



Method of Inspection

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Method of Inspection



- Un aided visual
- Macro etch examination
- Micro etch examination



Unaided Visual Inspection

- Its Visual inspection, without the aid of magnifying equipment
- Surface preparation can be carried out at any stage of production from the receipt of the raw material, to the finished article.
- Used to inspect surface defects only





Macro etch examination



- Purpose
 - To examine the weld cross-section to give assurance that: -
 - The weld has been made in accordance with the standards
 - The weld is free from defects



Macro etch examination

- Specimen preparation

- Full thickness slice taken from the weld (typically ~10mm thick)
- Width of slice sufficient to show all the weld and HAZ on both sides plus some unaffected base material
- One face ground to a progressively fine finish (grit sizes 120 to ~ 400)
- Prepared face heavily etched to show all weld runs & all HAZ
- Prepared face examined at up to x10 (& usually photographed for records)
- Prepared face may also be used for a hardness survey



Micro etch examination



- Purpose
 - To examine a particular region of the weld or HAZ in order to:-
 - To examine the microstructure
 - Identify the nature of a crack or other imperfection



Micro etch examination



- Specimen preparation
- A small piece is cut from the region of interest (typically up to ~ 20mm x 20mm)
- The piece is mounted in plastic mould and the surface of interest prepared by progressive grinding (to grit size 600 or 800)
- Surface polished on diamond impregnated cloths to a mirror finish
- Prepared face may be examined in as-polished condition & then lightly etched
- Prepared face examined under the microscope at up to ~ x 600



Etching reagents



- Etching reagents are used to make grain boundaries visible. Some of the reagents are
 - Hydrochloric Acid
 - Nitric Acid
 - Ammonium per sulphate
 - Iodine & Potassium iodide



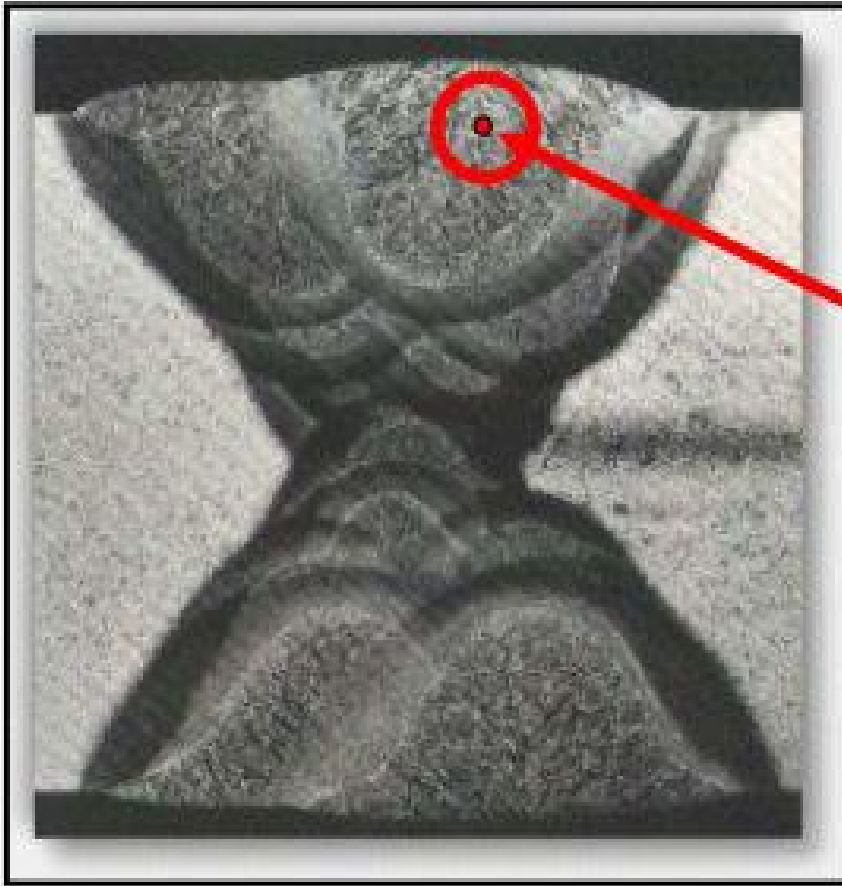
Macro Vs Micro Examination



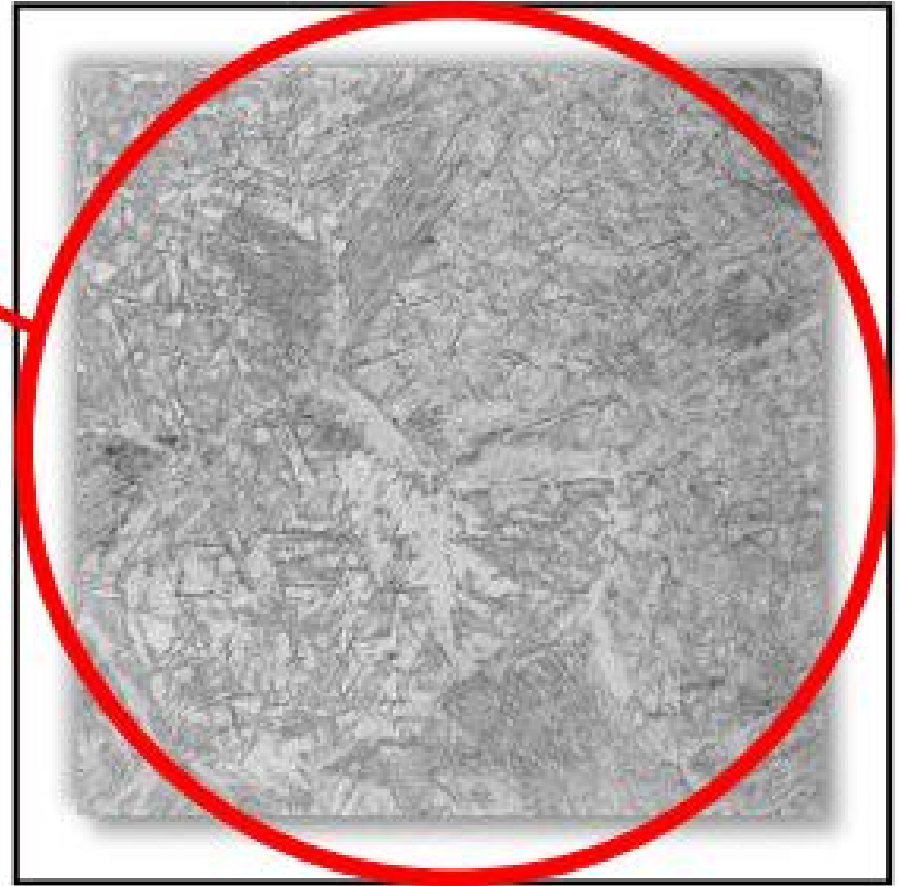
- Visual examination for defects
- Cut transverse from the weld
- Ground & polished P400 grit paper
- Acid etch using 5-10% nitric acid solution
- Wash and dry
- Visual evaluation under 5x magnification

- Visual examination for defects & grain structure
- Cut transverse from a weld
- Ground & polished P1200 grit paper, 1 μ m paste
- Acid etch using 1-5% nitric acid solution
- Wash and dry
- Visual evaluation under 100-1000x magnification

Macro Vs Micro Examination



Macro examination



Micro examination