

RES Magnetic Particle Testing (MT) Inspection / Documentation Requirements R-RES-QA001.R00

This document in no way is intended to conflict with or modify any sections or clauses in ASTM E1444. Where any statements in this document are in conflict, ASTM E1444 shall take precedence.

ROUSH's successful business in the manufacture of components for our Entertainment customers is built on attention to detail, high quality, and strict adherence to customer requirements. We have identified the following areas of oversight and cause for rejection from our customers related to Magnetic Particle Testing (MT). We are providing this document to highlight these areas and improve our acceptance rates by our customers' QA Teams.

General

- The magnetizing current application and indicating media application sequence shall be the wet continuous method.
 - This method will detect surface breaking and slightly subsurface cracks, laps, seams, inclusions and other linear discontinuities whose major axis is perpendicular to the direction of the flux field established in the part being tested.
 - When testing in the conventional mode, the component under test shall be magnetized and inspected in at least two different directions. The two directions shall be perpendicular to each other. The testing sequence shall be 1st – central conductor, 2nd – circular magnetism, and 3rd – longitudinal magnetism.
- When not in conflict with a drawing or applied standard, parts shall be reasonably protected against corrosion after testing. Ex. Rust preventative spray, VCI paper. etc.
- Personnel shall be qualified and certified in their roles to support MT testing, either via ASNT, ACCP, AWS certification or in-house certification subject to approval by Roush.

Technique Sheets (TS)

- Must be drafted and verified in practice by an ASNT Level II or Level III Inspector and approved by a ASNT Level III Inspector, evidenced by:
 - ASNT Certificate, or
 - Certifications from the MT vendor showing the drafter and signer of the Technique sheet have been designated Level II or Level III, respectively.
- When multi-directional testing is used, both Quantitative Quality Indicators (QQI) / Center Bore Conductor (CBC) and Gauss meter readings of the magnetic force shall be balanced and established in both directions and documented to demonstrate sufficient magnetization.
- Must illustrate achieved magnification at multiple points around the full part geometry.
- Any bore larger than 0.375" diameter must be tested using a central conductor.
- Must include all relevant data elements as called out in ASTM E1444.

Certification / Test Results

- All approved Roush Request for Deviation (RFD) or Roush Request for Waiver (RFW) should be considered and cited when preparing the test results. Inclusion of an RFD/RFW should be noted in the “Acceptance Criteria” region on the Technique Sheet and/or Test Results.
- The test results must clearly show the results of each part by serial number.
- All observed indications must be clearly marked and identified on the part surface by a suitable marking method, e.g., paint pen, etc.
- The test results must also show the following data:
 - Date
 - Part or Drawing Number
 - Part Description
 - NDT Procedure Number
 - Identification of person performing Mag particle Inspection (Ex. Initials, Employee ID, or other)
 - Identification must include ASNT level of the Inspector
 - Number of parts received
 - Number of parts tested
 - Number of parts accepted
 - Number of parts rejected
 - Acceptance Criteria

Acceptance Criteria

The following acceptance criteria shall apply when no other criteria are given by the drawing or referenced specification:

- All indications shall be determined to be one of the following:
 - False Indication – caused by faulty processing e.g. lack of demagnetizing or cleaning of the component. Complete reprocessing of the component should eliminate indications.
 - Non-relevant Indications – caused by a feature in the part other than the discontinuities being sought e.g. roots or splines or teeth or threads.
 - Relevant Indications – caused by the discontinuities being sought e.g. cracks, laps, etc.
- Only relevant indications shall be evaluated in accordance with the following acceptance criteria:
 - All linear indications are cause for rejection. Linear indications are any indications which have a length/width ratio of 3:1 or greater.
 - All rounded indications equal to or greater than 1/8” maximum dimension are cause for rejection.
 - Four or more rounded indications greater than 1/32” in any 1/2” diameter circle is cause for rejection.
- Any indications which are deemed not to be covered in the above shall be documented and presented to Roush for disposition.

REVISION HISTORY

Rev #	Revision Description	Author	Approver	Date
R00	Initial Release – Doc. Number change - Previously ENGR-15-PM. Added 1 st bullet content in “General” and updated data requirements in “Certification/Test Results”.	R. Demyan	K. Wayne	6/9/23
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R02				---
R03				---
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R16				---
R17				---
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R19				---