

Manufacturing / Casting Quality

FNHA-4-A-005.00

Casting Quality**1. SCOPE**

1.1 This standard defines guidelines to be used in the acceptance of production gray iron, ductile iron, aluminum, compacted graphite iron, and malleable iron castings used in New Holland products.

1.2 The objective is to establish economical and practical requirements that recognize foundry variables without compromising the quality and function of the end product.

1.3 This standard shall be used in conjunction with New Holland materials specifications referenced on the casting drawing and New Holland drafting standards for casting drawings.

1.4 The final determination of acceptance lies with Product Engineering in conjunction with Materials Engineering and Manufacturing Quality Control.

2. APPLICATION

2.1 Castings, unless otherwise specified on the part drawing, will conform to the general specifications described in this standard. Suppliers are advised to look for the special requirements and tolerances noted on the Engineering drawing.

2.2 If there is a conflict between special requirements or tolerances noted on the part drawing and this standard, the part drawing will always take precedence. Any suggestions that will improve the quality and/or lower the cost of a part are solicited.

3. DESIGNATION

3.1 All Engineering drawings for cast parts shall have the following note:

**CASTING MUST MEET QUALITY
ACCEPTANCE REQUIREMENTS PER
DESIGNATED STANDARD.**

3.2 The Engineering drawing shall have this standard listed as an item in the Applicable Standards Block per standards 86511126 (FNHA-3-B-100).

4 RELATED STANDARDS

ASTM E446 - Standard Reference Radiographs for Castings.

MSS SP-112 - Quality Standard for Evaluation of Cast Surface Finishes*

MSS SP-55 - Quality Standard for Steel Castings*

86507093(FNHA-2-A-920.00) - Ductile Iron

86529218(FNHA-2-A-930.00) - Gray Iron

86507096(FNHA-3-A-010.00) - Casting

Identification

86511126(FNHA-3-B-100) - Specifying and Referencing Standards on Drawings

* Published by: Manufacturers Standardization Society of the Valve and Fitting Industry Inc.;
127 E. Park St. N.E., Vienna, VA 22180,
(708)281-6613

					NAME	STD CASTING QUALITY		
					 NEW HOLLAND		ENGINEERING SPECIFICATION	
							FRAME 1	OF 7
							PART NUMBER	
							86507097	
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ALL	A	RE	104739	2/94				
FRAME NO.	REV	BY	ECN NO.	DATE				
APP.	DRAWN		MLN	10/93				
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5. ACCEPTANCE GUIDELINES - VISUAL/RAISED SURFACE DEFECTS

5.1 SURFACE CLEANLINESS AND TEXTURE

5.1.1 The surface of the castings shall be free of adhering sand, scale, scabs, veining, and other raised surface defects as determined by visual examination. Unacceptable surface irregularities (see 5.1.2) may be removed by tumbling, blasting, or grinding. The area of the defect removal must be blended to the adjacent surfaces.

5.1.2 Unless otherwise specified on the Engineering drawing, as cast surface roughness shall not exceed surface finish number 6, as defined by MSS Cast Surface Comparator used with MSS SP-112 standard. Special surface requirements shall be noted on the Engineering drawing by the surface finish number and shall be approved by New Holland on the basis of a sample casting submitted. The decision as to the acceptability of a surface finish will be the responsibility of New Holland. Maintaining a comparable finish on subsequent castings is the responsibility of the New Holland supplier.

5.1.3 Roughness of irregularities in the casting surfaces resulting from grinding, sawing, or burning may not exceed level B as defined by MSS SP-55 Type VIII.

5.1.4 Areas required by note on the casting drawing to meet a specific surface finish and areas designated as fixturing locations shall not exhibit grinding marks.

5.1.5 All metallic and non-metallic particles which could become loose under vibration or by the impingement of air, water, or lubricant shall be removed.

5.2 ACCEPTANCE OF GATES, RISERS, AND FINS

5.2.1 Unless otherwise specified on the Engineering drawing, all gates and risers shall be ground so as not to protrude more than .06 in (1.5 mm) above the adjacent surface. Breaking of the

gate or riser area below the adjacent surface may not exceed .03 in (0.8 mm).

5.2.2 Parting line fins and core print fins shall not protrude above adjacent surfaces in excess of the thickness of the fin at its base up to a maximum of .03 in (0.8 mm). Fins in areas that will be removed in subsequent machining operations may protrude up to a maximum of .06 in (1.5 mm).

5.3 MOLD SHIFT AND CORE SHIFT

5.3.1 Parting line shift from one side of the mold to the other shall not exceed .047 in (1.2 mm). When closer tolerances are noted on the casting drawing, that requirement must be met.

5.3.2 Grinding to remove parting line shift is permitted only when the part conforms to print tolerance after grinding.

5.3.3 Core shift is permissible only within print tolerance.

5.4 SWELL

Swell is acceptable if the casting appearance (See 5.1.1) is acceptable and the area involved is within print tolerance.

6. ACCEPTANCE GUIDELINES - VISUAL/DEPRESSION TYPE SURFACE DEFECTS

6.1 Linear surface discontinuities such as hot tears and cracks (MSS SP-55 Type I) are not permitted. Miss runs and incomplete castings are not permitted.

6.2 Linear surface discontinuities such as wrinkles, laps, folds, and cold shuts are permitted to levels A and B as defined by MSS SP-55 Type VII. Defects of greater severity are not permitted.

6.3 For depression type surface defects such as pin holes, gas porosity, shrinkage porosity, sink and surface roughness which extend below the main surface, the following will apply:

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6.3.1 On non-machined surfaces, the depression may not exceed a depth of .06 in (1.5 mm) for section thickness of .75 in (19 mm) or less and .09 in (2.4 mm) for section thickness greater than .75 in (19 mm).

6.3.2 Depression type defects are not permitted on areas designated as fixturing locations or on edges of reinforcement ribs.

6.3.3 On machined surfaces, any defects which will be completely removed by machining are acceptable as long as no sand or slag inclusions are present in the defect.

7. ACCEPTANCE GUIDELINES - INTERNAL DEFECTS

7.1 Unless otherwise specified, internal defects such as gas porosity, shrinkage porosity, inclusion of sand or slag, and unfused chaplets are not permitted. This shall be verified by sectioning initial samples.

7.2 When inspection for internal defects by radiography or ultrasound is required, it shall be specified on the drawing. Design Engineering shall specify all critical control areas that require internal defect inspection along with the required method and frequency of inspection for production quantities.

7.3 When the casting design makes a totally sound casting impossible or cost prohibitive and limited defect is determined to be allowable and so noted on the Engineering drawing, the following guidelines shall be used to determine acceptability.

When internal defect is permissible, it shall be noted on the Engineering drawing in the following manner:

DEFECT PER 7.4 LEVEL 3 PERMITTED IN SPECIFIED AREA

7.4 Gas porosity, characterized by smooth spherical cavities, shall not exceed Category "A" severity Level 3 per ASTM E446 Radiographic

Specification Volume II. Visual comparison of sectioned castings is permitted. (Use Illustration I for visual comparison of sectioned part.) Lower levels may be specified by note on the Engineering drawing when required. Location and extent of allowable defect must be defined on the Engineering drawing.

7.5 Shrinkage porosity, characterized by dendritic (tree like) shaped cavities shall not exceed category "CD" severity of Level 3 per ASTM E446 Radiographic Specification Volume II.

Visual comparison of sectioned castings is permitted. (Use Illustration II for visual comparison of sectioned part.) Lower levels may be specified by note on the Engineering drawing when required. Location and extent of allowable defect must be defined on the Engineering drawing.

7.6 Shrinkage porosity characterized by an area of very small irregular shaped holes, shall not exceed category "CC" severity of Level 3 per ASTM E446 Radiographic Specification Volume II.

Visual comparison of sectioned castings is permitted. (Use Illustration III for visual comparison of sectioned part.) Lower levels may be specified by note on the Engineering drawing when required. Location and extent of allowable defect must be defined on the Engineering drawing.

7.7 Inclusions, characterized by irregular shaped particles of foreign matter embedded in the metal, shall not exceed category "B" per ASTM E446 Radiographic Specification Volume II.

Visual comparison of sectioned castings is permitted. (Use Illustration IV for visual comparison of sectioned part.) Lower levels may be specified by note on the Engineering drawing when required. Location and extent of allowable defect must be defined on the Engineering drawing.

The following set of illustrations are to be used as visual comparators when destructive testing is used to detect defects.

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