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ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION
R 185

CLASSIFICATION OF GREY CAST IRON

1st EDITION
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BRIEF HISTORY

The ISO Recommendation R 185, *Classification of Grey Cast Iron*, was drawn up by Technical Committee ISO/TC 25, *Cast Iron*, the Secretariat of which is held by the British Standards Institution (B.S.I.).

Work on this question by the Technical Committee began in 1955 and led, in 1959, to the adoption of a Draft ISO Recommendation.

In June 1959, this Draft ISO Recommendation (No. 220) was circulated to all the ISO Member Bodies for enquiry. It was approved, subject to some amendments, by the following Member Bodies:

Australia	Greece	Romania
Belgium	Hungary	Spain
Burma	India	Sweden
Chile	Italy	Switzerland
Czechoslovakia	Netherlands	United Kingdom
Denmark	New Zealand	U.S.A.
Finland	Norway	
Germany	Portugal	

One Member Body opposed the approval of the Draft: France.

The Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided, in November 1961, to accept it as an ISO RECOMMENDATION provided the text was completed by the last sentence of the Note preceding Table 2.

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Amendement 1 à la Recommandation ISO/R 185-1961 Septembre 1969

CLASSIFICATION DE LA FONTE GRISE

Chapitre 4 – CLASSIFICATION DE LA FONTE GRISE

Corriger la Note au-dessus du Tableau 2 comme suit :

"NOTE. – Le type d'éprouvette à utiliser pour obtenir les résultats d'essai doit faire l'objet d'un accord entre acheteur et fournisseur."

HISTORIQUE

La modification de la Note au-dessus du Tableau 2 de la Recommandation ISO/R 185-1961 fut décidée en 1962 par le Comité Technique ISO/TC 25 et un projet d'Amendement fut adopté.

Ce projet d'Amendement à la Recommandation ISO/R 185-1961 fut directement soumis, conformément à la procédure accélérée, au Conseil de l'ISO qui décida, en septembre 1969, de l'accepter.

ISO Recommendation R 185 November 1961

CLASSIFICATION OF GREY CAST IRON

1. SCOPE

1.1 This ISO Recommendation refers to the classification of grey cast iron according to its tensile strength.

2. MACHINED STANDARD TENSILE TEST PIECES

2.1 The test bar is cast as a cylindrical bar of $30 \, ^{+2}_{0}$ mm $\left(1.2 \, ^{+0.08}_{0.00} \text{ in}\right)$ diameter, the length being dependent on the type of the test piece (A or B) and whether the machined test piece is to have plain or screwed ends.

2.2 The machined standard tensile test piece, Type A, is of the dimensions shown in Figure 1 and Table 1. The machined standard tensile test piece, Type B, is of the dimensions shown in Figure 2 and Table 1.

If plain ends are used, the diameter should be 23 mm (0.9 in) minimum. If screwed ends are used, the diameter at the root of the thread should be 25 mm (0.98 in) minimum; the top diameter should be chosen in such a way that it is compatible with a 30 mm (1.2 in) bar and with the jaws used.

The test piece should be well machined, with a good surface finish. In the case of the standard tensile test piece, Type B, the transition between the ends and the parallel length should be smooth, without undercutting or a sudden step-down in diameter.

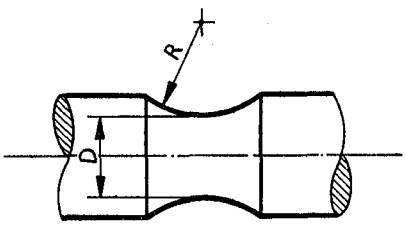

FIG. 1. — Test piece Type A

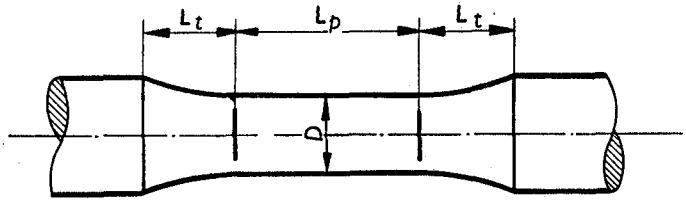

FIG. 2. — Test piece Type B

TABLE 1. — Dimensions of test pieces, Type A and Type B

Gauge diameter D				Radius at curvature R				Minimum parallel length L_p		Minimum transition length L_t	
Nominal dimension		Machining tolerance *		Nominal dimension		Machining tolerance					
mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
20	0.79	±0.5	±0.02	25	1	$+5$ 0	$+0.2$ 0	55	2.2	25	1

* If it is desired to calculate the tensile strength on the basis of the nominal diameter, the machining tolerance should be ±0.10 mm (±0.004 in), which is the tolerance IT 12 of the ISA System.

3. METHOD OF CASTING GREY IRON TEST BAR

3.1 The test bar is cast in dry sand and its structure is entirely grey.

3.2 Each test bar should be separated from its neighbour or any other casting in the same mould or the container by not less than 50 mm (2 in).

3.3 The test bar is obtained from the same metal as that used for casting the parts, and at a temperature high enough to ensure a sound test bar.

3.4 The test bar should not be removed from the mould as long as the temperature is above 500 °C.

3.5 If any test piece shows defective machining or obvious lack of continuity in the metal, it should be discarded and replaced by another test piece.

4. CLASSIFICATION OF GREY CAST IRON

4.1 The mode of production of the grey cast iron should be left to the discretion of the manufacturer, but the structure of the test bar should be entirely grey cast iron; any special requirements regarding composition will be the subject of agreement between the manufacturer and the purchaser. Grey cast iron is classified in terms of the tensile strength in kilogrammes-force per square millimetre obtained on either of the machined standard tensile test pieces. The standard grades are given in Table 2.

NOTE. As the two types of test pieces described in section 2 may give different test results, the type of the test piece used in obtaining the test results should be stated. Until such time as values based on results obtained on the test piece Type A are available for inclusion in this ISO Recommendation, the test piece Type B should be used in cases of dispute.

TABLE 2. — **Standard grades of grey cast iron**

Standard grade	Minimum tensile strength		
	kgf/mm²	tonf/in²	lbf/in²
10	10	6.3	14 200
15	15	9.5	21 300
20	20	12.7	28 400
25	25	15.9	35 600
30	30	19.0	42 700
35	35	22.2	49 800
40	40	25.5	56 900

NOTE. For the purposes of acceptance, cast iron of Grade n should have a tensile strength between n and $(n+10)$ kgf/mm² (between n and $(n+6.3)$ tonf/in² or between n and $(n+14\,200)$ lbf/in²), except that in the case of Grade 10 the maximum tensile strength is 15 kgf/mm² (9.5 tonf/in²).

5. METHOD OF TENSILE TEST

Pending the preparation of a separate specification for the tensile testing of grey cast iron, the following requirements are applicable:

5.1 Machined test pieces are held by positive grips in such a way that the load is applied axially.

5.2 After reaching 50 per cent of the anticipated tensile strength, the rate of application of the load should not exceed 5 000 kgf/min.

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