

ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION

R 944

PEARLITIC MALLEABLE CAST IRON

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BRIEF HISTORY

The ISO Recommendation R 944, *Pearlitic malleable cast iron*, was drawn up by Technical Committee ISO/TC 25, *Cast iron*, the Secretariat of which is held by the British Standards Institution (BSI).

Detailed work on this question by the Technical Committee led, in 1966, to the adoption of a Draft ISO Recommendation.

In February 1967, this Draft ISO Recommendation (No. 1195) was circulated to all the ISO Member Bodies for enquiry. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies :

Argentina	Greece	South Africa, Rep. of
Belgium	India	Sweden
Brazil	Israel	Switzerland
Canada	Korea, Rep. of	Thailand
Chile	Netherlands	Turkey
Czechoslovakia	New Zealand	U.A.R.
Finland	Norway	United Kingdom
France	Portugal	Yugoslavia
Germany	Romania	

Two Member Bodies opposed the approval of the Draft :

Australia
Italy

The Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided, in January 1969, to accept it as an ISO RECOMMENDATION.

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PEARLITIC MALLEABLE CAST IRON

1. SCOPE

This ISO Recommendation refers to the characteristics of pearlitic malleable cast iron and its classification by mechanical properties. Details are also included on testing conditions, dimensions of test bars and sampling.

2. GENERAL

- 2.1 Malleable cast iron is a heat-treated iron-carbon alloy, which solidifies in the as-cast condition with a graphite-free structure, i.e. the total carbon content at the moment of solidification is present in the dissolved form and in the combined form as cementite (Fe_3C).
- 2.2 Three groups of malleable cast iron are specified, differentiated by temperature and time cycle of the annealing process, by the annealing atmosphere and by the properties resulting therefrom, as follows :
- whiteheart malleable cast iron (see ISO Recommendation R 942);
 - blackheart malleable cast iron (see ISO Recommendation R 943);
 - pearlitic malleable cast iron (covered by this ISO Recommendation).

3. CHARACTERISTICS OF PEARLITIC MALLEABLE CAST IRON

The microstructure has a matrix essentially, according to the grade specified, of pearlite or other transformation products of austenite. Tempered carbon is also present. The microstructure should not contain primary or flake graphite.

4. MECHANICAL PROPERTIES

4.1 Tensile strength, proof stress, elongation

The minimum tensile strength, proof stress and elongation of grades A, B, C, D and E should be in accordance with the values included in Table 1.

TABLE 1 – Minimum mechanical properties of pearlitic malleable cast iron

Grade	Diameter of test bar	Tensile strength		0.5 % proof stress **		0.2 % proof stress **		Elongation ($L_0 = 3d$)
	mm	kgf/mm ²	tonf/in ²	kgf/mm ²	tonf/in ²	kgf/mm ²	tonf/in ²	%
A*	15	70	44.4	55	34.9	50	31.7	2
B	15	65	41.3	43	27.3	39	24.8	3
C	15	55	34.9	36	22.9	33	21.0	4
D	15	50	31.7	32	20.3	30	19.0	5
E	15	45	28.6	28	17.8	26	16.5	7

* Oil quenched and subsequently tempered.

** In cases of dispute regarding the proof stress values, the value for the 0.5 % proof stress should be binding.

4.2 Brinell hardness (for information only)

The Brinell hardness values, measured at an agreed point on the casting, should be within the range of values, which are given for information only, in Table 2.

TABLE 2 – Brinell hardness of pearlitic malleable cast iron

Grade	Brinell hardness, HB
A	240 to 285
B	210 to 250
C	190 to 240
D	170 to 230
E	150 to 200

5. TESTING CONDITIONS

5.1 Tensile test

For the tensile test (tensile strength, proof stress, elongation), test bars in accordance with section 6 should be used.

5.2 Brinell hardness test

The Brinell hardness test should be carried out in accordance with ISO Recommendation R 184, *Brinell hardness test for grey cast iron*.