

Sampling and Testing Method for Certification of Inclusion Pursuant to ASTM F2063 (Published in June 2026)

Introduction and Background

ASTM F2063 requires suppliers to provide certification with comprehensive sampling and testing information. This report updates Resonetics' protocol for measuring and certifying inclusions in NiTi alloy products in accordance with ASTM F2063 and the forthcoming ASTM standard on inclusion analysis. It includes updated statements on sampling and inclusion analysis. The protocol is intended for certifying Nitinol mill products at the New Hartford facility and for general information on the Resonetics website.

Protocol of Sampling and Testing for Inclusion Evaluation and Reporting

The statement below is adapted from Resonetics' inclusion analysis work instruction and provides sampling and testing details in accordance with ASTM F2063.

1. Each NiTi alloy heat consists of a single vacuum-melted ingot.
2. Mill products fabricated from one ingot may comprise one or more lots.
3. Two longitudinal samples are examined for each lot.
 - 3.1 Samples shall be taken from both ends along the length of the mill product whenever possible.
 - 3.2 Samples shall be mounted, ground, and polished using Resonetics' metallographic procedure.
 - 3.3 Microcleanliness shall be evaluated in the as-polished condition.
4. Three section regions are examined for each sample.
 - 4.1 Select distinct regions across the radius, such as the edge, mid-radius, and center for solid mill products.
5. Four fields of view are examined and photographed in each region.
6. The sample is examined and photographed by either scanning electron microscopy or optical microscopy.
7. Images are analyzed using Image-Pro® 10 image analysis software.
 - 7.1 Analyze the full image, excluding the data bar.
 - 7.2 Set the cutoff threshold at 1 μm for inclusion particles or voids.
8. The inclusion rating for each lot is reported for ASTM F2063 certification.
 - 8.1 A total area of 24 mm^2 is examined.
 - 8.2 A total of 24 images are analyzed.
 - 8.3 Characterization is performed across areas along the ingot length and radius.
 - 8.4 This protocol complies with Method B, Random Nested Fields, in the forthcoming ASTM standard on inclusion testing.