

Track – Liquid Penetrant Testing (LPT)

Scope

- Includes: Liquid Penetrant Testing (LPT), visible penetrant, solvent removable or water washable, non-aqueous wet developer processes
- Excludes: Magnetic Particle Testing (MPT)

Preparation

Tools, equipment and plant items required but not limited to:

- Liquid Penetrant – either aerosol spray or liquid form to be applied by brush
- Penetrant remover (same product family as penetrant)
- Developer
- Wire brush
- Solvent cleaner
- Lint Free Rags or cloths
- Lighting (500 lux at the test surface)
- Approved rail thermometer
- Approved umbrella (with earthing strap, if required)

Work planning considerations:

- Staff undertaking these operations must be trained and certificated in the technique being applied
- Size and location of area to be tested – solvent removable process is suited to site work or small areas, whereas the water washable process is more suited for use in depots and for large areas.
- Surface temperature must be no greater than 50°C or the penetrant will dry out and not enter cracks

Method

1. Take rail temperature. If surface temperature is greater than 50°C LPT cannot be undertaken.
2. A wire brush should be used to remove rust, grease or scale contamination before cleaning the area to be tested by wiping with a solvent cleaner dampened cloth.
3. Allow the solvent cleaner to evaporate from the test surface (2 minutes).
4. Apply penetrant and leave for at least 20 minutes. The penetrant shall be rewetted if necessary during this time.
5. Remove excess Penetrant using water or solvent dampened cloth then a dry cloth, until clean.
6. Allow the remover to evaporate or water to dry from the test surface.

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7. After agitating the developer tin for 10 seconds, apply developer to the test area in a light even coat, holding the tin at least 30cm away from the test surface. Care must be taken to ensure that the developer is not applied too thickly as this can mask the defect indications.
8. Under adequate lighting, inspect the test area as soon as developer is applied, before bleed out renders the interpretation of narrow cracks impractical and continue for at least ten minutes.
9. Report and action any defects identified in accordance with NR/SP/TRK/132.
10. Clean the test area using a solvent cleaner dampened rag or cloth

References

Supports Ellipse Standard job

- At present there is no Ellipse code for LPT

If applicable refer to the following directly associated documents:

- NR/SP/TRK/056 Rail testing: Non-Ultrasonic Procedures
- NR/SP/TRK/032 Joining of Rails by Aluminothermic Welding
- NR/SP/TRK/132 Weld repair of rails

- Risk Control Sheets:
- NR/L3/MTC/0002/TK000 Generic Track Risks
- NR/L3/MTC/0002/TK702 Liquid Penetrant Testing