4)
TEST DETAILS					LEVELS OF CONTROL		REMARKS
Clause	Requirements	Test Method		Test equipment requirement R: required (or) S: Sub-contracting permitted	No. of Samples	Frequency	
		Clause	Reference				
5, Table 1	Dimensions and Tolerances of Wires and Rods	-----	IS 6419	R	Firm shall exercise adequate in-process controls to ensure that the material conforms to the requirements of the specification. Wherever required, appropriate records shall be maintained by the manufacturer. Adequate inspection to ensure that the material conforms to the requirements of the specification		
6	Reels for Wire	6.1, 6.2	IS 6419	R			
7	Reeling Conditions	-----	IS 6419	R			
8	Dimensions of the spools, rims and coils	8.1,8.2,8.3	IS 6419	R			
9	Length of Rods	9.1,9.2	IS 6419	R			
10.1	Finish	----	IS 6419	R	One	Each Control Unit	----
10.2.1	Temper of Wire	-----	IS 6419 IS 1608 (Part 1)	R	One	Each Control Unit	-----
10.2.1	Cast	Table 6	IS 6419	R	One	Each Control Unit	-----

10.2.2	Helix	Table 6	IS 6419	R	One	Each Unit	Control	-----
14	Test for Filler Metals							
14.1	Chemical Composition	Table 7	IS 6419 IS 228 (various parts) Any other established instrumental method IS 18632	R	One	Each Unit	Control	-----
14.2	Soundness Test	Table 7	IS 6419 IS 18632	S	One	Once a year		The radiographs should conform to the standard as agreed to between the manufacturer and purchaser
14.3.2	All Weld Metal Tensile Test	13.1, Annex A	IS 6419 IS 1608 (Part 1) IS 18632	R	One	Once in a month		----
14.3.3	All Weld Metal Impact Test	13.2, Annex A	IS 6419 IS 1757 IS 18632	R	One	Once in a month		----

ANNEXURE I

XYZ IRON AND STEEL Company
(Registered office Address and works address)

ISI Mark
With IS no.
and CM/L
no.

TEST CERTIFICATE FOR Welding Rods and Bare Electrodes for Gas Shielding Arc Welding of Structural Steels- Specification as per IS 6419:1996

TEST CERTIFICATE NO.

DATED_____

TO M/s_____

We certified that the material described below fully conforms to 6419:1996 Chemical composition and Physical properties of the product as tested in accordance with the Scheme of Inspection and Testing contained in the BIS Certification Marks Licence No. CM/L_____ are as indicated below against each order No.

(PLEASE REFER TO IS 6419:1996 FOR DETAILS OF SPECIFICATION REQUIREMENTS)

TEST RESULTS

Order No. & Date	Size	Control Unit No.	Classes	Quantity in tonnes	CHEMICAL COMPOSITION										Condition (Finish, Temper , Cast, Helix)	All Weld Metal Tensile Test	All Weld Metal Impact Test	Soundness	Dimensions and Tolerances	Remarks
					C %	S i %	M n %	N i %	C r %	M s %	P %	V %	Zr %	Cu %	Ti %	Al %				

REMARKS

WAGON NO.

TRUCK NO.

(It is suggested that size A4 paper be used for this test Certificate)

FOR XYZ IRON AND STEEL COMPANY