



उत्पाद मानुयल
स्प्रिंग वाशर के लिए स्टील के लिए विशिष्टता
IS 4072:1975 के अनुसार

PRODUCT MANUAL FOR
Specification for Steel for Spring Washers
According to IS 4072:1975

भारतीय मानक ब्यूरो (अनुरूपता मूल्यांकन (विनियम की स्कीम-I के तहत यह उत्पाद मानुयल प्रमाणीकरणके प्रचलन में रीति और पारदर्शिता के सुसंगतता सुनिश्चित करने के लिए सभी क्षेत्रीय/शाखा कार्यालयों एवं लाइसेन्स धारियों द्वारा संदर्भ सामग्री के रूप में 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 4072:1975
	शीर्षक Title	:	Specification for Steel for Spring Washers
	संशोधन संख्या No. of amendments	:	2
2.	नमूनाकरण दिशा निर्देश Sampling Guidelines		
a)	कच्चा माल Raw material	:	No specific raw material requirement
b)	समूहिकरण दिशा निर्देश Grouping Guidelines	:	Please see Annex-A

c)	नमूने का परिमाण Sample Size	:	For chemical tests: 5 pcs of 5 cm x 5 cm For physical tests : 1 pc of 500 mm length* *No samples may generally be drawn for the requirements of Freedom from Defects (cl.6.) and Rolling/Casting Tolerances (cl.7.) as these requirements may be tested in the factory.
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 4072:1975 के अनुसार मानक मुहर का उपयोग करने के लिए लाइसेन्स निम्नलिखित कार्यक्षेत्रके लिए प्रदान किया जाता है Licence is granted to use Standard Mark as per IS 4072:1975 with the following scope:		
	Name of the product	Specification for Steel for Spring Washers	
	Grade/Designation	1/55C6,2/65C6, 3/70C6, 4/80C6.....	
	Variety	Ingots/Billets/Slabs/Plate/Strip/Sheet/Wire Rod	
	Condition of Supply	As-cast/As-rolled/ As-rolled and Annealed/Hardened and Tempered	
	Sizes	Thickness fromxx... mm up to and includingxx... mm, Width fromxx... mm up to and includingxx... mm	

ANNEXURE A
TO PRODUCT MANUAL FOR
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1) IS 4072:1975 classifies Steel for Spring Washers into Grade/Designations as per Table 2 (also see Amendment No.02, Dec 1978). These Grade Designations have been grouped based upon the chemical composition/alloying elements.

2) For the purpose of GoL/CSoL, the following Grouping Guidelines may be considered:-

Group	Designations	Grouping
1	55C6 65C6 70C6 80C6	One sample of any designation, size, variety for each condition of supply shall be drawn from the group.
2	38Si7 50Si7 55Si7 60Si7	One sample of any designation, size, variety for each condition of supply shall be drawn from the group.
3	50CrV4	One sample of any size, variety for each condition of supply shall be drawn from the group.

2) During preliminary inspection, before drawing samples for independent testing, it shall be ensured by IO that tests for Freedom from Defects as per cl.6. and Rolling /Casting Tolerances as per cl.7. of IS 4072:1975 shall be carried out at factory premises on the samples to be drawn for independent testing as it is difficult to transport bulky samples to laboratory.

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
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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.	Vision based inspection system, Microscope with 100X magnification, Sample Preparation Equipment, Sample Polishing Equipment, Clamp or Plastic Mount, Etchant (100% nital).	Freedom from Defects cl.6.
2.	Vernier Caliper, Micrometer, Steel Scale, Steel Tape, Measuring Tape, Weighing Scale	Rolling/Casting Tolerances, cl .7., Calculation of Weight cl.8.
3	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	cl.5. Chemical Composition (C, S, P, Mn, Si, Cr,V)
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.5. Table 1

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 $[(\text{NH}_4)_2 \text{Mo}_2\text{O}_7]$, Ammonium Phosphate $[(\text{NH}_4)_3 \text{PO}_4]$, Potassium Nitrate ($\text{K}_2\text{NO}_3$), 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	Phosphorus content, chemical method as per IS 228, alternative to instrumental method, cl.5., Table 1
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.5., Table 1
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.5., Table 1
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.5., Table 1

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 the same cast, grade/designation 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 4072:1975 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				
4	Manufacture	4	IS 4072	R	-----	-----	Applicable for all manufacturers including: i) manufacturers with steel making facilities ii) Manufacturers without steel making facilities producing material from rolling of Ingots/Billets/Slabs as raw material: Must ensure that Ingots/Billets/Slabs procured by them are ISI marked only as per IS 4072.
5	Chemical Composition						

	Ladle Analysis	5.1, Table 2	IS 228 (various parts)	R	One	Each Heat	Applicable only for primary producers
	Product Analysis	5.1, Table 2	IS 228 (various parts)	R	i) NIL ii) One	i) NIL ii) Each Cast	i) For primary producers ii) For manufacturers without steel making facilities procuring Ingots/Billets/Slabs as raw material for further rolling, must ensure that the material procured by them is ISI marked only as per IS 4072 and is received with test certificate indicating results of ladle analysis. Further testing of chemical composition is not required for such manufacturers
6	Freedom from Defects	11	IS 4072	R	Adequate Inspection to ensure that each item is free from harmful defects		
7.1	Rolling Tolerances	7.1	IS 4072	R	Adequate Inspection to ensure that each item conforms to the requirements of the specification		
7.2	Casting Tolerances	7.2	IS 4072 IS 2830 IS 6914	R	Adequate Inspection to ensure that each item conforms to the requirements of the specification		
10	Rust Prevention	10	IS 4072	The surface of the material may be coated with a thin layer of anti-rust oil or anti-rust compound when agreed to between the purchaser and supplier			

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 Steel for Spring Washers**TEST CERTIFICATE No.**BIS
STANDA
RD
MARK

To M/s _____

DATE _____

We certified that the material described below fully conforms to **4072:1975** 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 **4072:1975** FOR DETAILS OF SPECIFICATION REQUIREMENTS)**TEST RESULTS**

Order No. & Date	Size	Control Unit No.	Grade	Quantity in tonnes	CHEMICAL COMPOSITION								Freedom from Defects	Rolling /Casting Tolerances	Remarks
					C %	Si %	Mn %	Ni %	Cr %	V %	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