

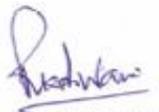
**Document Title: Procedure for Magnetic Particle Examination**

<p><b>1.0 SCOPE</b></p> <p> This procedure is applicable for WET FLOURESCENT magnetic particle examination for detecting discontinuities that are open to surface or at sub-surface of Pipe Fittings (Surface, Bevel Edges, Side Wall Areas of Cold Formed Tees, Cold Formed Reducers), Flanges or weldments, of all FERROMAGNETIC materials. The Stage, Extent and Location of examination shall be specified in the Quality Plan.</p>		
<p><b>2.0 PERSONNEL</b></p>	<p>Personnel PERFORMING shall have (at least) valid NDT Level I Certificate in accordance with the requirements of ASNT SNT-TC-1A.          Personnel INTERPRETING/EVALUATING shall have valid NDT Level II Certificate in accordance with the requirements of ASNT SNT-TC-1A.</p>	<p><b>Magnetic Particle Examination</b></p> 
<p><b>3.0 METHOD</b></p> <p><b>TECHNIQUE &amp; EQUIPMENT:</b></p> <p>Portable Electromagnetic yoke (AC / half wave rectified AC / DC) may be used for magnetization, using continuous method.          Model: MF-XXX, EF-XXX or Equivalent          Make: Magnafield, EECI, 220V AC 50Hz 1PH, Current 2.5A or Equivalent.</p>		<p><b>Surface Preparation:</b>          Prior to the test, the area to be inspected and at least one inch either side shall be free from any features that may inhibit the test or mask unacceptable discontinuities. These include but are not limited to slag, spatter, oil, scale, rough surface and protective coatings. Surface preparation by grinding, machining or other methods may be necessary where surface irregularities could mask indications of unacceptable discontinuities.          Cleaning may be accomplished using organic solvents, paint remover or shot blasting methods.</p> <p><b>Equipment &amp; Consumable Control:</b>          Magnetic powders may be re-used a few times. Care to be taken to avoid possible contamination. Care may be taken to thoroughly agitate the bath sample before use. Bath may be subjected to a settlement test (centrifuge tube) before use. Settlement time shall be 30 minutes and settlement volume for the solids shall be as below,          - Fluorescent Powder Bath Concentration 0.1 - 0.4 ml/100 ml.</p> <p><b>Temperature:</b>          The temperature of the test surface shall not exceed 57°C for Magnetic Powder.</p> <p><b>Direction of Magnetizing Field:</b>          Examination shall be performed on 'AC' mode only, unless otherwise specified. The magnetizing field may be applied sequentially in two directions approximately perpendicular to one another. Determination of field direction may be carried out for each geometry of weld / job to be inspected.</p>



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**Lighting Conditions:**

Examinations under ultra violet lighting should be performed in Dark Room and an ultra violet intensity at the test surface of not less than 1000  $\mu\text{W}/\text{cm}^2$ . Any increase / decrease in these values shall be accepted by the client.

The inspector may allow at least 5 minutes for dark adaptation before beginning the inspection.

If the examiner wears glasses or lenses, they shall not be photosensitive.

**Calibration:**

**A] Lux Meter:** Lux meter shall be calibrated at least once a year or whenever the meter has been repaired. If the light meter has not been in use for 6 months, calibration shall be done before use.

**B] Intensitometer / Lux Meter (Combo):** For black light, shall be calibrated once a year or whenever the Intensitometer has been repaired.

**C] Lifting power of yoke:** Magnetizing power of electromagnetic yokes shall be checked at least once a year or whenever the yoke has been repaired. Each electromagnetic yoke shall have lifting power of least 10LB (4.5kg) for alternating current (AC) and 40LB (18.1kg) for direct current (DC) / half wave rectified AC, at the maximum pole spacing that will be used.

In-house and properly identified weights can be used for this verification.

**Magnetic Field Direction and its Adequacy:**

The direction and adequacy of the magnetic field may be verified by pie shaped field indicator. The magnetic particle field indicator described in ASME Section V, Article 7, Fig. T-764.1.1 may be used. The indicator shall be placed on the surface to be examined, such that the copper plated side is away from the inspected surface. An adequate field strength is indicated when a clearly defined line (or lines) of magnetic particles form across the copper face of the indicator when the magnetic particles are applied simultaneously with the magnetizing force.

**Sequence of Operations:**

The surface to be inspected shall be prepared as indicated in this procedure.

The CONTINUOUS magnetization technique is to be employed.

Ensure in all operations that the pole faces remain in maximum contact with the surface.

Position the poles as described in this procedure and turn on the magnetizing field.

For the wet fluorescent magnetic particle method, apply the bath onto the area under test and allow to flow over the surface such as to allow maximum exposure of the magnetic particles to any flux leakage present, excess material may be gently poured across the surface to aid interpretation.

Maintain the magnetizing field for at least two seconds and inspect immediately.

Repeat the above sequence at approximately 90°.

Repeat the above steps to cover the complete area under inspection ensuring an overlap between inspected areas of at least 25% of the pole spacing.

The area to be inspected shall be limited to the distance between the two legs.

Pole spacing may be limited to a maximum value equal to or less than that used when conducting the lift test of the standard weight but shall be not less than 2 inches.

**Interpretation & Evaluation of Indications:**

All relevant indications shall be interpreted and evaluated in accordance with the appropriate criteria and acceptance standards of the referencing Code Section after each individual examination and the results recorded on the Examination Report.

An indication may be the evidence of a surface imperfection. All indications need not be relevant. Relevant indications are those caused by leakage flux. Relevant indications due to unacceptable mechanical discontinuities are to be noted, located and sized.

Any indication which is believed to be non-relevant may be re-examined again by different NDT method.

A linear indication is one having length greater than three times width.



<p><b>RI</b></p>	<p>A rounded indication is one with circular or elliptical shape with length equal to or less than three times width.</p> <p><b>Unacceptable indications</b> may be removed by chipping or grinding and may be re-tested. Repaired area shall be blended into the surrounding surface so as to avoid sharp notches, crevices or corners. When a defect appears to be fully removed the area can be re-examined by the same method. If required, the repaired area can also be re-examined by another suitable NDT method.</p> <p><b>Acceptance Standards:</b> Acceptance criteria are listed as below, unless otherwise specified. Only indications &gt; 1/16"(1.5mm) shall be considered as relevant. This acceptance criteria shall apply unless other more restrictive standards are specified by Client, <b>ASME Section VIII Div1 (Rejection Criteria)</b></p> <ol style="list-style-type: none"> <li>1. Any linear indication / crack.</li> <li>2. Relevant rounded indications &gt;3/16" (5.0 mm).</li> <li>3. Four or more rounded indications in a line separated by 1/16" (1.5 mm) or less, edge to edge.</li> </ol> <p><b>Demagnetization:</b> When residual magnetism in the part could interfere with subsequent processing or usage, the part may be demagnetized any time after completion of examination. Demagnetization may be done by passing AC current through the yoke and slowly moving the part away (while the yoke is still energized) or reducing the amperes. The maximum residual magnetism shall be ±3 Gauss or less, on Gauss meter.</p> <p><b>Post Examination Cleaning:</b> Post examination cleaning may be conducted as soon as possible, using a suitable process that will not adversely affect the part.</p> <p><b>REPORTING:</b> Magnetic Particle Examination Report Format (NDT0200) is to be used.</p> <p><b>SAFETY:</b> All required safety precautions shall be ensured (Safety Shoes, Safety Helmet, Safety Gloves, Safety Goggles, etc). Eye protection should be worn by the operator. PPE should be worn to protect against the possible skin irritation from the bath.</p> 
<p><b>4.0</b></p>	<p><b>RESPONSIBILITY</b> This procedure is the responsibility of the NDT Level II Engineer.</p>
<p><b>5.0</b></p>	<p><b>REFERENCES</b> SE / E 709 and ASME Sec V Article 7 (Latest Edition) ASME Sec VIII Div1 (Latest Edition) SNT-TC-1A of ASNT (Latest Edition)</p>



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 Commissionerate : Palghar

GSTIN No. : 27AABCF3645C1ZZ  
 PAN No. : AABCF3645C  
 CIN No. : U74900MH2009PTC192904

## MAGNETIC PARTICLE EXAMINATION REPORT

<b>CLIENT:</b>		<b>REPORT NO:</b>	MPI/
<b>PROJECT (if any):</b>		<b>DATE:</b>	
<b>PO NO:</b>		<b>PART TEMP:</b>	Ambient

<b>REFERENCE PROCEDURE:</b>	* SE / E 709 / ASME Sec V Art 7 / FTI/SOP/11 / Others
<b>ACCEPTANCE CRITERIA:</b>	* ASME Sec VIII Div 1 / Others
<b>MATERIAL FORM:</b>	* Weld / Bar / Pipe / Plate / Forging / Fitting / Others
<b>MANUFACTURING PROCESS:</b>	* Forged / Formed / Others
<b>SURFACE CONDITION:</b>	* Welded / Ground / Machined / Rough / As-Forged / As-Formed / Others
<b>TESTED AREA</b>	* All Accessible Surfaces / Bevel Edges / Side Wall Areas / Others
<b>STAGE:</b>	* Initial / In-process / Final / Others

SR NO	DESCRIPTION (Include Material Specification)	QUANTITY (nos)	HEAT / ID NO	DETAILS OF RECORDABLE INDICATIONS (Location / Size / Type)	RESULT

<b>Equipment</b>  Make: Sr No: Calibration Valid Till: Magnetic Mode: AC / HWDC Magnetization Method: Continuous Magnetization Technique: Longitudinal / Transverse	<b>Ferro-Magnetic Particles:</b>  Type: Wet Fluorescent Colour: Green Manufacturer: Batch No: (Exp )	<b>Magnetization Current:</b>  Type: AC Yoke Spacing: Min 2inch Max 8inch
Calibration before every use: Weight Lifting of 4.5 kgs in AC Mode & Field Indicator check found satisfactory		
Test Performed in Dark Room; Ultra Violet (UV) intensity (at the test surface): $\geq 1000 \mu\text{W}/\text{cm}^2$		
Demagnetization: Done; Post Cleaning: Done; All accepted materials are identified as "MPI OK".		

<b>FitTech Industries Private Limited (NDT Level II MT)</b>	<b>Client / Third Party Inspection Agency</b>
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