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SPECIFICATION FOR STEEL CUT-WIRE SHOTS FOR USE IN FOUNDRIES

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INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
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SPECIFICATION FOR STEEL CUT-WIRE SHOTS FOR USE IN FOUNDRIES

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Indian Standard

SPECIFICATION FOR STEEL CUT-WIRE SHOTS FOR USE IN FOUNDRIES

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 30 December 1970, after the draft finalized by the Foundry Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 This specification is intended to assist foundries in the purchase and quality testing of steel cut-wire shots, and is based on SAE J441 'Recommended practice for cut steel wire shots', issued by Society of Automotive Engineers, Inc., New York, USA.

0.3 This standard contains clauses **5.1.1** and **7.1** which call for agreement between the purchaser and the manufacturer at the time of placing an order.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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1. SCOPE

1.1 This standard covers the requirements for steel cut-wire shots for use in foundries for blast cleaning processes.

2. DESIGNATION AND GRADING

2.1 Steel cut-wire shots shall be designated as 'S-CW' and graded by the shot number which represents the mean diameter of the wire in millimetres from which it is made (*see* Table 1).

3. SUPPLY OF MATERIAL

3.1 General requirements relating to the supply of steel cut-wire shots, shall be as laid down in IS : 1387-1967†.

*Rules for rounding off numerical values (*revised*).

†General requirements for the supply of metallurgical materials (*first revision*).

TABLE 1 DESIGNATION OF STEEL CUT-WIRE SHOTS AND DIAMETERS OF WIRE

(*Clauses* 2.1 *and* 5.1)

Grade Designation	Wire Diameter mm
S-CW160	1·60 ± 0·05
S-CW135	1·35 ± 0·05
S-CW118	1·18 ± 0·05
S-CW106	1·06 ± 0·05
S-CW 90	0·90 ± 0·025
S-CW 80	0·80 ± 0·025
S-CW 71	0·71 ± 0·025
S-CW 60	0·60 ± 0·025
S-CW 50	0·50 ± 0·025

4. CHEMICAL COMPOSITION

4.1 The material, when tested in accordance with the method given in IS : 228-1959*, shall have the following chemical composition:

Constituent	*Percent*
Carbon	0·45 to 0·75
Silicon	0·10 to 0·30
Manganese	0·60 to 1·20
Sulphur	0·050 *Max*
Phosphorus	0·045 *Max*

5. SIZE

5.1 The steel cut-wire shot shall be made from wire of the diameters given in Table 1.

5.1.1 Shot sizes varying from those given in the table may also be supplied by agreement between the purchaser and the manufacturer.

5.2 The combined length of 10 random steel cut-wire shot particles when mounted, ground and polished to the centre line of the cylinder longitudinal cross-section shall be within the limits given in Table 2.

6. WEIGHT

6.1 The total weight of 50 random particles shall be within the limits specified in Table 2.

*Methods of chemical analysis of pig iron, cast iron and plain carbon and low-alloy steels (*revised*).

TABLE 2 LENGTH AND WEIGHT LIMITS FOR STEEL CUT-WIRE SHOTS

(*Clauses* 5.2 *and* 6.1)

GRADE DESIGNATION	LENGTH OF 10 PIECES	WEIGHT OF 50 PIECES
	mm	g
S-CW160	16·00 ± 1·00	1·11 — 1·43
S-CW135	13·50 ± 1·00	0·68 — 0·91
S-CW118	11·80 ± 1·00	0·43 — 0·60
S-CW106	10·60 ± 1·00	0·30 — 0·44
S-CW 90	9·00 ± 0·75	0·20 — 0·26
S-CW 80	8·00 ± 0·75	0·13 — 0·18
S-CW 71	7·10 ± 0·75	0·09 — 0·13
S-CW 60	6·00 ± 0·50	0·06 — 0·08
S-CW 50	5·00 ± 0·50	0·03 — 0·05

7. TENSILE PROPERTIES

7.1 Steel cut-wire shots shall be made from the wire having tensile strength of 160 to 220 kgf/mm². For special applications, wire having tensile strength other than that specified above may be used by agreement between the purchaser and the manufacturer.

8. HARDNESS

8.1 The average hardness of the steel cut-wire shots shall be as given in Table 3.

8.1.1 In obtaining hardness values, particles shall be mounted in a suitable material, such as thermosetting plastic and polished. A minimum of 20 hardness readings shall be taken at random in accordance with the method given in IS:1501-1968*. A 5 kg load on indentor shall be applied during the test.

9. SOUNDNESS

9.1 Steel cut-wire shot particles shall be free from shear cracks and laps and shall not contain excessive seams or burrs.

10. SAMPLING

10.1 Samples each weighing 0·5 kg shall be taken from top, centre and bottom of at least five containers for every tonne of material. These shall be combined, mixed and quartered to obtain a 2·5 kg laboratory sample from which 100 g samples shall be taken for testing purposes. Three 100 g samples shall be required for testing, one for chemical composition, one for size and weight and one for hardness of material.

*Method for Vickers hardness test for steel (*first revision*).

TABLE 3 HARDNESS OF STEEL CUT-WIRE SHOT

(*Clause* 8.1)

GRADE DESIGNATION	HARDNESS VICKERS, *Min*
S-CW160	354
S-CW135	382
S-CW118	402
S-CW106	412
S-CW 90	434
S-CW 80	446
S-CW 71	458
S-CW 60 and S-CW50	484

11. RETEST

11.1 If the sample selected fails to meet the requirements given under **4**, **5**, **6** and **8**, two further samples shall be selected for each test. Should the two retests satisfy the requirements of this standard, the lot shall be accepted. Should either of the samples fail, the material shall be taken as not complying with the requirements of this standard.

12. PACKAGING

12.1 Unless specified otherwise, the material shall be supplied in waterproof double gunny bags or lined polythene bags each containing 50 kg.

13. MARKING

13.1 Each container shall be clearly marked with the following information:

a) Manufacturer's name or trade-mark, and

b) Designation of the material.

13.1.1 The material may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act, and the Rules and Regulations made thereunder. Presence of this mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard, under a well-defined system of inspection, testing and quality control during production. This system, which is devised and supervised by ISI and operated by the producer, has the further safeguard that the products as actually marketed are continuously checked by ISI for conformity to the standard. Details of conditions, under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

Quantity	*Unit*	*Symbol*
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	*Unit*	*Symbol*
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	*Unit*	*Symbol*	*Conversion*
Force	newton	N	1 N = 1 kg. 1 m/s^2
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Pressure, stress	pascal	Pa	1 Pa = 1 N/m^2

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