

Document Title: Procedure for Liquid Penetrant Examination

1.0 SCOPE

This procedure covers **visible** Liquid Penetrant Examination by Solvent Removable process using Colour Contrast Penetrant for detecting discontinuities that are open to surface of Pipe Fittings (**Surface, Bevel Edges, Side Wall Areas of Cold Formed Tees, Cold Formed Reducers**), Flanges or weldments, of all materials. **The Stage, Extent and Location of examination shall be specified in the Quality Plan.**

2.0 PERSONNEL

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.

3.0 METHOD

Consumables:

Penetrant testing chemicals (**i.e., Penetrant, Cleaner, Developer**) shall be either General Purpose (GP) / Nuclear Purpose (NP) grades. Preferably use Pradeep, PMC Flaw Check, Flaw Test OR Equivalent make. Ensure that you use the **SAME Brand** across any performed Test. **Intermixing of Consumables from different brands / manufacturers is not permitted.** **Batch certificates shall be the basis of acceptance of the penetrant materials and shall be reviewed by the NDT personnel.**

Surface Preparation:

Surface to be inspected and adjacent areas within one inch shall be **dry and free from dirt, grease, lint, scale, welding flux, weld** or any other extraneous matter that would interfere with the test. **The surface to be examined may be in the as-welded, as-formed or as-forged condition. Surface preparation by grinding, machining or other suitable means may be necessary where surface irregularities could mask indications.**

Pre-Cleaning:

Thoroughly clean the test area with cleaner (**spraying / brushing**) and then wipe dry with lint free cloth. **Allow the surface to dry by normal evaporation for minimum 30 seconds.**

Temperature:

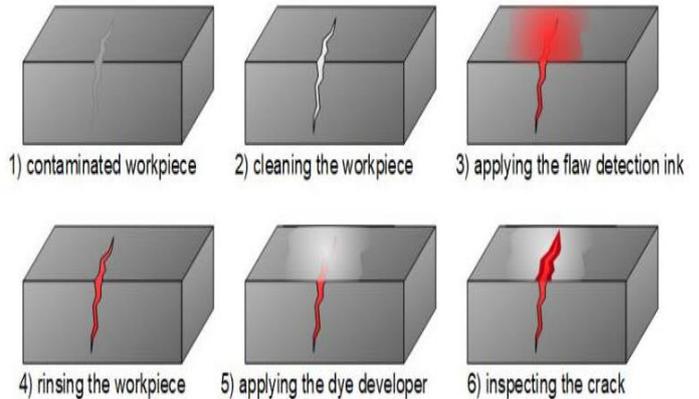
During testing the material temperature shall be between Ambient (i.e., **16°C and 50°C**).

Application of Penetrant:

Apply liquid penetrant by spraying / brushing to cover area adequately and allow a minimum dwell time of 10 minutes and maximum dwell time of 60 minutes. During dwell time, if necessary, the penetrant may be re-applied to ensure that the first coat does not get dried up. If surface to be examined is large enough to preclude complete examination within 60 minutes of developer application, the examination shall be performed in increments. If the penetrant dwell time exceeds the maximum of 60 minutes, then the testing shall be repeated from precleaning stage.

Removal of Excess Penetrant:

Dye Penetrant Testing



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Wipe penetrant applied area with clean lint free cloth. Continue cleaning till all traces of visible penetrant are removed. Cleaning should be done in one direction only. Final cleaning shall be done by lightly wiping the surface with lint free cloth MOISTENED with cleaner. Take care to avoid use of excess cleaner and deposition of any contaminating material which may lead to misinterpretation of the test result. Allow the surface to dry by normal evaporation for minimum **30 seconds**.

Application of Developer:

RI Apply developer by spraying to give a THIN uniform coat. **Developer shall be applied as soon as possible after removal of excess penetrant, however, within 10 minutes maximum.** Allow developer to remain on specimen prior to **Interpretation / Evaluation** for a developing dwell time of minimum 5 minutes **and maximum 60 minutes**.

Interpretation & Evaluation of Indications:

Evaluation shall be carried out at Light Intensity ≥ 1000 lux (can be achieved with a 60W bulb ≤ 200 mm). Evaluation and acceptance standard shall be (as applicable and) as follows (unless otherwise specified),

- Only indications/imperfections with major dimensions greater than 1.5 mm shall be considered Relevant.
- A linear indication is one having length greater than three times width.
- A rounded indication is one with circular or elliptical shape with length equal to or less than three times width.

ASME Section VIII Div1, Appendix-8

All surfaces examined shall be free of,

- RI**
- 1) **Any linear indication / crack.**
 - 2) Relevant rounded indications greater than 5 mm.
 - 3) Four or more relevant rounded indications in line separated by 1.5 mm or less, edge to edge.

Post Cleaning:

RI On completion of testing and interpretation, the part shall be cleaned, **preferably with cleaner and** free from any residues & developer.



Reporting:

RI **Liquid Penetrant Examination Report Format (NDT0100) is to be used.**

SAFETY:

All required safety precautions shall be ensured (Safety Shoes, Safety Helmet, Safety Gloves, Safety Goggles, Mask, etc).

Inspection personnel involved in the liquid penetrant inspection should take precautions due to the toxic and inflammable nature of the chemicals used.

RI **Perform the penetrant examination in a well-ventilated area so as to dissipate the emitted vapour. Avoid direct skin contact with penetrant consumables.**



4.0 RESPONSIBILITY

This procedure is the responsibility of the NDT Level II Engineer.

5.0 REFERENCES

- E / SE 165 and ASME Section V Article 6 (Latest Edition)
- ASME SEC VIII Div1 (Latest Edition)
- SNT-TC-1A of ASNT (Latest Edition)



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 CIN No. : U74900MH2009PTC192904

LIQUID PENETRANT EXAMINATION REPORT

CLIENT:		REPORT NO:	LPE/
PROJECT (if any):		DATE:	
PO NO:		PART TEMP:	Ambient

REFERENCE PROCEDURE:	* SE / E 165, ASME Sec V Article 6 / FTI/SOP/10 / Others
ACCEPTANCE CRITERIA:	* ASME Sec VIII Div 1 Appendix 8 / Others
MATERIAL FORM:	* Weld / Bar / Pipe / Plate / Forging / Fitting / Others
MANUFACTURING PROCESS:	* Forged / Formed / Others
SURFACE CONDITION:	* Welded / Ground / Machined / Rough / As-Forged / As-Formed / Others
TESTED AREA	* All Accessible Surfaces / Bevel Edges / Side Wall Areas / Others
STAGE:	* Initial / In-process / Final / Others

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

Penetrant Make: Batch No. (Exp) Type: Solvent Cleaner Type Red Penetrant Method: Visible Contrast (Dark Red) *Application: Brushing / Spraying Dwell Time: minute(s)	Cleaner (Penetrant Remover) Make: Batch No. (Exp) Type: Penetrant Removal Based *Application: Spraying / Solvent-dampened lint-free cloth Drying Time: minute(s)	Developer Make: Batch No. (Exp) Type: Non-Aqueous Developer Colour: Bright White *Application: Spraying Dwell Time: minute(s)
Light Intensity (at test surface): ≥1000 lux (60W bulb at 200mm)		
Post Cleaning: Done		

FitTech Industries Private Limited (NDT Level II PT)	Client / Third Party Inspection Agency
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