

ENGINEERING MATERIAL SPECIFICATION

Material Name

Specification Number

GRAY, CAST IRON, PASSENGER CAR BRAKE DRUM

ESA-M1A43-B

1. SCOPE

The material defined by this specification is a medium strength structural gray iron.

2. APPLICATION

This specification was released originally for gray cast iron to be used in sand cast brake drums, including composite type castings.

3. REQUIREMENTS

3.1 STANDARD REQUIREMENTS FOR PRODUCTION MATERIALS

Material suppliers and part producers must conform to the Company's Standard Requirements For Production Materials (WSS-M99P1111-A).

3.2 CHEMICAL COMPOSITON

(Typical, except manganese and carbon equivalent which are requirements)

Carbon Equivalent	4.30 max
Total Carbon	3.35 - 3.65
Manganese	*min - 0.90
Silicon	1.60 - 2.40
Phosphorus	0.12 max
Sulfur	0.17 max
Chromium	0.40 max

Carbon Equivalent is calculated as % carbon plus 1/3 (% silicon) minus 1/3 (% chromium minus 0.10).

*Manganese min is calculated as 1.7 (% sulfur) plus 0.30.

3.3 BRINELL HARDNESS (ASTM E 10)

179 - 241

Hardnesses must be taken on the areas specified on the Engineering Drawing.

Date	Action	Revisions
2002 09 24	Revised	Updated and renumbered
1992 09 01	NC00E10079779030	Revised & Updated A.J. Yuhas
1972 10 02	CAB2-709083	Released E. Francis

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3.4 MECHANICAL PROPERTIES

Mechanical properties can be determined from test cast bars.

3.4.1	Transverse Strength, min (ASTM A 438)	Corrected Load
	30.5 mm dia bar	9800 N
	22.4 mm dia bar	5100 N

Two transverse bars (a modified "U" bar is acceptable) per lot are to be cast and tested in accordance with the above standard. The bars are to be shaken out of their molds at approximately the same temperature as the rotor castings. Transverse strength must be checked at least every 8 h.

3.4.2	Tensile Strength of Drum Castings, min (ASTM A 48)	207 MPa
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As opposed to determining tensile strength from drum castings, tensile test bars can be cast and tested in accordance with the above standard or machined from the transverse bars described in para 3.4.1. Cast test bars are to be shaken out of their molds at approximately the same temperature as the drum castings. If tensile strength is determined from separately cast bars, a correlation study must be made to determine what tensile strength is required of the test bars to insure the tensile strength of the actual drum castings will meet the above requirement. Tensile bar tests must be conducted a min of 1 per month; if used as lot control, a min of 1 every 8 h.

3.5 MICROSTRUCTURE (ASTM A 247)

The described microstructure shall be evaluated in accordance with the above standard.

Graphite	Type A predominant with Type B not to exceed 40 %. Types D and E not to exceed 10 %. Type C not to exceed 5 %. Graphite flake size: 3 - 5.
Matrix	Fine lamellar pearlite with max of 5 % ferrite and not more than 1 % carbides.