IS 9175-12 (1988): Rationalized steels for the automobile and Ancillary Industry, Part 12: Mechanical and Physical Properties of 35 Mn6Mo3S15 [MTD 16: Alloy Steels and Forgings]

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Indian Standard

SPECIFICATION FOR RATIONALIZED STEELS FOR THE AUTOMOBILE AND ANCILLARY INDUSTRY

PART 12 MECHANICAL AND PHYSICAL PROPERTIES OF 35Mn6Mo3S15

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SPECIFICATION FOR RATIONALIZED STEELS FOR THE AUTOMOBILE AND ANCILLARY INDUSTRY

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0. FOREWORD

0.1 This Indian Standard (Part 12) was adopted by the Bureau of Indian Standards on 5 May 1988, after the draft finalized by the Coordinating Committee on Materials for Automobiles Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 Part 1 of this standard was published in 1979 which covers the chemical composition of 33 rationalized steels. The mechanical properties, hardenability and isothermal transformation characteristics of these 33 rationalized steels are being covered in different parts of this standard (Parts 2 to 34).

1. SCOPE

1.1 This standard covers the chemical composition, mechanical properties, hardenability and isothermal transformation characteristics of 35Mn6Mo3S15 grade of steel for use by the automobile and ancillary industry.

2. CHEMICAL COMPOSITION

2.1 The chemical composition of this grade of steel shall be as given in Table 1.

3. HARDNESS

3.1 The maximum hardness for this grade of steel delivered in the annealed or normalized condition, determined in accordance with IS : 1500-1983*, shall be 220 HB.

4. MECHANICAL PROPERTIES

4.1 The mechanical properties of this grade of steel (in the hardened and tempered condition), when determined in accordance with IS : 1598-1960† and IS : 1608-1972‡ shall be as given in Table 2.

4.2 The media of quenching is oil to attain the properties specified in **4.1**.

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

†Method for Izod impact test of metals (*first revision*).

‡Method for tensile testing of steel products (*first revision*).

TABLE 1 CHEMICAL COMPOSITION

(*Clause* 2.1)

Constituent, Percent					
C	Si	Mn	Mo	S	P
0·30-0·40	0·15-0·35	1·30-1·80	0·20-0·35	0·12-0·20	0·060, *Max*

TABLE 2 MECHANICAL PROPERTIES

(*Clause* 4.1)

Limiting Ruling Section mm	Tensile Strength MPa	0·2 Percent Proof Stress MPa, *Min*	Elongation Percent *Min*, $5{\cdot}65\sqrt{S_o}$	Izod Impact *J*, *Min*	Hardness BHN
150	700-850	525	14	55	201-255
100	780-930	585	12	50	223-277
63	850-1 000	680	12	50	248-302
30	950-1 100	740	10	45	269-331

5. HOT WORKING AND HEAT TREATMENT TEMPERATURE

5.1 The recommended hot working and heat treatment temperatures shall be as given below:

Forging rolling temperature	1 250°C, *Max*
Annealing temperature	840/860°C
Normalizing temperature	840/860°C
Sub-critical annealing temperature	640/660°C
Hardening temperature	840/860°C
Tempering temperature	660°C, *Max*

6. TRANSFORMATION CHARACTERISTICS

6.1 The isothermal transformation diagram for this grade of steel is shown in Fig. 1.

7. EFFECT OF TEMPERING ON MECHANICAL PROPERTIES

7.1 The curves for effect of tempering on mechanical properties of steel are given in Fig. 2 and 3.

8. EFFFCT OF SECTION SIZE ON MECHANICAL PROPERTIES

8.1 The curves for effect of section size on mechanical properties are given in Fig. 4 and 5.

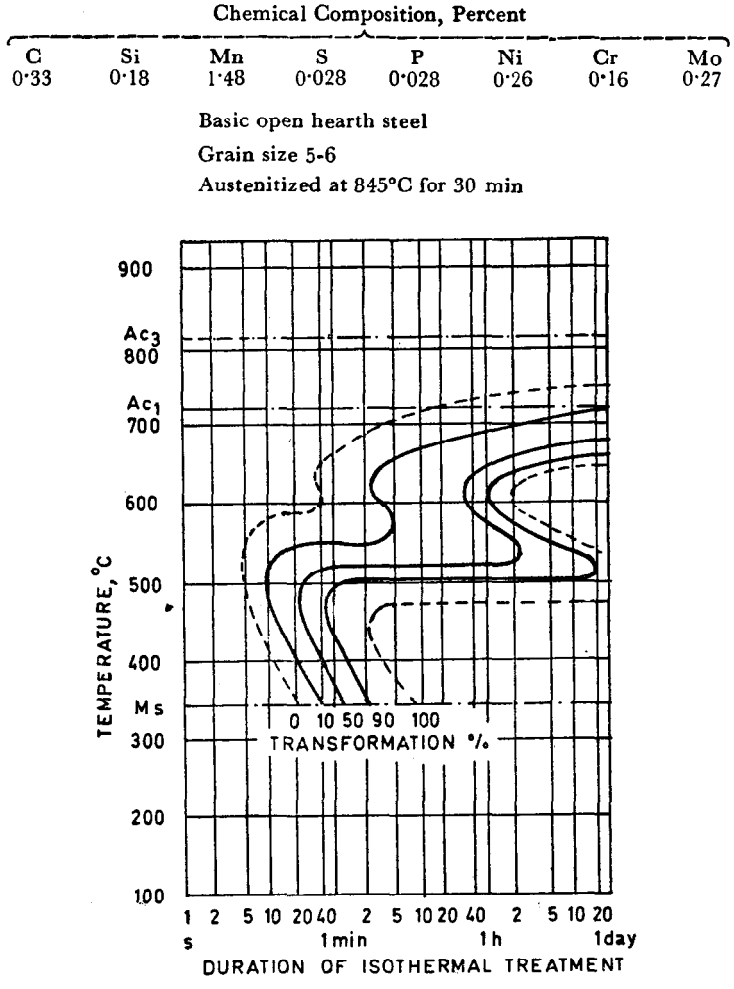

FIG. 1 ISOTHERMAL TRANSFORMATION DIAGRAM OF 35Mn6Mo3S15

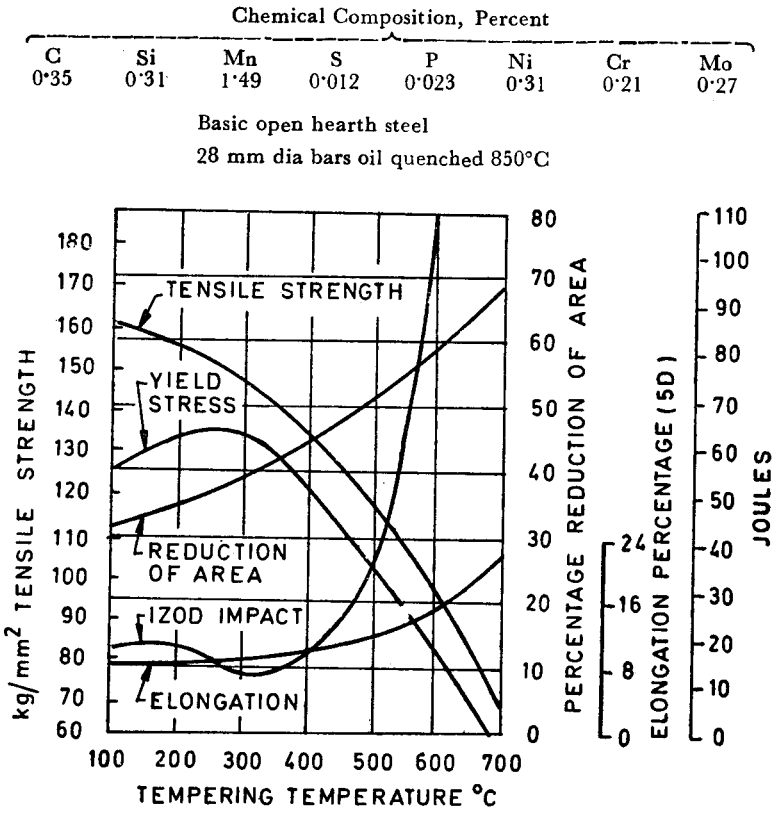

FIG. 2 CURVES SHOWING THE EFFECT OF TEMPERING TEMPERATURE ON THE MECHANICAL PROPERTIES OF 35Mn6Mo3S15 GRADE STEEL

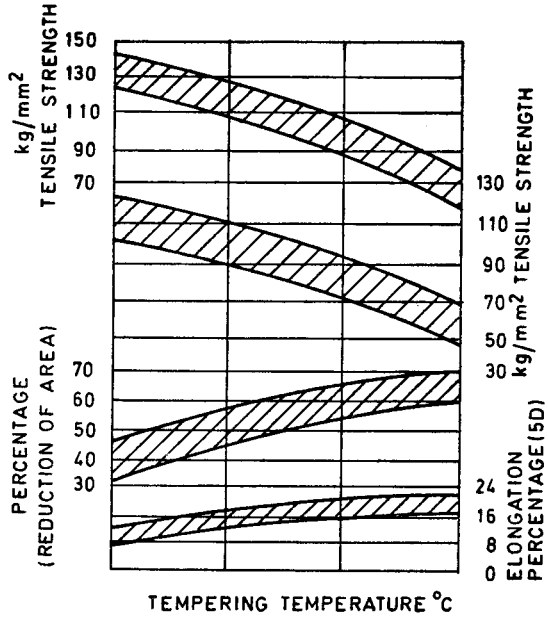

FIG. 3 BANDS SHOWING THE EFFECT OF TEMPERING TEMPERATURE ON THE RANGE OF MECHANICAL PROPERTIES OF 35Mn6Mo3S15 GRADE STEEL

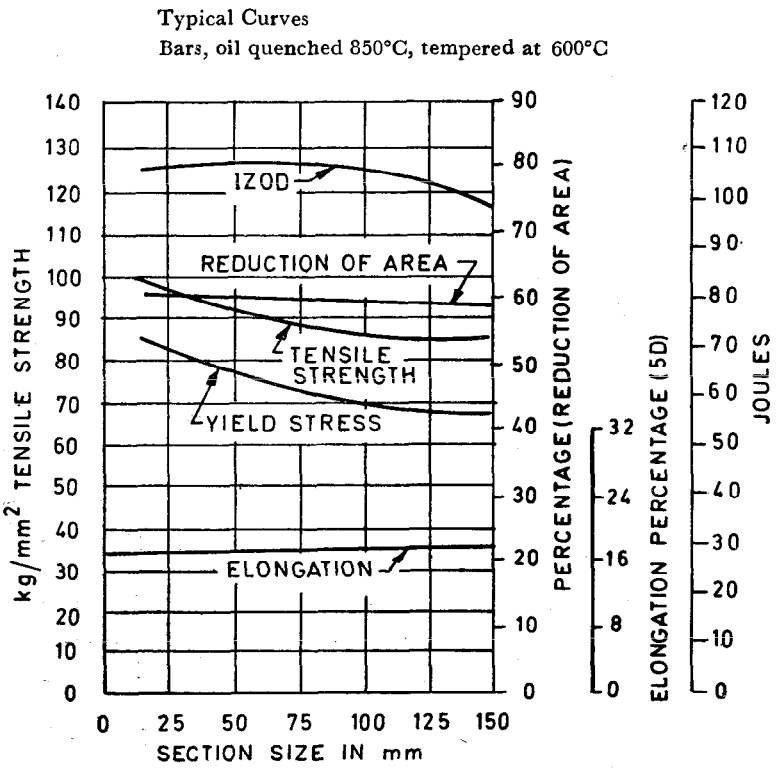

FIG. 4 CURVES SHOWING THE EFFECT OF SECTION SIZE ON MECHANICAL PROPERTIES OF 35Mn6Mo3S15 GRADE STEEL

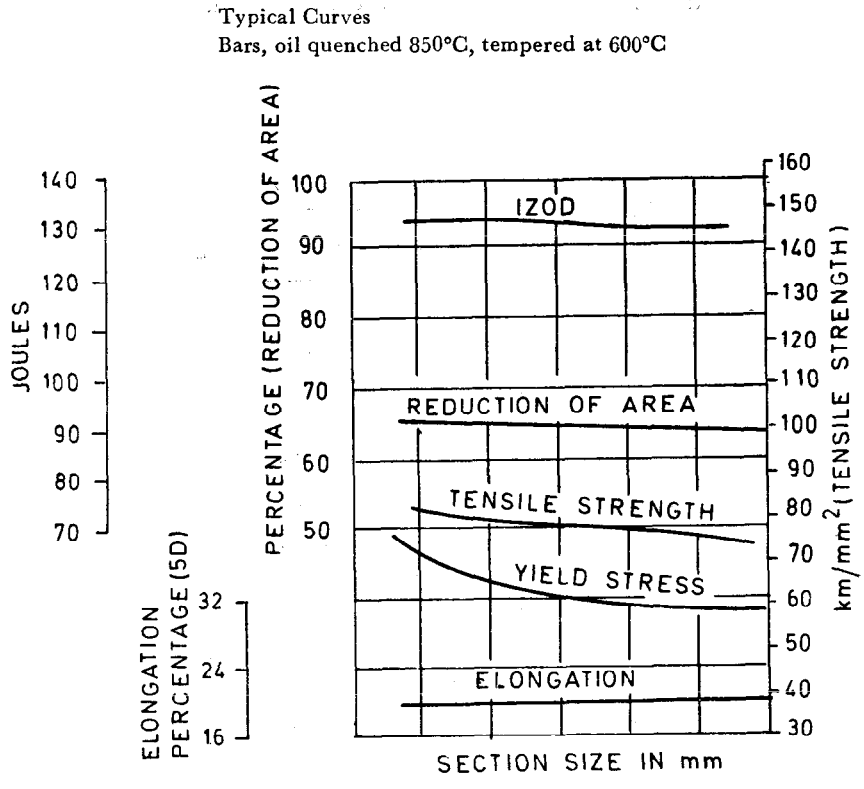

FIG. 5 CURVES SHOWING THE EFFECT OF SECTION SIZE ON MECHANICAL PROPERTIES OF 35Mn6Mo3S15

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