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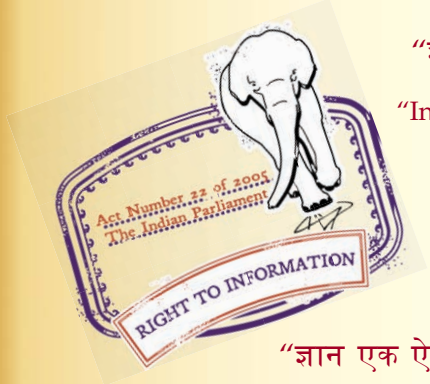

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Indian Standard

SPECIFICATION FOR COLD-ROLLED MEDIUM, HIGH CARBON AND LOW ALLOY STEEL STRIP FOR GENERAL ENGINEERING PURPOSES

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SPECIFICATION FOR COLD-ROLLED MEDIUM, HIGH CARBON AND LOW ALLOY STEEL STRIP FOR GENERAL ENGINEERING PURPOSES

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(*Continued on page* 9)

Indian Standard

SPECIFICATION FOR COLD-ROLLED MEDIUM, HIGH CARBON AND LOW ALLOY STEEL STRIP FOR GENERAL ENGINEERING PURPOSES

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 28 February 1974, after the draft finalized by the Wrought Steel Products Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 Cold-rolled steel strip is produced by cold rolling descaled hot-rolled strip between plain rolls to obtain a bright surface, closely controlled gauge, thinner gauges and a variety of tempers. In order to assist the manufacturer, the purchaser is recommended to indicate on the enquiry and order, the purpose for which the material is to be used. A drawing of the part in question is useful.

0.3 In cases where the manufacturer undertakes that the steel is suitable to make a particular part or for a given purpose, the steel should not be subject to rejection if there are minor variations from the specified chemical composition or mechanical properties, or both, for that steel. In such cases, the purchaser, when ordering the steel strips, should state that the strips should be ' suitable for making parts '.

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.

1. SCOPE

1.1 This standard covers the requirements for cold-rolled medium, and high carbon and low alloy steel strips of thickness up to 3 mm and width up to 330 mm intended for general engineering purposes.

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

2. SUPPLY OF MATERIAL

2.1 General requirements relating to the supply of cold-rolled medium, high carbon and low alloy steel strip shall conform to IS : 1387-1967*.

2.2 Cold-rolled steel strips shall be supplied in annealed, or annealed and re-rolled condition.

2.3 Cold-rolled steel strip shall be supplied in the form of coils.

3. MANUFACTURE

3.1 Strips shall be manufactured from steel made by open hearth, electric furnace, basic oxygen or duplex process or by a combination of these processes. In case any other process is employed in the manufacture, prior approval of the purchaser shall be obtained. If the basic oxygen process is employed for manufacture, the nitrogen content of steel shall not exceed 0·007 percent.

NOTE — Nitrogen content of the steel should be ensured by the manufacturer by occasional product analysis.

4. CHEMICAL ANALYSIS

4.1 Ladle Analysis — Ladle analysis of steel when determined in accordance with IS : 228-1959† shall be as given in Table 1.

4.2 Permissible variation in the case of product analysis from the limits specified in Table 1 shall be as given below:

Constituent	*Percentage Limit of Constituent*	*Permissible Variation* Percent
Carbon	Up to and including 0·50	±0·03
	Over 0·50 and up to 1·3	±0·04
Silicon	Up to and including 0·40	±0·03
Manganese	Up to and including 0·90	±0·04
Sulphur	Up to and including 0·040	+0·006
Phosphorus	Up to and including 0·040	+0·006
Chromium	Up to and including 0·50	±0·03
Tungsten	Up to and including 2·5	±0·05

5. HARDNESS TEST

5.1 One sample shall be taken for the hardness test for every 5 tonnes of a charge or a part thereof.

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

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

TABLE 1 LADLE ANALYSIS OF STEEL STRIP

(*Clause* 4.1)

Type	Steel Designation	Constituents, Percent						
		Carbon	Manganese	Silicon	Sulphur *Max*	Phosphorus *Max*	Chro-mium	Tungs-ten
Medium carbon	C40	0·35-0·45	0·60-0·90	0·15-0·35	0·040	0·040	—	—
	C55	0·50-0·60	0·50-0·65	0·15-0·35	0·040	0·040	—	—
High carbon	C70	0·65-0·75	0·50-0·80	0·10-0 35	0·040	0·040	—	—
	C80	0·75-0·85	0·50-0·80	0·10-0·35	0·040	0·040	—	—
	C85	0·80-0·90	0·50-0·80	0·10-0·35	0 040	0·040	—	—
	C98	0·90-1·05	0·50-0·80	0 10-0·35	0·040	0·040	—	—
High carbon low alloy	120Cr35	1·10-1·30	0·30-0·60	0·25 *Max*	0·030	0·030	0·20-0·50	—
	110Cr35W2	1·0-1·20	0·30-0·60	0·35 *Max*	0·030	0·030	0·20-0·50	2·0-2·5

NOTE — Closer or wider ranges of carbon and manganese contents may be specified subject to mutual agreement between the purchaser and the manufacturer.

5.2 Cold-rolled steel strip, when subjected to Rockwell hardness test in accordance with IS : 1586-1968* or IS : 5072-1969† whichever is applicable, shall conform to the requirements given in Table 2.

TABLE 2 ROCKWELL HARDNESS REQUIREMENTS

Steel Designation	Hardness			
	Annealed		Annealed and Re-rolled	
	HRB, *Max*	Equivalent HV, *Max*	HRC, *Max*	Equivalent HV, *Max*
C40	83·4	160	28	290
C55	85·0	165	35	350
C70	87·9	175	35	350
C80	91·6	190	35	350
C85	91·6	190	35	350
C98	94·8	205	35	350
120Cr35	97·5	220	35	350
110Cr35W2	97·5	220	35	350

6. FREEDOM FROM DEFECTS

6.1 The cold-rolled steel strip shall be free from harmful surface defects, such as, scales, rust, blisters, laminations, pitting, cracked edges, etc.

7. RETEST

7.1 Should any of the test pieces selected fails to pass any of the tests specified in this standard, two further samples shall be selected from the same lot for testing in respect of each failure. Should the test pieces from both these additional samples pass, the material represented by the test samples shall be deemed to comply with the requirements of that particular test. Should the test pieces from either of these additional samples fail the material represented by the test samples shall be deemed as not conforming to this standard.

8. EDGE CONDITION

8.1 Cold-rolled steel strip shall be supplied with mill, trimmed or slit edges as mutually agreed to between the manufacturer and the purchaser.

*Methods for Rockwell hardness test (B and C scales) for steel (*first revision*).
†Method for Rockwell superficial hardness test (N and T scales) for steel.

9. ROLLING TOLERANCES

9.1 The tolerances on thickness and width of cold-rolled strips shall conform to Tables 3 and 4.

TABLE 3 TOLERANCE ON WIDTH

Sheared Edges		Tolerance Over and Under Specified Width, mm
Thickness	Width	
Up to and including 1·6 mm	Up to 225 mm	0·15
	225 to 330 mm	0·20
Over 1·6 and up to 3·0 mm	Up to 225 mm	0·20
	225 to 330 mm	0·25
Mill edge	Over 200 up to 330 mm	+ 3·2 − 1·6

TABLE 4 TOLERANCE ON THICKNESS

Thickness, mm	Tolerance, mm	
	Up to and Including 225 mm Width	Over 225 mm and Up to 330 mm Width
Up to 0·15	± 0·015	± 0·020
0·15 ,, 0·40	± 0·020	± 0·030
0·41 ,, 0·73	± 0·030	± 0·040
0·74 ,, 1·20	± 0·040	± 0·050
1·21 ,, 3·0	± 0·050	± 0·060

9.2 Camber — The permissible camber on cold-rolled steel strip shall not exceed the following limits:

Thickness, mm	*Width*, mm	*Camber Tolerance Over* 2 m
Less than 2	Up to and including 50	10 mm
Less than 2	Over 50	6·5 mm
2·0 and over	All widths	13·0 mm

Note — Measurements are to be taken on 2 metre length.

10. SURFACE FINISH

10.1 Cold-rolled steel strips shall be supplied with bright finish.

11. PACKING

11.1 Cold-rolled steel coils shall be suitably packed to prevent them from rusting and damage during transit.

12. MARKING

12.1 Every coil of strip shall be legibly marked with:

a) Name or trade-mark of the manufacturer,

b) Grade,

c) Size, and

d) Cast number or any other identification mark by which the coil may be traced to the cast from which it was made.

12.1.1 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. The ISI 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 which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. 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.

(*Continued from page* 2)

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