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उत्पाद मानुयल
STEELS FOR DIE BLOCKS FOR DROP FORGING
IS 5518:1996 के अनुसार

PRODUCT MANUAL For
STEELS FOR DIE BLOCKS FOR DROP FORGING
ACCORDING TO IS 5518:1996

भारतीय मानक ब्यूरो) अनुरूपता मूल्यांकन (विनियम की स्कीम-I के तहत यह उत्पाद मानुयल प्रमाणीकरण के प्रचलन मेरीति और पारदर्शिता के सुसंगत सुनिश्चित करने के लिए सभी क्षेत्रीय/शाखा कार्यालयों एवं लाइसेंसधारियों द्वारा सन्दर्भ सामग्री के रूप में उपयोग किया जाएगा। बीआईएस लाइसेंस/प्रमाणपत्र 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, 2008 for various products. The document may also be used by prospective applicants desirous of obtaining BIS certification licence/certificate.

1.	उत्पाद Product	:	IS 5518:1996
	शीर्षक Title	:	STEELS FOR DIE BLOCKS FOR DROP FORGING
	संशोधन संख्या No. of amendments	:	00
2.	नमूनाकरण दिशानिर्देश Sampling Guidelines		
a)	कच्चा माल Raw material	:	No specific requirement
b)	समूहिकरण दिशानिर्देश Grouping Guidelines	:	Please refer Annex –A
c)	नमूने का परिमाण Sample Size	:	For Chemical tests: i) For instrumental chemical analysis - 5 pieces of 5 cm ii) For Wet Chemical analysis

		- 50 gm drillings For Mechanical tests- 1no. x 1mtr
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 can be performed in a day except for additional test as per clause 15 of IS 5518:1996
6.	लाइसेन्स का कार्य क्षेत्र/Scope of the Licence:	
	IS 5518:1996 के अनुसार मानक मुहर का उपयोग करने के लिए लाइसेन्स निम्न लिखित कार्य क्षेत्र के लिए प्रदान किया जाता है Licence is granted to use Standard Mark as per IS 5518:1996 with the following scope:	
	Name of the product	Steels For Die Blocks For Drop Forging
	Steel Designation	60T6, T60Ni5 etc...
	Condition of supply	Annealed or hardened and tempered (Temper designations i.e. A, B, C, D, E)
	Form, Shape and Size	Square bar/section die blocks of size .. mm up to and including .. mm Rectangular bar/section die blocks of sizes ..x.. mm up to and including ..x ..mm Roundbar/ circular section die blocks of sizes (Dia) ..x.. mm up to and including .. x .. mm
	Optional Requirements	With or Without macro etch test, Cleanliness test, distribution of carbides ...

ANNEX-A

GROUPING GUIDELINES

Grouping of different steel designations has been done on the basis of chemical composition/alloying elements and condition of supply. Guidelines for drawing of samples from each group are as under:

Group	Steel Designation	Remarks
1	60T6 T60Ni5 T55Ni6Cr3 T50NiCrMo4 T55Ni6Cr3Mo3	One sample of any steel designation within the group of any form, size, shape shall be drawn and tested for all requirements of the specification, as applicable, to cover all steel designations, sizes and shapes within the group. However, separate samples of each condition of supply, i.e. annealed or hardened and tempered, shall be drawn and tested.
2	T55Ni7Cr4Mo5V1 T55Ni7Cr3Mo3V1	One sample of any steel designation within the group of any form, size, shape, shall be drawn and tested for all requirements of the specification, as applicable, to cover all steel designations, sizes and shapes within the group. However, separate samples of each condition of supply, i.e. annealed or hardened and tempered, shall be drawn and tested. For die blocks supplied in hardened in tempered condition, the sample of the highest temper designation (i.e. highest hardness range) may be drawn to cover the lower tempers as well. e.g. Sample of temper designation A can be drawn to cover all the designations i.e. A, B, C, D, E

1. If the above sample passes, then licence may be granted/inclusion be done for the Steel designations, for all sizes and varieties of the Group.
2. However, it shall be ensured that necessary manufacturing facilities, testing equipment for all requirements are available with manufacturer.
3. During the operation of licence, BO shall ensure that all the sizes/grade designations/ varieties covered in the license are drawn for independent testing on rotation over a period of time.

ANNEX B
LIST OF TEST EQUIPMENTS

Major test equipment required to test the requirements of the Indian Standard.

Sl. No.	Test Equipment/Chemicals and Identification Numbers (Where applicable)	Tests Used in with Clause Reference
1.	Rough Polishing Machine, Abrasive Cutting Machine, Fine Polishing Machine, Grinding Machine, Molding machine, Longitudinal cutting machine	Preparation of Specimen
2.	Vision-based inspection system, metallurgical microscope	Cl. 6 (Freedom from Defects)
3.	Device for instrumental chemical analysis such as Optical Spectrometer with all requisite channels, certified reference materials. OR Equipment, Apparatus and reagents as per the relevant parts of IS 228 in case of analysis as per IS 228.	Cl.7 for Chemical Composition
4.	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	Cl.7 (Carbon & Sulphur) (chemical method, alternative to instrumental method)
5.	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 ₂ NO ₃), Ammonium Molybdate [(NH ₄) ₂ Mo ₂ O ₇], Ammonium Phosphate [(NH ₄) ₃ PO ₄], Potassium Nitrate (K ₂ NO 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	Cl.7 (Phosphorous content) (chemical method, alternative to instrumental method)

6.	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	Cl.7 (Mn content) (chemical method, alternative to instrumental method)
7.	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	Cl. 7 (Si content) (chemical method, alternative to instrumental method)
8.	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	Cl.7 (Cu content) (chemical method, alternative to instrumental method)
9.	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	Cl.7 (Ni content) (chemical method, alternative to instrumental method)
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.	Cl.7 (Cr content) (chemical method, alternative to instrumental method)
11.	Hardness Tester (Brinell)- with tungsten carbide Indenter, Brinell Microscope	Cl. 9 (Brinell Hardness test)
12.	Vernier Caliper, Micrometer, Steel Scale, Measuring Tape,	Cl.12 (Dimensional Tolerances)
13.	Ultrasonic flaw detector with amplifier/attenuator calibrated in steps of at least 2dB, CRT/Monitor, Double Crystal probes, calibration blocks	Cl. 14 (Ultrasonic Test)
14.	Machine grinding unit with metallographic polish paper No. 00, 000 for finer finish, etchant (See table 1 of IS 11371)	Cl. 15.1 (Macro etch test)
15.	Fixed or mobile MPI equipment, Inspection medium	Cl.15.1 (Cleanliness Test)
16.	Metallurgical microscope(1000X), photomicrographs of series NA, NH, LE, LD	Cl.15.1 (Distribution of carbides)

Note 1: The above is an indicative list for the purpose of guidance only

Note 2: The least count/accuracy, range and specification of the apparatus, chemicals and reagents used shall be as per the Indian Standards Specifications.

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** – The Standard Mark as given in schedule of the licence and Licence Number (i.e. CM/L.....) shall be incorporated on each bar or bundle of bars or the test certificate, and the marking 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. In addition, details of BIS website shall be marked as follows: “For details of BIS certification please visit www.bis.gov.in”.
4. **CONTROL UNIT** – For the purpose of this Scheme, a control unit is defined as material of same cast, steel designation, condition & shape and processed to same nominal dimensions under uniform conditions of production.
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. **TEST CERTIFICATE** - For each consignment of BIS Certified material conforming to IS 5518:1996 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
(PARA 5 OF THE SCHEME OF INSPECTION AND TESTING)**

(1)				(2)	(3)		
Test Details				Test equipment requirement R: required(or)S: Sub-contracting permitted	Levelsof Control		
Cl.	Requirement	Test Methods			No. of Sample	Frequency	Remarks
		Clause	Reference				
5	Manufacture (Reduction ratio, defect, depth of conditioning)	5	IS5518:1996	R	Each Item	Each Item	If found defective, item shall be rejected and not be marked.
6	Freedom from Defects	6	IS5518:1996	R	-do-	-do-	-do-
7	Chemical Composition						
7.1, 7.2	Ladle Analysis	Relevant part of IS 228/any other established instrumental/chemical method		R	One	Each Cast	
7.3	Check analysis		-do-	R	One	Each Cast	If required by the purchaser.
9	Hardness		IS 1500 (Part 1):2019	R	One	Each control unit	If supplied in bar form
					One	Each die block	If supplied as die blocks
12, 13	Dimensional Tolerances	12,13	IS 5518:1996	R	Each item	Each item	
14	Ultrasonic test		IS 3664:1981	R	Each bar of size 100 mm or above or each die block		
15	Additional tests						
i)	Macro Etch Test		IS 11371:1985	S	As agreed between purchaser and supplier		
ii)	Cleanliness Test		IS 10138 (Parts 1 to 3)	S	As agreed between purchaser and supplier		
iii)	Distribution of		IS 12211:1987	S	As agreed between purchaser and supplier		

	carbides				
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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

(Para 6 of the Scheme of Inspection and Testing)

XYZ IRON AND STEEL COMPANY

(Registered office Address and works address)

TEST CERTIFICATE FOR SPECIFICATION FOR Tool and Die Steels

BISSTAN
DARDMA
RK

TEST CERTIFICATE No. _____ DATE ____

To M/s _____

We certify that the material described below fully conforms to IS 5518:1996 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 _____ areas indicated below against each order No.

(PLEASE REFER TO IS 5596:1996 FOR DETAILS OF SPECIFICATION REQUIREMENTS)

TEST RESULTS

Order no and date	Size/ Shape /Type	Designation/Condition/Method of manufacture	Cast	Quantity	Chemical Composition												Hardness	Tolerances	Additional# tests/Remarks
					C	Si	Mn	P	S	Ni	Cr	Mo	Cu	Cr	W	V			

as required by purchaser

REMARKS

WAGON NO.

TRUCK NO.

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

FOR XYZ IRON AND STEEL COMPANY