# Quality Standard for Steel Castings for Valves, Flanges, Fittings, and Other Piping Components

## Radiographic Examination Method

**Standard Practice**
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**This Standard Practice has been substantially revised from the previous 1999 (R 2007) edition. It is suggested that if the user is interested in knowing what changes have been made, that direct page by page comparison should be made of this document and that of the previous edition.**

Non-toleranced dimensions in this Standard Practice are nominal unless otherwise specified.



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# QUALITY STANDARD FOR STEEL CASTINGS FOR VALVES, FLANGES, FITTINGS, AND OTHER PIPING COMPONENTS

## RADIOGRAPHIC EXAMINATION METHOD

### 1. SCOPE

1.1 This Standard Practice provides methods and acceptance standards for the film method of radiographic examination of steel castings for valves, flanges, fittings, and other piping components.

This Standard Practice is applicable to the initial examination of castings and toward the examination of casting repairs.

1.2 The methods contained in this Standard Practice provide uniform procedures that will produce satisfactory and consistent results upon which the acceptance standards of Section 5 may be used.

1.3 This examination guide may be used on a voluntary basis or when specified in an inquiry, contract, or order, and when mutually agreed upon by the manufacturer and the purchaser.

1.4 It is difficult to rigidly interpret radiographs to a set of acceptance standards. Consequently, there is a need for close cooperation between the manufacturer and the purchaser in applying radiographic acceptance standards.

### 2. DEFINITIONS

2.1 For definitions of terms relating to radiography, refer to ASTM E94, Appendix X1.

### 3. BASIS FOR USE

3.1 Critical sections of pressure containing valve castings, as identified by ASME B16.34, shall be radiographed.

3.2 Radiographs of castings up to 2 in. (50.8 mm) wall thickness shall be interpreted to ASTM E446; heavy-wall thickness from 2 to less than 4½ in. (50.8 to 114 mm) shall be interpreted to ASTM E186; and heavy-wall thickness from 4½ to 12 in. (114 to 305 mm) shall be interpreted to ASTM E280.

### 4. RADIOGRAPHIC PROCEDURE

4.1 ASTM E94, “Standard Guide for Radiographic Testing” shall be used as a guide.

4.2 Areas to be radiographed shall be in accordance with Section 3.1.

4.3 The film shall be as close as practical to the casting being radiographed.

4.4 Any commercial available intensifying screen except those of the fluorescent type may be used.

4.5 All film shall bear identification markings to properly orient the film for interpretation and to denote the actual casting under examination. Film shall be marked to identify the organization producing the radiograph and the date exposed.

4.6 Penetrameters shall be used on each radiograph and shall conform to the requirements of ASTM E94.

4.7 Any commercially available film may be used provided it is equal to or finer grained than ASTM E94, Type 2.

4.8 Radiographs may be made using multiple film techniques, and in either single or multiple viewing, so as to cover a greater latitude in casting thickness with a single exposure.

4.9 Radiographs shall be within the following photographic (H&D) density range:

a) *Single film viewing* – 1.5 minimum, 4.0 maximum.

b) *Superimposed viewing of double film, each single film* – 1.00 minimum, 2.5 maximum; with a double film – 4.0 maximum.

4.10 Surface shall be such that radiographic contrast due to surface condition cannot mask or be confused with that of any indication.