



**American Welding Society**

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The Practical  
Reference Guide for

# Radiographic Inspection

Acceptance Criteria

# **THE PRACTICAL REFERENCE GUIDE for RADIOGRAPHIC INSPECTION ACCEPTANCE CRITERIA**

**Located, reviewed and reformatted under the  
AWS Product Development Committee as a service  
for quality-minded welding fabricators.**

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# FOREWORD

A US military standard (MIL-STD-2035), in use for more than twenty years, set forth acceptance criteria for welds evaluated by nondestructive examination. As a military standard, those acceptance criteria could be applied as standards for fabrications for military use. It is recognized that certain nonmilitary fabrications might also benefit from comparison with these criteria. Although these criteria, offered herein, do not constitute a consensus standard of the American Welding Society, they are made available by AWS for consideration by fabricators.

A technical committee of AWS is currently evaluating these acceptance criteria with a view to possibly producing a consensus standard, but that evolution is not complete at this time. Should it be completed and result in an AWS standard, this document will be withdrawn in favor of the resulting standard.

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## 1.0 SCOPE

Three classes of radiographic quality are offered for possible application to welds in general fabrication. Normally, the choice of an appropriate quality level is made by the engineer, the user or may be contained in the contractual documents. Among the possibilities are the quality levels shown in this document, however, other choices may also be appropriate.

## 2.0 DEFINITIONS

The definitions of the identified discontinuities are contained in AWS A3.0, Standard Welding Terms and Definitions. Specific terms not included in AWS A3.0 are clarified below.

**2.1 Crater Pit.** An approximately circular surface condition extending into the weld in an irregular manner caused by insufficient filler metal at the weld stop.

**2.2 Incomplete Consumable Insert Melting.** Melting of the consumable insert without fusion to the base metal along either side of the consumable insert.

**2.3 Oxidation.** A condition resulting from partial or complete lack of inert gas shielding of a surface which is heated during welding, resulting in formation of oxide on the surface. This condition may range from slight oxidation evidenced by a multicolored or tightly adhering black film, to the extreme of a very rough surface having a crystalline, or "sugared" appearance.

**2.4 Root Surface Center-line Crease or Shrinkage.** An intermittent or continuous center-line concavity formed on the root surface.

## 3.0 RADIOGRAPHIC INDICATIONS

### 3.1 General

**3.1.1 Radiographic Technique.** Radiographic technique is usually required to be in accordance with some applicable standard for nondestructive testing requirements. To properly evaluate radiographic indications in welds, the film reviewer should be sure that the correct film has been used and has been developed according to the manufacturer's specifications. Any film conditions such as density, penetrometer location and identification, and extraneous artifacts should be evaluated by the film reviewer.

**3.1.2 Cracks.** Welds containing any crack are usually rejected.

**3.1.3 Burn Through, Melt Through and Crater Pit.** Burn through, melt through and crater pits are usually accepted provided the areas do not contain cracks, crevices or globules and provided the convexity or concavity limits otherwise specified are not exceeded.

**3.1.4 Tungsten Inclusions.** Tungsten inclusions having a maximum dimension greater than 20% of the design material thickness or 1/8 inch, whichever is less, are usually rejected. Smaller tungsten inclusions are generally counted as porosity.

**3.1.5 Questionable Indications.** When doubt exists as to whether an indication on the radiograph is the result of surface imperfections or subsurface defects, it is common practice to compare the radiograph with the weld. If the indication in question is the result of an acceptable surface imperfection and does not interfere with interpretation, that weld may be accepted.