

ENGINEERING MATERIAL SPECIFICATION

Material Name

Specification Number

**GREY CAST IRON - METALLURGICAL STRUCTURE NOT FOR NEW DESIGN WSE-M1A32-B1
OF CYLINDER BLOCKS AND HEADS WSE-M1A32-B2**

1. SCOPE

This specification defines the acceptable metallurgical structure of gray cast iron cylinder blocks and heads.

2. APPLICATION

The metallurgical structures described in this specification were established to control acceptance of cylinder blocks and heads in order to assure the desired properties. Satisfactory performance and machinability can best be controlled by metallurgical structure, which is not always indicated by hardness and chemical composition.

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 HARDNESS

(ISO 6506/ASTM E 10) (ISO R80/ASTM E 18)

3.2.1 Cylinder Block

Unless otherwise stated on the Engineering drawing, the hardness will be checked between the center bores or end of head face at a point which does not interfere with the gasket bead, and is a minimum of 9.5 mm from any outside edge or opening in the block head face.

3.2.2 Cylinder Head

Unless otherwise stated on the Engineering drawing, the hardness will be checked at a point between the center bores that does not interfere with the gasket bead.

Note: The hardness requirements shall be as stated on the affected Engineering drawing.

Date	Action	Revisions	Rev 03
2011 12 16	N Status	1 - No usage	S. Ryzzi, NA
2002 09 30	Revised	Updated	
1987 10 30	SM/ER0886TC	Released	H.Nikkel NAAO, N P Riley EAO

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3.3 MICROSTRUCTURE
(ASTM A 247)

3.3.1 Sampling

The areas from which the samples for microscopic examination shall be taken are indicated on the attached sketches. If the rough casting is sectioned, approximately 3 mm of stock must be removed to approximate the wear surface area.

3.3.2 Sample Preparation and Examination

The specimen shall be prepared in accordance with ASTM A 247, and inspected at a magnification of 100X.

3.3.3 Graphite (ASTM A 247)

B1

B2

Flake Types

A	50 % min	70 % min
B	50 % max	20 % max
C	10 % max	2 % max
D & E	10 % max	10 % max

Flake Size

3	10 % max	10 % max
4 & 5	50 % min	50 % min
6 & 7	50 % max	50 % max

3.3.4 Matrix

Pearlite	85 % min	90 % min
Ferrite	15 % max	10 % max
Carbide	1 % max	1 % max