

PM/ IS/ISO 3183/ 2/ November 2022



**PRODUCT MANUAL
FOR CERTIFICATION OF
Petroleum and Natural Gas Industries - Steel Pipe for Pipeline Transportation Systems**

According to IS/ISO 3183:2019

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.	Product	:	IS/ISO 3183:2019
	Title	:	Petroleum and Natural Gas Industries – Steel Pipe For Pipeline Transportation Systems
	No. of Amendments	:	NIL
2.	Sampling Guidelines:		
a)	Raw material	:	As per Cl 8.3 of API Spec 5L (46 th Edition).
b)	Grouping guidelines	:	Please refer ANNEX – A
c)	Sample Size	:	Mechanical: 2 m. and prepared piece for impact test Chemical: 5 pcs of 5 cm x 5 cm
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	:	All tests
6.	Scope of the Licence :		
	“Licence is granted to use Standard Mark for IS/ISO 3183:2019” with the following scope:		
	Name of the product	Petroleum and Natural Gas Industries – Steel Pipe For Pipeline Transportation Systems	
	Process of Manufacture	SMLS, CW, LFW,HFW, LW,SAW,..	
	Finish of Pipe Ends	Threaded Ends (PSL 1 only), Plain end (PSL2 only),...	
	Pipe Grade/Steel Grade	PSL 1 - L175 or A25, PSL 2 L245 N or BN,	
	Delivery Condition	As-rolled, Normalizing Rolled,.....	
	Size(OD and Wall Thickness)		

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ANNEXURE A
TO PRODUCT MANUAL FOR
Petroleum and Natural Gas Industries – Steel Pipe for Pipeline Transportation Systems
According to IS/ISO 3183:2019

GROUPING GUIDELINES

1. Grouping of Steel Pipe For Pipeline Transportation Systems is carried out on the basis of method of manufacture and pipe grade as under:
 - i) PSL 1 or PSL 2
 - ii) SMLS, CW, LFW, HFW, LW, SAW, COW
2. In view of above, the following grouping guidelines shall be considered for the purpose of GoL/CSoL:-

Samples of each pipe grade (PSL1, PSL2) and each method of manufacture (i.e. SMLS, CW, LFW, HFW, LW, SAW, COW) shall be drawn to cover the grades and manufacturing processes intended to be covered in the licence. However, the samples drawn may be of any size, finish of pipe ends and delivery condition.
3. If the above samples are found to be conforming to the requirements of IS/ISO 3183:2019, Licence may be granted for all the sizes, end finishes and delivery conditions provided that the firm is having all necessary manufacturing and testing facilities for the manufacture and testing of all other sizes, end finishes and delivery conditions proposed to be included in the licence scope.
4. During the operation of license, BO shall ensure that all Grades & varieties covered in the license are drawn for independent testing on rotation over a period of time.

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

Sl No.	Tests used in with Clause Reference	Test Equipment
1.	Universal testing machine, Class 1 or better as per IS 1608	Tensile Properties (9.3)
2.	Hydrostatic test equipment	Hydrostatic test (9.4)
3.	Universal testing machine with attachments	Bend Test (9.5)
4.	Hydraulic press	Flattening test (9.6)
5.	Bending Device	Guided bend test (9.7)
6.	Impact tester in accordance with ASTM A 370	CVN impact test for PSL 2 pipe (9.8)
7.	in accordance with API RP 5L3	DWT test for PSL 2 welded pipe (9.9)
8.	Vernier calliper, micrometer	Surface conditions, imperfections and defects (9.10)
9.	Vernier calipers, steel scale, micrometer, weighing balance, measuring tape	Dimensions, mass and tolerances (9.11)
10.	straight edge, angle of taper measuring instrument	Finish of pipe ends (9.12)
11.	Hydrostatic test equipment	Hydrostatic test (9.4)
12.	micrometer	Tolerances for the weld seam (9.13)
13.	Weighing balance	Tolerances for mass (9.14)
14.	Instrumental methods Spectrometer: atomic-absorption spectrometry, inductively coupled plasma atomic emission, inductively coupled plasma mass spectrometry techniques, spark source optical emission spectrometry. Spectrophotometer	C,S,P,Mn,Si,Al, Microalloying elements content (9.2) Mn,S,P,Si

15.	Strohlein or Leco apparatus with all attachments Barometer with chart, Hot plate, Muffle furnace, Complete range of glass wares, measuring cylinders, Desiccator, porcelain boats or ceramic crucibles, Thermometer, Electronic Balance, Distilled Water, Hot air oven, Oxygen - 99.5 percent minimum purity, ether or acetone, Standard Reference Material (NML) with certificate Reagents for C: tin granules or pure iron fillings, acidulated water/brine water, methyl red, caustic potash Reagents for S: Ceramic boats/crucibles – desiccators, Fluxes -Low sulphur copper, tin or iron, Dilute hydrochloric acid, Starch Iodide solution, Potassium iodate	C& S -chemical method, alternative to instrumental method (9.2)
16.	Weighing balance, Heater/ Heating element along with energy regulator, Ice water bath, Vol Flask Cap – 1 litre, (Whatman) filter paper No. 040, Suction Filtration Facility, Filter paper pulp pad, Standard Reference Material (NML) with certificate Potassium Permanganate (KMnO₄), Sodium Nitrite (NaNO₂), Ammonium Molybdate [(NH₄)₂ MoO₇], Ammonium Phosphate [(NH₄)₃ PO₄], Potassium Nitrate (KNO₃), Phenolphthalein Solution, Rectified spirit or methyl alcohol, Sodium Hydroxide (NaOH), Hydrofluoric Acid (HF), Perchloric Acid (HClO₄), Sulphurous Acid, Hydrobromic Acid (HBr), other chemicals and reagent as applicable	Phosphorus content- chemical method, alternative to instrumental method (9.2)
17.	Hot plate, Conical flask Reagents: silver nitrate, ammonium persulphate sodium arsenite solution, Dilute Nitric Acid, Phosphoric Acid, Dilute Sulphuric Acid, Concentrated Nitric Acid, NaCl Solution, Permanganic acid	Manganese content- chemical method, alternative to instrumental method (9.2)

18.	Medium textured filter paper, Porcelain casserole, platinum crucible, filter paper pulp, hot plate, hot air oven, muffle furnace Reagents: Silver nitrate solution, concentrated nitric acid, concentrated sulphuric acid, Dilute Hydrochloric Acid, Dilute Sulphuric Acid, Perchloric Acid, Tartaric acid and hydrofluoric acid	Silicon content- chemical method, alternative to instrumental method(9.2)
19.	ashless paper pulp, paper pulp pad, hot plate, dessicator, Reagents: ammonium nitrate, methyl red, dilute ammonium hydroxide, Concentrated hydrochloric acid Concentrated nitric acid, Perchloric acid, Hydrofluoric Acid	Ni content-chemical method, alternative to instrumental method(9.2)
20.	Hot plate, stop watch Reagents: dilute sulphuric acid and phosphoric acid mixture, concentrated nitric acid, ammonium persulphate, silver nitrate, dilute hydrochloric acid, ferrous ammonium sulphate, standard potassium permanganate solution.	Cr content-chemical method, alternative to instrumental method(9.2)

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

**** The clauses mentioned pertain to the clauses of API Spec 5L (46th Edition)***

SCHEME OF INSPECTION AND TESTING
FOR PETROLEUM AND NATURAL GAS INDUSTRIES —
STEEL PIPE FOR PIPELINE TRANSPORTATION SYSTEMS
According to IS/ISO 3183:2019

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.

The manufacturer shall prepare a calibration plan for the test equipments.

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

3. LABELLING, MARKING, PACKING- The Standard Mark as given in schedule of the licence and Licence Number (i.e. CM/L.....) shall be incorporated on the Product and on the Test Certificate, and the marking and packing shall be done as per the provisions of the Indian Standard, provided always that the product thus marked conform to all the requirements of the specification.

4. CONTROL UNIT - The prescribed quantity of pipes that is made to the same specified outside diameter and specified wall thickness, from coils/plates produced by the same hot rolling practice (as applicable to welded pipe), by the same pipe-manufacturing process, from the same heat and under the same pipe-manufacturing conditions (As per cl.3.1.60 of API Spec 5L (46th Edition))

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.

All the production which conforms to the Indian Standards and covered by the licence should be marked with Standard Mark.

MANUFACTURING- The pipe shall be manufactured in accordance with applicable requirements and limitations given in clause 8 of API Spec 5L (46th Edition).

The purchaser information shall include details as per clause 7 of API Spec 5L (46th Edition).

The general technical delivery requirements shall be as per clause 9.1 of API Spec 5L (46th Edition).

Pipe loading requirements, if applicable, shall be in accordance with clause 14 API Spec 5L (46th Edition).

If agreed, the manufacturer shall supply weldability data for the type of steel concerned or perform weldability tests as per API Spec 5L (46th Edition).

Reprocessing shall be done as per clause 10 2.11 of API Spec 5L (46th Edition)..

6. TEST CERTIFICATE - Each consignment of BIS Certified material conforming to IS/ISO 3183:2019 shall be accompanied with requisite certificate in accordance with ISO 10474:1991 or EN 10204:2004.

7. 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.

SCHEME OF INSPECTION AND TESTING
FOR PETROLEUM AND NATURAL GAS INDUSTRIES —
STEEL PIPE FOR PIPELINE TRANSPORTATION SYSTEMS
According to IS/ISO 3183:2012
TABLE 1: LEVELS OF CONTROL

(1)				(2)	(3)		
Test Details				Test equipment requirement R:Required (or) S: Sub-contracting permitted	Levels of Control		
Clause	Requirements	Test Method			No. of Samples	Frequency	Remarks
		Clause	Reference				
8	Manufacturing	8.1 to 8.13	API Spec 5L (46 th Edition)	R	The pipe shall be manufactured in accordance with applicable requirements and limitations given in clause 8 of API Spec 5L (46 th Edition)		
9.2	Chemical Composition	9.2.1 to 9.2.5 (Table 4 , 5) 10.2.4.1& 10.2.12.1	API Spec 5L (46 th Edition) Any other established instrumental/chemical method IS 228(various parts)/ISO 14284/ASTM E1806	S	1	Each Cast	In case the starting Material (base steel) is certified by the supplier according to the requirements of API Spec 5L (46th Edition), no further testing is required
9.3	Tensile Properties	9.3.1, 9.3.2 (Table 6 , 7) 10.2.3.1, 10.2.3.2, 10.2.4.2 &10.2.12.2	API Spec 5L (46 th Edition) IS 1608 Pt.1/ISO 6892-1/ASTM A 370	R	1	Once per lot of 25 tonnes of Pipes or part thereof	
9.4	Hydrostatic Test	9.4.1, 9.4.2, 10.2.3.1 & 10.2.6	API Spec 5L (46 th Edition)	R	Each Pipe	Each Pipe	
9.5	Bend test	9.5,	API Spec 5L (46 th Edition)	R	1	Once per lot of 25 tonnes	

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		10.2.3. 1, 10.2.3. 5 , 10.2.4. 5 &10.2. 12.4	IS 2329/ISO 8491/AST M A370			of Pipes or part thereof	
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9.6	Flattening Test	9.6, 10.2.3.1, 10.2.3.7, 10.2.4.7, Fig 6 & 10.2.12.3	API Spec 5L (46 th Edition) IS 2328/ISO 8492/ASTM A370	R	1	Once per lot of 25 tonnes of Pipes or part thereof	
9.7	Guided-Bend Test	9.7.1, 9.7.2, 10.2.3.6, Fig 8 , 10.2.4.6 & 10.2.12.5	API Spec 5L (46 th Edition) IS 1599/ISO 5173/ASTM A370	R	1	Once per lot of 50 lengths of pipe of the same grade or part thereof	
9.8	CVN impact test for PSL 2 pipe	9.8.1, 9.8.2, 9.8.3, 10.2.3.1, 10.2.3.3 10.2.4.3 , Fig 7 , Annex 'G' &10.2.12.6	API Spec 5L (46 th Edition) ASTM A 370 IS 1757 Part 1	R	1	Pipes having Same cold-Expansion Ratio or part thereof	
9.9	DWT test for PSL 2 welded pipe	9.9.1, 9.9.2, 10.2.3.1, 10.2.3.4 , 10.2.4.4	API Spec 5L (46 th Edition) API 5L3	R	1	Pipes having Same cold-Expansion Ratio or part thereof	

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		&10.2. 12.8					
9.10	Surface conditions, Imperfections & Defects	9.10.1 To 9.10.7 , 10.2.7 10.2.10 Annex E	API Spec 5L (46 th Edition)	R	Each pipe	Each Pipe	Pipes failing in this requirement shall not be marked

9.11 & 9.14	Dimensions, Mass & Tolerances	9.11.1 to 9.11.3, 9.14.1 to 9.14.3 & 10.2.8 to 10.2.9	API Spec 5L (46 th Edition)	R	1	Once per 4 hours per operating shift	The record shall be maintained and in case sample fails, the production of that four hours shall not be marked.
9.12	Finish of Pipe Ends	9.12.1 To 9.12.5 & 12.2	API Spec 5L (46 th Edition)	R	Each Pipe (Threaded ends shall be checked with ring gauges)	Each Pipe	Pipes failing in this requirement shall not be marked.
9.13	Tolerances for the Weld Seam	9.13.1 To 9.13.3 & 10.2.5	API Spec 5L (46 th Edition)	R	1	One Control Unit	Every Shift plus in case of change of pipe size during shift
9.15	Weldability of PSL 2 Pipe	9.15	API Spec 5L (46 th Edition)	S	If agreed the manufacturer shall supply weldability data for the type of steel concerned or perform weldability tests for which details of carrying out tests and the acceptance criteria shall be as specified in the purchase order		
10.2.4.8	Hardness Test	10.2.4.8	API Spec 5L (46 th Edition) ISO 6506, IS 6507, ASTM A370 ASTM A956 ASTMA1038 ASTME110	R	When suspected hard spots are detected by visual inspection, hardness test shall be carried out This test shall be carried out when any hard spot exceeding 50 mm is observed in any direction		
10.2.5	Macrographic and Metallographic Tests	10.2.5.1 to 10.2.5.4	API Spec 5L (46 th Edition)	R	One	Once per operating shift plus whenever any change of Pipe size occurs during shift	---
10.2.7	Visual inspection	10.2.7	API Spec 5L (46 th Edition)	R	Each pipe	Each Pipe	Except as followed by cl.10.2.7.2 of API Spec 5L(46 th Edition)
8.11	Welded Joints	Annex 'M'	API Spec 5L (46 th Edition)	R	Joints may be furnished if agreed.		

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Annex -F	Couplings(PSL 1 only)mm	Annex 'F'	API Spec 5L (46 th Edition)	R	5% with ring gauge on both ends and record of tensile test (one test for each consignment) shall be made available from the supplier
Annex H	PSL 2 Pipe Ordered for Sour Service	Annex H Annex K	API Spec 5L (46 th Edition)	R	Applies for PSL 2 pipes that is ordered for sour service.
Annex I	Pipe Ordered as TFL Pipe	Annex I	API Spec 5L (46 th Edition)	R	Applies for pipe that is ordered as TFL Pipe
Annex J	PSL 2 Pipe Ordered for Offshore Services	Annex J Annex K	API Spec 5L (46 th Edition)	R	Applies to PSL 2 Pipe ordered for Offshore services
Annex N	PSL 2 Pipe Ordered for Applications Requiring Longitudinal Plastic Strain Capacity	Annex N	API Spec 5L (46 th Edition)	R	Applies to PSL 2 Pipe that is ordered for applications with designs requiring longitudinal plastic strain capacity
Annex A	PSL 2 Pipe for European onshore natural gas transmission pipelines	Annex A	IS/ISO 3183:2019	R	Applies to PSL 2 Pipe ordered for European onshore natural gas transmission pipelines
4.4	Marking	4.4.1 to 4.4.3 11.2	IS/ISO 3183:2019 API Spec 5L (46 th Edition)	R	The requirements specified in API Spec 5L, 46th edition (2018) shall apply together with the exceptions specified in 4.4.2 to 4.4.3. Pipes shall be marked as per cl 4.4.2 or cl 4.4.3. Additional markings, as desired by the manufacturer or as specified in the purchase order, may be applied, provided that they do not interrupt the sequence of the required markings per 4.4.2 or 4.4.3. If additional markings are used, these markings shall be located after the end of the required marking sequence or as a separate marking at some other location on the pipe.

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 for approval to BO head.