



उत्पाद मानुयल
धातु बनाने के लिए उपकरण स्टील फोर्जिंग
IS 13387:1992 के अनुसार

PRODUCT MANUAL FOR
Tool Steel Forgings for Metal Forming
According to IS 13387:1992

भारतीय मानक ब्यूरो)अनुरूपता मूल्यांकन (विनियम की स्कीम-I के तहत यह उत्पाद मानुयल प्रमाणीकरणके प्रचलन मे रीति और पारदर्शिता के सुसंगता सुनिश्चित करने के लिए सभी क्षेत्रीय/शाखा कार्यालयों एवं लाइसेन्स धारियों द्वारा संदर्भ सामग्री के रूप मे 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 13387:1992
	शीर्षक Title	:	Tool Steel Forgings for Metal Forming
	संशोधन संख्या No. of amendments	:	1
2.	नमूनाकरण दिशा निर्देश Sampling Guidelines		
a)	कच्चा माल Raw material	:	Chemical composition (ladle analysis) of the steel shall be as per Cl.10 of IS 13387. Those forging manufacturers who are procuring steel from outside, shall ensure that the steel is received with test certificate of ladle analysis from the steel manufacturer indicating conformity to the chemical composition requirement of the Indian Standard. (Please also see Cl 10 in Scheme of Inspection and Testing at Annex C)
b)	समूहिकरण दिशा निर्देश Grouping Guidelines	:	Please see Annex-A

c)	नमूने का परिमाण Sample Size	:	For Physical test: Prepared test specimen for Decarburization (cl.7.), Freedom from Defects (cl.8.), Hardness (cl.11.) For chemical test : 5 pieces of 50 mm length/50 g drilling (Samples are to be drawn by discarding the heat affected zone in case of gas cutting) No market samples shall be drawn for the product as the product is bulky in nature
3.	परीक्षण उपकरणों की सूची List of Test Equipment	:	Please refer Annex – B
4.	निरीक्षण व परीक्षण स्कीम Scheme of Inspection and Testing	:	Please refer Annex - C
5.	एक दिन में संभावित परीक्षण Possible tests in a day	:	All tests are possible to be carried out in a day
6.	लाइसेन्स का कार्यक्षेत्र / Scope of the Licence :		
	IS 13387:1992 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 IS 13387:1992 with the following scope:		
	Name of the product	Tool Steel Forgings for Metal Forming- Specifications	
	Designation	T158, T118Cr2, T103V2,.....	

ANNEXURE A
TO PRODUCT MANUAL FOR
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1) IS 13387:1992 classifies Tool Steel Forgings for Metal Forming into Designations for Cold Forming and Hot Forming as per Table 2 and specifies the application against which the designations are generally used for. Grade Designations have been grouped based upon their application.

2) For the purpose of GoL/CSoL, the following Grouping Guidelines are proposed:-

Group	Cold Forming/Hot Forming	Application	Designations	Grouping
1	Cold Forming	Dies for Cold Forming	T158 T118Cr2 T103V2	One sample of any one of the designations from the group shall be drawn to cover all designations within the group
2	Cold Forming	Press Die for Cold Forming	T90Mn6Cr2V2W2	One sample of the designation shall be drawn to cover the designation in the scope of the licence
3	Cold Forming	Wire Drawing Die, for press, die for powder, die for thread rolling, cold forging, cold forging roll	T215Cr48 T150Cr48Mo10V4 T210Cr54 T100Cr20Mo10V4	One sample of any one of the designations from the group shall be drawn to cover all designations within the group
4	Hot Forming	Dies for Press Forging, Dies for upsetter, dies for extrusion	T37Cr20Si4Mo50V4 T37Cr20Si4Mo50V4W5 T30Cr10V4W38	One sample of any one of the designations from the group shall be drawn to cover all designations within the group
5	Hot Forming	Dies for hot forging in hammer and press	T55Ni8Cr3Mo3V2 T55Ni8Cr4Mo5V2	One sample of any one of the designations from the group shall be drawn to cover all designations within the group

3) However, it shall be ensured that the firm is having all the necessary manufacturing and testing facilities for manufacturing/testing of all the designations covered in the scope of the licence.

4) During the operation of the licence, BOs shall ensure that all designations covered in the scope of the licence are drawn for independent testing in rotation over a period of time.

ANNEXURE B
TO PRODUCT MANUAL FOR
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LIST OF TEST EQUIPMENTS

Major test equipment essentially required to test as per requirements of Indian Standard.

Sl. No.	Test Equipment/Chemicals and Identification Numbers (Where applicable)	Tests Used in with Clause Reference
1.	Microscope with 100X magnification, Sample Preparation Equipment (as per cl.6.1 of IS 6396), Sample Polishing Equipment, Clamp or Plastic Mount, Etchant (100% nital).	Decarburization Cl 7
2.	Vernier Caliper, Steel Scale, Steel Tape, Weighing Scale, Radius Gauge, Drafter	Dimensions and Tolerances, Cl 9
3.	Brinell Hardness Test Machine, Indenter, Indentation diameter measuring system	Hardness test ,Cl 11
4.	Instrumental methods Spectrometer: atomic-absorption spectrometry, inductively coupled plasma atomic emission, inductively coupled plasma mass spectrometry techniques, spark source optical emission spectrometry. spectro polisher(sample preparation) Spectrophotometer, Oxygen Nitrogen Analyzer/Gas Analyzer	Chemical Composition (C, S, P, Mn, Si, Ni, Cr, Mo, V, Al, Cu, B, Sn, W,O) cl.10.

5.	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	for C& S, chemical method as per IS 228, alternative to instrumental method, cl.10., Table 2
6.	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 (KMnO_4), Sodium Nitrite (Na_2NO_3), Ammonium Molybdate [(NH_4)$_2$ Mo_2O_7], Ammonium Phosphate [(NH_4)$_3$ PO_4], Potassium Nitrate (K_2NO_3), Phenolphthalein Solution, Rectified spirit or methyl alcohol, Sodium Hydroxide (NaOH), Hydrofluoric Acid (HF), Perchloric Acid (HClO_4), Sulphurous Acid, Hydrobromic Acid (HBr), other chemicals and reagent as applicable	Phosphorus content, chemical method as per IS 228, alternative to instrumental method, cl.10., Table 2
7.	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 as per IS 228, alternative to instrumental method, cl.10., Table 2
8.	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 as per IS 228, alternative to instrumental method, cl.10., Table 2

9.	Plate, Muffle Furnace, porcelain or silica crucible, Reagents: HotWash Solution(dilute sulphuric acid solution 1: 99 v/v with hydrogen sulphide), dilute sulphuric acid, hydrogen sulphide, Dilute Nitric Acid, Sodium Fluoride, solid, Dilute Ammonium Hydroxide, Acetic Acid, Potassium Iodide, Starch Solution, Sodium Thiosulphate Solution, Ammonium Bifluoride Solution	Cu content, chemical method as per IS 228, alternative to instrumental method, cl.10.
10.	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 as per IS 228, alternative to instrumental method, cl.10., Table 2
11.	Reagents: Perchloric Acid, Phosphoric Acid, Nitric Acid, Hydrochloric Acid, Dilute sulphuric acid, potassium thiocyanate solution, stannous chloride solution, n-butyl acetate, Iron-Mo free, molybdenum metal (99.9 pc pure) Spectrophotometer, Volumetric flask, conical flask, titration apparatus(burette, pipette etc.), hot plate, thermometer, separating funnel, dry filter paper and other laboratory glassware and apparatus	Mo content (for determination of Mo by thiocyanate photometric method) method in low and high alloy steels for Mo 0.01 to 1.50 percent), cl.10., Table 2
12.	Reagents: Dilute sulphuric acid, conc nitric acid, hydrofluoric acid, boric acid solution, potassium bisulphite, ferrous sulphate solution, Alpha-Benzoinoxime Solution, Bromine Water, Sulphuric Acid-Benzoinoxime Wash Solution, Dilute Ammonium Hydroxide Solution, Concentrated Hydrochloric Acid, Dilute Hydrochloric Acid, Tartaric Acid, solid, Hydrogen Sulphide, gas, Hydrogen sulphide Wash Solution, Cinchonine Solution Platinum crucible, Volumetric flask, conical flask, titration apparatus (burette, pipette etc.), hot plate, thermometer, separating funnel, ashless filter paper and other laboratory glassware and apparatus	Mo content (for determination of Mo by Alpha-benzoinoxime method in alloy steels for Mo > 1 percent and not containing Tungsten), cl.10., Table 2
13.	Sulphuric Acid, Phosphoric Acid, Nitric Acid, Sodium Hydroxide Solution, Hydrochloric Acid, Potassium Thiocyanate Solution, Stannous Chloride Solution, Titanium Trichloride Solution, Standard Tungsten Solution, Spectrophotometer, Pure Iron	W content (by spectrophotometric method (For Tungsten 0.1 To 2 Percent), cl.10., Table 2

Note 1: The above is an indicative list for the purpose of guidance only and may not be treated as exhaustive

ANNEXURE C
TO PRODUCT MANUAL FOR
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SCHEME OF INSPECTION AND TESTING

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 and implement 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, 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 - For the purpose of this scheme material or part thereof representing all forgings of the same cast, grade and manufactured under uniform conditions of production in the same place 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.

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

6. TEST CERTIFICATE - For each consignment of BIS Certified material conforming to IS 13387:1992 there shall be a test certificate which shall contain the Standard Mark, the cast/Control Unit number and the corresponding test results (as given in Annexure-I enclosed)

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. Any rejected material which is potentially re-salable be sheared or cut or deformed in such a manner that it cannot be used for any other purpose except re-melting. A separate record shall be maintained giving information on quantity and cast number/control unit number, as applicable, relating to all such rejections/defective/sub-standard material of the production not conforming to the requirements of the Specification and the method of its disposal. Such material shall in no case be stored together with that conforming to the Specification. The Standard Mark (if already applied) on rejected material should be defaced.

TABLE 1: LEVELS OF CONTROL

(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	Manufacture	5	IS 13387	R	-----	-----	Applicable for all manufacturers including: i) manufacturers with steel making facilities i i) Manufacturers without steel making facilities producing forgings from Ingots as raw material: Must ensure that Ingots procured by them comply with Cl 5 of IS 13387:1992 . Accordingly, records in support of the same shall be maintained which shall include raw material certificate indicating steel manufacturing process, freedom from defects, microstructure etc.
7	Decarburization	7	IS 13387 IS 6396	R	One	Each Heat	----
8	Freedom from defects	8.1	IS 13387	R			Adequate inspection to ensure each forging is free from harmful internal and surface defects as agreed to between manufacturer and purchaser

9	Tolerances	9	IS 13387 IS 3469 (Part 1 to 3)	R	Adequate inspection to ensure that each forging conforms to the requirement of the specification		Tolerances on Rough Machined Forgings shall be as agreed to between the manufacturer and purchaser
10	Chemical Composition						
	Ladle Analysis	10 & Table 2	Chemical composition shall be determined either by method specified in IS 228 or any other established instrumental/Chemical Method	R*	One	Each Heat	*In house chemical analysis (ladle analysis) testing facility is only required in case of manufacturers with steelmaking facilities, Those forging manufacturers, who are procuring steel from outside, shall ensure that the steel is received with test certificate of ladle analysis from the steel manufacturer indicating conformity to the chemical composition requirement of the Indian Standard. (these manufacturers need not establish in house chemical testing facilities)
11	Hardness	11	IS 13387 IS 1500(Part 1)	R	One	Each Heat	-----
12	Additional tests	12	IS 13387	S	Requirements as agreed between purchaser and manufacturer. Test Method for all additional tests to be specified by the manufacturer.		

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: The control unit and levels of control as decided by the Bureau are obligatory to which the licensee shall comply with.

ANNEXURE I**Page 4 of 4**

(Para 6 of the Scheme of Inspection and Testing)

XYZ IRON AND STEEL COMPANY

(Registered office Address and works address)

TEST CERTIFICATE FOR Tool Steel Forgings for Metal Forming**TEST CERTIFICATE No.**

DATE_____

BIS
STANDA
RD
MARK

To M/s_____

We certified that the material described below fully conforms to **13387:1992** Chemical composition and Mechanical properties of the product, as tested in accordance with the Scheme of Testing and Inspection contained in the BIS Certification Marks Licence No. CM/L_ _____ are as

indicated below against each order No.

(PLEASE REFER TO IS **13387:1992** FOR DETAILS OF SPECIFICATION REQUIREMENTS)

TEST RESULTS

Order No. & Date	Size	Control Unit No.	Grade	Quantity in tonnes	CHEMICAL COMPOSITION										MECHANICAL PROPERTIES	Decarburization	Freedom from Defects	Additional Tests	Remarks
					C %	Si %	Mn %	Ni %	Cr %	Mo %	V %	W %	S %	P %					

REMARKS

WAGON

NO.

TRUCK NO.

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

FOR XYZ IRON AND STEEL COMPANY