

NANDTB-P009 Rev 0

Specimen requirements for ATO

General requirements for specimens used for NDT training programs for manufacturing and maintenance of aerospace applications.

1. Weldments

Courses including examinations in NDT of welds shall include, as a minimum, samples exhibiting the following discontinuities in varying degrees of severity:

- 1.1 Excessive root penetration
- 1.2 Incomplete root penetration
- 1.3 Heat affected zone crack
- 1.4 Sidewall slag inclusion
- 1.5 Lack of sidewall fusion
- 1.6 Central crack in weld
- 1.7 Transverse crack in weld
- 1.8 Porosity (localised and uniform)
- 1.9 Lack of root fusion
- 1.10 Solidification cracking
- 1.11 Lamellar tearing
- 1.12 Worm holes
- 1.13 Tungsten/Copper inclusions

2. Castings

Courses including examinations in NDT of casting inspection are required to have, as a minimum, samples showing the following features in varying degrees of severity:

- 2.1 Gas porosity
- 2.2 Dross inclusion/porosity
- 2.3 Core blows
- 2.4 Misruns
- 2.5 Cold shuts
- 2.6 Shrink porosity
- 2.7 Hot tears
- 2.8 Core shifts
- 2.9 Segregation
- 2.10 Inclusions
- 2.11 Cracking
- 2.12 Sponginess
- 2.13 Air Locks
- 2.14 Shrinkage cavities
- 2.15 Diffraction mottling

3. Wrought Products

Courses including examinations in NDT of inspecting wrought products are required to have, as a minimum, samples showing the following features in varying degrees of severity:

- 3.1 Rolled products:
 - 3.1.1 Rolling laps
 - 3.1.2 Broken or burst corners
 - 3.1.3 Inclusions
 - 3.1.4 Piping

3.2 Forgings:

- 3.2.1 Forging burst
- 3.2.2 Forging laps
- 3.2.3 Forging flash
- 3.2.4 Hydrogen cracking
- 3.2.5 Voids

3.3 Incorrect heat treatment:

- 3.3.1 Reheating cracks
- 3.3.2 Cooling cracks

3.4 Machining defects:

- 3.4.1 Grinding cracks
- 3.4.2 Surface tearing

4. Aerospace

The aerospace industry utilizes all of the aforementioned product technologies and in addition, some others of a more specialised nature such as advanced composite structures, powdered metal components, Fibre metal laminates, and super plastic formed metals.

NDT trainees from the aerospace industry, who are to be candidates for certification examinations, would be expected to have a general familiarity with manufacturing defects. In addition to those defects, Training Organisations should have a range of defects in components and structures upon which students will be trained and which should include the following:

- 4.1 Corrosion
- 4.2 Stress corrosion cracking
- 4.3 Fatigue cracking
- 4.4 Disbonds in bonded joints
- 4.5 Delaminations in laminated structures
- 4.6 Entrapped water freezing damage and other defects in honeycomb structure.