

Magnetic Particle Structural Weld Examination JHA

Worked instructional example

Work and worksite

A qualified examiner will perform a specified visible dry magnetic-particle examination on identified cooled ferrous-steel building welds using a Magnaflux Y-2 AC yoke and compatible #1 Gray powder. The weld surfaces and protected ground-level access are released beforehand. The written examination method governs coverage, equipment performance and indication evaluation. This fictional learning example describes planned controls and records no actual inspection or work authorization.

- The project supplies the qualified examination procedure, examiner requirements, weld identities, required performance checks, lighting/coverage criteria and actual indication acceptance process. This example supplies no universal defect limit, yoke lift-test criterion or certification.
- The actual Y-2 configuration, applicable manual, selected #1 Gray product/SDS and approved dispensing method are available. Known cooled dry surfaces are prepared independently; safe electrical protection, powder containment and magnetic-field precautions are established.
- Field-welding activity 238120-08 is a partial connection: post-weld visible dry examination only. Welding, cleaning solvents, coating removal, wet or fluorescent methods, rain exposure, radiography, defect repair and structural load release are excluded.

Questions before work

- Which qualified written examination procedure and acceptance criteria identify these welds and this exact yoke/media method?
- Can required electrical, magnetic-field, lighting and powder controls remain effective throughout the examination?
- Who evaluates the actual indications and receives unresolved findings before any separate connection or structural release?

Task Hazard Control

1 Establish the weld and examination authority

Hazard: A wrong weld, unqualified method or assumed defect limit can produce a report that conceals an unexamined connection.

Control: Examination lead matches weld marks, material and current test requirements to the qualified written procedure and designated examiner. Confirm the selected AC-yoke dry visible method, actual acceptance criteria and reporting authority. Verify separately released prepared surfaces and retained structural restrictions. Hold unavailable requirements; a welding qualification or a generic product instruction does not establish qualification to evaluate this examination.

Verification: Lead confirms weld identities, qualified roles and the actual procedure/acceptance basis.

Reasoning: The examination needs a defined method and accountable disposition before it generates evidence.

2 Prepare protected electrical and magnetic-field access

Hazard: Damaged power equipment, nearby medical implants or a worker reaching from an unsafe position can create shock, field or fall exposure.

Control: Use the accepted dry work position and safe supply arrangement under construction electrical requirements and the actual Y-2 instructions. Inspect the required cord/connection condition, keep disconnection accessible and protect leads from damage. Establish the manufacturer's applicable magnetic-field/implant precautions and control adjacent access. Hold rain, unsuitable footing or uncertain supply protection rather than relying on the yoke's casing appearance.

Verification: Examiner checks protected access, supply and required field boundaries before energizing.

Reasoning: A portable inspection tool still has electrical and magnetic exposures that must be controlled.

3 Verify equipment performance and matched media

Hazard: A poorly performing yoke, wrong powder or inadequate viewing condition can miss relevant indications while giving a plausible test appearance.

Control: Identify the actual Y-2, #1 Gray batch and compatible dispenser, with applicable instructions and SDS. Complete and record the written method's required equipment-performance and viewing checks using its accepted reference equipment. Keep prescribed reference equipment and test pieces stable, with hands and feet outside any test-load drop or crush path. Arrange assessed ventilation, eye/hand protection and dust-minimizing containment. Reject defective gear or compromised media and hold unverified performance; no borrowed test-weight or lighting value is supplied here.

Verification: Qualified examiner records actual required performance, media and viewing-condition findings.

Reasoning: The apparatus and examination conditions must demonstrate suitability before the weld is examined.

Complete the work and hand over

4 Examine the weld through the qualified coverage method

Hazard: Uncontrolled powder, prolonged energization or incomplete magnetization coverage can expose people and leave a portion of the weld unexamined.

Control: Follow the written method's actual yoke positioning, orientations and area coverage, applying and handling the selected powder through the approved controlled dispenser method. Keep unrelated personnel clear and minimize airborne material; no compressed-air dispersal is included. Maintain the selected unit's duty and handling limits and stop for abnormal heat, poor contact, supply faults or inadequate visibility. Record interrupted or incomplete coverage.

Verification: Examiner checks actual coverage and operating/control performance throughout the examination.

Reasoning: Complete method-based coverage matters more than a quick pass over a visible weld bead.

5 Evaluate and document actual indications

Hazard: Treating every pattern as harmless or applying an unapproved criterion can conceal a weld issue and encourage premature loading.

Control: Qualified examiner evaluates relevant indications through the actual written procedure and project criteria, preserving location, coverage and required evidence. Mark and report findings through the accepted process and identify inconclusive results or repeat-examination needs. Do not grind an indication away, authorize repair or release structural support through this test. Keep the connection's separate acceptance authority informed of held findings.

Verification: Designated examination authority records actual results and unresolved limitations for disposition.

Reasoning: Indication evaluation and structural use are distinct decisions requiring their proper authority.

6 Secure equipment and transfer the examination state

Hazard: Residual powder, an energized lead or an overstated report can expose the next crew or obscure remaining connection work.

Control: Complete prescribed post-examination actions, including any required demagnetization, through the actual method and yoke instructions. Disconnect and secure equipment, contain powder waste through the SDS/site process and restore safe access. Deliver traceable examination records and held locations to the receiving lead. Any repair, re-examination or connection/load release remains separately authorized; a clean surface is not an acceptance record.

Verification: Receiving lead confirms actual report scope, findings and continuing structural restrictions.

Reasoning: Closeout must preserve both worker protection and the limits of the examination evidence.

Pause and reassess

- Weld identity, qualified procedure, examiner role or actual indication acceptance criteria is missing or mismatched.
- Equipment performance, compatible media, viewing condition, dry electrical access or magnetic-field precautions cannot be maintained.
- Coverage is incomplete, findings are unresolved or examination is being treated as permission to repair or release structural support.

Improve the controls

Needs improvement: The weld has no obvious mark, so it passed.

More useful: Qualified personnel complete and record the actual method's coverage, performance and indication evaluation against the project criteria.

Needs improvement: A small handheld yoke needs no electrical or exposure check.

More useful: Verify actual supply, cord condition, magnetic-field precautions, duty limits and powder controls before energizing.

Decisions that change the analysis

May the examiner grind an uncertain indication and repeat the test?

Not through this bounded examination. Preserve and report the finding and obtain the responsible weld/engineering disposition. Surface removal or weld repair changes the examined condition and needs its actual accepted procedure, worker controls and subsequent examination requirements. A repeated favorable image does not authorize structural use.

What must the examiner record for actual use?

Record weld/material identities, procedure and examiner basis, yoke/media identities, actual equipment-performance and viewing checks, coverage and interruptions. Preserve indications, criteria-based findings, limitations, post-examination actions and report receipt. Identify repair or re-examination holds without inventing a passed weld, completed qualification or connection/load release.

Training needs

- Required magnetic-particle examination qualification and actual procedure instruction on equipment performance, coverage, indications and report traceability.
- Y-2/#1 Gray instruction on safe supply, magnetic-field and implant precautions, duty limits, controlled powder handling, exposure response and safe shutdown.

Confirm applicable qualifications and actual training evidence for the people assigned. Related toolbox talks support discussion; they do not establish competence.

References and adaptation

Magnaflux Y-2 AC yoke operating manual: performance, electrical and magnetic-field precautions
https://magnaflux.com/Files/Accessory-Manuals/628300_Y-2-Yoke-ML-Manual.pdf

Magnaflux magnetic-particle instructions Rev0925: selected visible dry method
https://magnaflux.com/Files/Instructions/MPI-Instructions_EN.pdf

Magnaflux #1 Gray SDS version1.1: handling, exposure controls and disposal
https://magnaflux.com/Files/Safety-Data-Sheets/Safety-Data-Sheets---English/1-Gray_Safety-Data-Sheet_English.pdf

OSHA 1926.404 Construction electrical wiring design and protection
<https://www.osha.gov/laws-regs/regulations/standardnumber/1926/1926.404>

References reviewed October 13, 2026. Use actual equipment and product instructions, project design and site requirements. This original draft supplies no fabricated inspection, signature or approval.