

Q405: NonDestructive Evaluation Processes**Effective Date: 11/14/2019**

The design requirements of this product include the performance of Non-Destructive Examination or Test methods to be performed during the manufacturing of this product to determine and confirm the product conforms to design requirements. The process may be radiographic examination, liquid penetrant inspection, or magnetic particle inspection. Does not apply to any pressure, leak, or functional tests required by the products' design requirements.

Suppliers performing Non-Destructive Examination or Testing processes shall have a Nadcap Accreditation or Aerojet Rocketdyne approval. Supplier personnel performing any nondestructive inspection, testing, or evaluation at any level of the processing of this product shall be qualified and certified to perform those activities per the requirements of NAS410. The processes shall include ensuring direct traceability between each unit examined and the documented results of the examination of that item. See below for requirements specific to each method/process.

If the product's design requirements (Engineering Drawings, Specifications, etc.) include Non-Destructive Examination, Testing, or Inspection specifications other than the specifications cited in this Note, those design requirements shall apply.

Method / Process

- **Radiographic Inspection (including X-ray)** – The Supplier shall develop and submit a radiographic technique/process instructions meeting the requirements of ASTM E 1742 and the revision applicable at the Purchase Order award. The techniques/process instructions shall include ensuring direct traceability between each unit examined and the documented results of the examination of that item. Radiographs shall be available for review by Aerojet Rocketdyne at any time. In addition all X-Ray film must be approved by Aerojet Rocketdyne prior to shipment.

- **Magnetic Particle Inspection** - The Supplier shall develop a magnetic particle examination technique/process instruction meeting the requirements of ASTM E 1444 and the revision applicable at the Purchase Order award. The techniques/ process instructions shall include ensuring direct traceability between each unit examined and the documented results of the examination of that item. Magnetic Particle inspection techniques or process instructions shall be available for Aerojet Rocketdyne's review at any time.

- **Liquid Penetrant Inspection** - The Supplier shall develop liquid penetrant inspection technique/process instructions meeting the requirements of ASTM E 1417 and the revision applicable at the Purchase Order award. The techniques/process instructions shall include ensuring direct traceability between each unit and the documented results of the examination of that item. Liquid penetrant inspection techniques or process instructions shall be available for Aerojet Rocketdyne's review at any time.

- **Ultrasonic Inspection** - The Supplier shall develop and submit an ultrasonic inspection technique/process instruction meeting the requirements of SAE AMSSTD- 2154A and the revision applicable at the Purchase Order award. The techniques/process instructions shall include ensuring direct traceability between each unit examined and the documented results of the examination of that item.

Deliverables:

A legible copy of actual examination/test reports of the Nondestructive Examinations or Tests performed and include the results for each unit examined indicating either accepted or rejected. When parts are serialized, serial numbers must appear on the report(s). Results must be identifiable with test parameters, specifications, and material(s) to product(s) delivered. Reports must bear the date and signature of a responsible representative of the agency performing the test(s). The specifications must be listed, including the revision letter(s) or revision number(s).

Information specifications referenced in this document:

NAS 410	NAS Certification & Qualification of Nondestructive Test Personnel
ASTM E 1742	Standard Practice for Radiographic Examination
ASTM E 1444	Standard Practice for Magnetic Particle Testing
ASTM E 1417	Standard Practice for Liquid Penetrant Testing
SAE AMS-STD-2154A	Inspection, Ultrasonic, Wrought Metals, Process For