



उत्पाद मैनुअल
औज़ार इस्पात - विशिष्ट
IS 3748: 2022 के अनुसार

Product Manual for
Tool Steels- Specification
According to IS 3748: 2022

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। दस्तावेज़ 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.	भारतीय मानक संख्या IS No.	:	IS 3748:2022
	शीर्षक Title	:	Tool Steels
	संशोधनों की संख्या No. of amendments	:	01
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	:	For chemical test: 5 pcs of 5 cm x 5 cm or 5 cm length For hardness test: Prepared pieces

		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	: Steel Grade/Name, Manufacturing Process, Heat Treatment Condition at Delivery, Form & Size. : 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
4.	निरीक्षण और परीक्षण की स्कीम Scheme of Inspection and Testing	: Please refer to Annex- C
5.	एक दिन में संभावित परीक्षण Possible tests in a day	
	All Tests can be carried out in a day 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 ready reference 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:	
	IS 3748:2022 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 3748:2022 with the following scope:	
7.	उत्पाद का नाम Name of the product	Tool Steels
	Steel Grade/Name	Non-Alloy Cold Work Tool Steels: C45U, C70U,.... Alloy Cold Work Tool Steels: 105V, 50WCrV8,....
	Manufacturing Process	Hot Rolled/Forged/Cold Drawn/Cold Rolled/Powder Metallurgy
	Heat Treatment Condition at Delivery	Untreated (+U), Annealed (soft annealed) (+A),.....
	Product Form and Size	Flats of Thickness fromxx....mm to up to and includingxx.... mm and Width fromxx.... mm to up to and including ...xx... mm

		Round Bars of Diameter fromxx.... mm to up to and includingxx.... mm Plates of Thickness fromxx.... mm to up to and includingxx.... mm, Width fromxx... mm to up to and includingxx....mm, Length from ...xx.... mm to up to and includingxx.... mm Any other shape and size as per enquiry and order
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BUREAU OF INDIAN STANDARDS
Manak Bhawan, 9, Bahadur Shah Zafar Marg,
New Delhi – 110002

ANNEX-A
TO PRODUCT MANUAL FOR
Tool Steels
According to IS 3748:2022

GROUPING GUIDELINES

- 1) IS 3748:2022 specifies requirements for the following grades of wrought tool steels: -
- a) non-alloy cold work tool steels;
 - b) alloy cold-work tool steels;
 - c) alloy-hot work tool steels;
 - d) high-speed tool steels
- 2) Further, Tool Steels manufactured all types of manufacturing processes such as Hot Rolled, Forged, Cold Drawn, Cold Rolled or the Powder Metallurgy route are covered under the standard which are supplied in one of the Heat Treatment conditions given in cl.6.2 and Table 1.
- 3) Further, all forms of steel, shapes and dimensions of Tool Steels manufactured by the above mentioned processed are covered under the standard.
- 4) In addition to the grades specified in Tables 2 to 9 of the standard, tool steel may also be supplied with chemical composition and mechanical properties as mutually agreed between the purchaser and the manufacturer. In this case, the designation of steel shall be given as per ISO/TS 4949.
- 5) In view of above, the following Grouping Guidelines shall be considered for the purpose of GoL/CSoL:-

Group	Steel Name/Grade	Grouping
1	Non-alloy cold work tool steels- C45U C70U C80U C90U C105U C120U	Two samples of steel names having the lowest and the highest carbon content , for each manufacturing process, each heat treatment condition of any form, shape and size, shall be drawn and tested to cover all steel names, processes, heat treatment conditions, forms, shapes and sizes within the group.
2	Alloy Cold Work Tool Steels- 105V 50WCrV8 60WCrV8 102Cr6 21MnCr5 70MnMoCr8 90MnCrv8 95MnWCr5 X100CrMoV5	Two samples of steel names having the lowest and highest alloying content (Cr+Mo+V+W), for each manufacturing process, each heat treatment condition of any form, shape and size, shall be drawn and tested to cover all steel names, processes, heat treatment conditions, forms, shapes and sizes within the group.

	X153CrMoV5 X210Cr12 X210CrW12 35CrMo7 X40Cr14 X93MnCrW5 (O1) X99CrMoV5 (A2) X150CrMoV12 (D2) X217CrVW12 (D3)	
3	Alloy Cold Work Tool Steels- 40CrMnNiMo8-6-4 45NiCrMo16 X38CrMo16	One sample of each steel name for each manufacturing process, each heat treatment condition of any form, shape and size, shall be drawn and tested to cover all steel names, processes, heat treatment conditions, forms, shapes and sizes within the group.
4	Alloy Hot Work Tool Steels- 32CrMoV12-28 X37CrMoV5-1 X38CrMoV5-3 X40CrMoV5-1 50CrMoV13-15 X38CrMoSi5-1-1 (H11) X38CrMoSiV5-1-1-1 (H13) 50CrMoSi13-15-2 (S7)	Two samples of steel names having the lowest and the highest carbon content , for each manufacturing process, each heat treatment condition of any form, shape and size, shall be drawn and tested to cover all steel names, processes, heat treatment conditions, forms, shapes and sizes within the group.
5	Alloy Hot Work Tool Steels- 55NiCrMoV7 X30WCrV9-3 X35CrWMoV5 38CrCoWV18-17-17 X31WCrV9-3 (H21) X35CrWMo5 (H12) 39CrCoWV18-17-17 (H19)	One sample of each steel name for each manufacturing process, each heat treatment condition of any form, shape and size, shall be drawn and tested to cover all steel names, processes, heat treatment conditions, forms, shapes and sizes within the group.
6	High Speed Tool Steels- HSO-4-1 HS1-4-2 HS18-0-1 HS2-9-2 HS1-8-1 HS3-3-2 HS6-5-2 HS6-5-2Cr HS6-5-3 HS6-5-3C HS6-6-2 HS6-5-4	Two samples of steel names having the lowest and highest alloying content (Cr+Mo+V+W), for each manufacturing process, each heat treatment condition of any form, shape and size, shall be drawn and tested to cover all steel names, processes, heat treatment conditions, forms, shapes and sizes within the group.
7	High Speed Tool Steels-	Two samples of steel names having the lowest and highest alloying content (Cr+Mo+V+W+Co), for

	HS6-5-2-5 HS6-5-3-8 HS10-4-3-10 HS2-9-1-8	each manufacturing process, each heat treatment condition of any form, shape and size, shall be drawn and tested to cover all steel names, processes, heat treatment conditions, forms, shapes and sizes within the group.
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6) In case the manufacturer opts to supply tool steels with chemical composition and mechanical properties as mutually agreed between the purchaser and the manufacturer, one sample of each steel designation (as given in ISO/TS 4949) for **each manufacturing process, each heat treatment condition** of any form, shape and size, shall be drawn and tested to cover that steel designation for **all processes, heat treatment conditions, forms, shapes and sizes**.

7) For the requirements of Shapes, Dimensions and Tolerances, a declaration shall be obtained from the manufacturer against the Forms of Steel, (such as Bar, Flat, Plate etc.) its Shapes (Round, Square, Hexagonal etc.), their sizes and their tolerances as agreed between the purchaser. Reference to corresponding International Standards or National Standards for such agreements shall be provided by the manufacturer.

Further, the requirements of Shapes, Dimensions and Tolerances shall be tested in the factory during PI on all samples drawn for I/T.

8) However, it shall be ensured that the firm is having all the necessary manufacturing and testing facilities for manufacturing/testing of all the steel names/manufacturing processes/heat treatment conditions/forms, shapes and sizes covered in the scope of the licence.

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

ANNEX – B
LIST OF TEST EQUIPMENTS
(INDICATIVE LIST, FOR GUIDANCE ONLY)

Major test equipment 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	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	Chemical Composition, cl.7.2. (C, Si, Mn, Ni, Cr, Mo, S, P,N, Cu, Al, Ti, Nb, Ce, Ta, Co, W, V)
2	<u>Any method can be used out of the below</u> Visual Examination, Magnetic Particle Inspection, Eddy Current Tester, Dye Penetrant Test Apparatus, Hot –Upsetting Tester, Cold Compression Testing Machine, Torsion Test machine, Ultrasonic Flaw Detector, Macro-Examination	Surface Quality, cl.7.3
3	Vernier Calipers, Micrometer, Scale, Cord, Measuring Tape, Straight Edge, Flat bench	Shapes, dimensions and tolerances, cl.7.4.
4	Brinell Hardness Tester, Rockwell Hardness Tester, Standard Calibration Blocks	Hardness Test, cl.7.2
5	Brinell Hardness Tester, Rockwell Hardness Tester, Standard Calibration Blocks, Salt Bath, Annealing Furnace,	Verification of Minimum Hardness in Hardening Test, Annex B.3
6	Weighing Bridge	Tolerance on Mass, Annex B.8
7	Ultrasonic flaw detector with amplifier/attenuator calibrated in steps of atleast 2dB, CRT/Monitor, Double Crystal probes, calibration blocks	Non-Destructive Test, Annex B.7

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

ANNEX- C SCHEME OF INSPECTION AND TESTING

1. QUALITY ASSURANCE PLAN

1.1 It is expected that during operation of BIS licence, manufacturers will implement a Quality Assurance Plan (QAP) 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 (QAP) defining the control unit (i.e. lot/batch etc.), the levels of control (i.e. the frequency and number of samples for conducting the different tests as per the Indian Standard) and declare the arrangement for testing i.e. whether in-house or subcontracting/sharing for each applicable test and submit the same to BIS Branch Office for information. The manufacturer shall comply with the QAP and maintain test records in accordance with para 2.1.

1.3 RECOMMENDED LEVELS OF CONTROL/CONTROL UNIT:

1.3.1 For the guidance of manufacturers, the recommended definition of control unit is: material of same cast, manufacturing process, heat treatment condition. form, shape and processed to same dimensions under uniform conditions of production shall constitute a 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. Manufacturer has the discretion of declaring their own levels of control or accept the levels of control given in this document.

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.

2. ENSURING COMPLIANCE THROUGH TESTING- manufacturers shall ensure compliance of their products to all the requirements of the Indian Standard for which they may have in-house test facilities. However, there is no obligation to maintain in-house laboratory. Licensee may use alternative arrangements for tests of the production as per the declared QAP. Various alternatives are available for operation of BIS certification as given below and the relevant guidelines for availing such relaxations by the manufacturers, as amended from time to time, are to be referred:

- i) Shared testing resources like common facility,
- ii) Cluster based testing facility,
- iii) Sub-contracting to outside laboratories which may either be:
 - a) BIS recognised/empanelled laboratories, or
 - b) Any accredited laboratory as per ISO/IEC 17025

2.1 TEST RECORDS- The manufacturers shall maintain test records for the tests carried out (either in-house or at a sub-contracted or at shared test facility) to establish conformity of the product to the Standard for operation of licence. For the tests being subcontracted or conducted at a shared test facility, test results issued by the laboratories or test facilities, shall be made 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 incorporated on the product and on the test certificate issued along with each consignment, 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.

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

3.2 Additional Marking requirements: Additionally, the following shall also be marked on each Package of the material:

- a) “For BIS certification details please visit www.bis.gov.in”
- b) Any other requirement not specified in the Indian Standard

4. TEST CERTIFICATE – For each consignment of BIS Certified material conforming to IS 3748:2022 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).

5. REJECTION - 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
(Recommended Levels of Control by BIS- For Guidance Only)

(1)				(3)		(4)
TEST DETAILS				LEVELS OF CONTROL		REMARKS
Clause	Requirements	Test Method		No. of Samples	Frequency	
		Clause	Reference			
7.2, 8.2.1.1	Chemical Composition					
	Ladle Analysis	7.2, Table-2, 4, 6, 8	IS 228 (all parts) Any other established instrumental/chemical method	One	Each Heat	Applicable for manufacturers having steel making facilities only
	Product Analysis	Annex B.2, Table-3, 5, 7, 9	IS 228 (all parts) Any other established instrumental/chemical method	i) Nil ii) One	i) Nil ii) Each Cast	i) For manufacturers having steel making facilities only. Testing can be carried out if specified in enquiry or order. ii) For manufacturers not having steel making facilities and are procuring raw material steel from outside for further rolling/forging. Such manufacturers must ensure that the raw material received is received with test certificate indicating results of Ladle Analysis of steel and proper traceability and records for the same shall be maintained. No further testing is required if the raw material is ISI marked and is received with test certificate.

7.2, 8.2.1.2	Mechanical Properties					
	Hardness	Table- 2, 4, 6, 8	IS 1500 (Part 1)/ISO 6506-1	One	Each Control Unit	—
	Verification of Minimum Hardness in the Hardening Test	Tables-2, 4, 6, 8 Fig 1, Fig 2	IS 1586 (Part1)/ISO 6508-1	—	—	To be carried when specified in enquiry or order
7.3	Surface Quality	7.3.1 to 7.3.3	IS 3748 ISO 9443 ISO 7788	Manufacturers shall maintain adequate inspections/in process controls to ensure freedom from surface imperfections, discontinuities and decarburization. The Machining Allowances shall be agreed at the time of enquiry or order		
		Annex B.5	IS 3748	—	—	The surface quality shall comply with the requirements agreed at the time of enquiry or order. In addition, the details for sampling and for preparation of the test pieces for testing the surface quality shall be agreed at the time of enquiry and order.
7.4	Shapes, Dimensions and Tolerances	7.4	IS 3748 IS 1730/ISO 1035-1 ISO 1035-3 ISO 1035-4 IS 16998/ISO 7542	Adequate inspection to ensure that the material conforms to the requirements of the specification.		
	Special Dimensional Inspection	Annex B.6	IS 3748	—	—	As agreed no. of products shall be inspected for their shape and dimension.
Annex B.4	Structure	—	IS 3748	—	—	To be carried when specified in enquiry or order.

Annex B.7	Non-Destructive Tests	—	IS 3748 IS 4225/ISO 17577	—	—	The products shall be non-destructively tested under conditions and to an acceptance standard agreed at the time of enquiry and order. For plates, ISO 17577 acceptance class B1 shall apply unless otherwise agreed.
Annex B.8	Tolerance on Mass	—	IS 3748	—	—	The mass tolerances shall comply with the requirements agreed at the time of enquiry and order.
9, Annex B.9	Marking	—	IS 3748	The manufacturer shall mark the products or the bundles or boxes containing the products in a suitable way so that the identification of the cast, the steel type and the origin of delivery is possible. Special agreements for marking can also be agreed at the time of enquiry and order		

PM/3748/3
January 2026

Annexure-I
(Para 4 of the Scheme of Inspection and Testing)
XYZ IRON AND STEEL COMPANY
(Registered office Address and works address)

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

Test Certificate for Tool Steels
According to IS 3748:2022
TEST CERTIFICATE NO. _____

To M/s _____

Dated _____

It is certified that the material described below fully conforms to IS 3748:2022 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 3748:2022 FOR DETAILS OF SPECIFICATION REQUIREMENTS)

TEST RESULTS

Order No. & Date	Form, Shape, Size	Control Unit No.	Steel Name	Qty. (In tonnes)	Chemical Composition (in %)										Hardness	Surface Quality	Shape, Dimensions and Tolerances	Supplementary or special Requirements	Remarks
					C	Si	Mn	Ni	Cr	Mo	S	P	V	Co					

Remarks
Wagon No.
Truck No.

FOR XYZ IRON AND STEEL COMPANY

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