

1 / 12 · Evaluation Techniques

**Relevant, nonrelevant, false:
what separates them?**

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**Suspected false indication:
first check?**

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3 / 12 · Quality Control of Equipment Processes

**Settling test vs water-break
test: what does each show?**

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4 / 12 · Quality Control of Equipment Processes

**Checking UV-A: which
meter, where, when?**

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5 / 12 · Equipment

**Electromagnetic vs
permanent-magnet yoke:
key contrast?**

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6 / 12 · Equipment

**Duty cycle 10% with 3 s
shots: minimum
start-to-start time?**

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Clean the area and reprocess the same way. Gone: likely residue, drainage or lint. Returns: leakage, or surface texture that holds particles. If it returns, change the field direction before deciding.

Topic: false indications, verification by reprocessing
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Cause. Relevant: leakage field from a real discontinuity. Nonrelevant: real leakage, but from a design or permeability feature (thread root, keyway, section change, joint). False: no leakage field at all; particles held by residue, roughness, lint or drainage.

Topic: relevant, nonrelevant and false indications
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4 / 12 · Quality Control of Equipment Processes

A UV-A radiometer, sensor at the examination surface, after lamp warm-up. A white-light meter cannot read UV-A. White light in the booth is a separate reading.

Topic: UV-A and white-light measurement
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3 / 12 · Quality Control of Equipment Processes

Settling test: particle concentration, and any contamination layer. Water-break test: whether a water-based bath wets the part in an unbroken film.

Topic: bath checks, settling test and water-break test
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6 / 12 · Equipment

Duty cycle = on-time / total cycle. $3 \text{ s} / 0.10 = 30 \text{ s}$ per cycle. Exercise numbers; real ratings come from the maker's data plate.

Topic: power pack duty cycle
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5 / 12 · Equipment

An electromagnetic yoke can be switched off before lifting. A permanent magnet cannot, so lifting can disturb indications and it draws loose steel. Its strength is also fixed.

Topic: portable yokes
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7 / 12 · Types of Discontinuities

Inherent, processing, service: where does each arise?

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8 / 12 · Types of Discontinuities

Seam, lamination, stringer, lap: one clue each?

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9 / 12 · Principles

Retentivity vs coercive force?

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10 / 12 · Flux Fields

Circular vs longitudinal field: which flaws does each find?

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11 / 12 · Flux Fields

Right-hand rule: straight conductor vs coil?

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12 / 12 · Principles

Which stainless steel can be examined with MT, and why?

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8 / 12 • Types of Discontinuities

Seam: long, straight, along the rolling direction. Lamination: planar at mid-thickness, seen on a cut edge. Stringer: short, scattered inclusion streaks. Lap: a fold, from forging or rolling.

Topic: rolled and forged product discontinuities
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7 / 12 • Types of Discontinuities

Inherent: from solidification and primary forming (pipe, porosity, inclusions). Processing: from forming, welding, heat treatment, finishing (laps, quench and grinding cracks). Service: in use (fatigue, stress corrosion).

Topic: inherent, processing and service discontinuities
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10 / 12 • Flux Fields

Each field finds discontinuities that cross it. Circular (current through the part) finds flaws along the length. Longitudinal (coil or yoke) finds flaws across the part.

Topic: circular and longitudinal fields
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9 / 12 • Principles

Retentivity: how much magnetism stays when the field is removed. Coercive force: the reverse field needed to bring it back to zero. High values of both make a part harder to demagnetize.

Topic: hysteresis loop terms
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12 / 12 • Principles

Hardenable martensitic grades (such as Type 410) are ferromagnetic. Annealed austenitic grades (such as Type 304 or 316) are not. Cold work can create some magnetic behavior in 304.

Topic: magnetic materials and austenitic stainless
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11 / 12 • Flux Fields

Conductor: thumb along conventional current, fingers show the circular field. Coil: fingers along the current in the turns, thumb shows the field direction and the north end.

Topic: right-hand rules
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