Document Title: Procedure for Pickling & Passivation

Pickling & Passivation Process

1.0 SCOPE

This procedure outlines the process of Cleaning and subsequent Pickling and Passivation of Stainless-Steel Finished Pipe Fittings and ensure that it complies with stated requirements.

2.0 POLICY

Pickling and Passivation is carried out for removal of surface scales, contamination, oxide films, oil, grease, grime, etc. generally formed due to Forging, Heat Treatment, etc. and formation of passive layer of chromium oxide.
Pickling is generally avoided for fully machined components.

3.0 METHOD

PRECLEANING / DEGREASING:

It involves removal of grease, oil paints, soil and other gross contamination preparatory to a machining process or final cleaning. Fittings shall be degreased before Pickling and shall be vigorously brushed with hot water and a SS bristle brush. Jet water pump may be used to increase effectiveness.

PICKLING ACID SOLUTION:

It comprises of the following,

- Dilute HNO_3 : 20% by volume
- Dilute HF : 10% by volume
- Water : 70% Rest by volume

PICKLING:

Fittings shall be soaked in the bath for 10 to 30 minutes at Room Temperature. Soaking time depends on usage of solution.
The surface may be scrubbed intermittently with SS brush / fiber crystal brush in conjunction with pickling to facilitate the removal of stubborn contaminants.
After Pickling, surface must be thoroughly rinsed to remove residual acids. Running water jet may be used. After rinsing, the fittings shall be immediately drained and dried.
The surface cleaning and descaling shall have dull to bright appearance. Fitting Surface shall be checked as indicated in 'Passivity Check'. Water shall be applied till neutralization (7 pH).

PASSIVITY CHECK:

This is carried out on surface by using pH paper. Paper after dipping in water is placed on surface of the component. Yellow paper shall not turn into red or blue. If there is no change in colour of paper than the surface is free from traces of acid.

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PASSIVATION:

Passivation treatment is for generation of 'oxide' film, the removal of free iron and other contamination resulting from handling, machining or exposure to contaminated atmospheres, and pickling.

All acid cleaned / pickled or brightly polished surfaces are passivated using the following mixture of chemicals at room temperature.

- Dilute HNO_3 : 25% by volume
- Na_2Cr_2O22 (H_2O) (Sodium Di chromate) : 5% by weight
- Water : 70% Rest

Passivation is to be done for a period of 10 to 15 minutes at Room Temperature.

Fitting Surface shall be checked as indicated in 'Passivity Check'. Water shall be applied till neutralization (7 pH).

QUALITY CHECKS & PROTECTION:

Swipe Test:

Rubbing of the surface with a clean lint free cloth for direct visual inspection. The presence of smudge on the cloth is evidence of contamination. Iron contamination may be checked with ferroxyl test.

Test may also be done for chloride contamination on surface of fittings.

PROTECTION of Cleaned Fittings:

Immediately after completion of all these tests, the fittings shall be packed in plastic sheets to prevent contamination from rust, dust & iron particles.

MATERIAL PROCESS TRACEABILITY:

Traceability is maintained with Heat Number only (preferably low stress). This number will be ensured on all technical documents (RM Inspection Records, Production Records, Heat Treatment Records, Lab Test Certificates, Manufacturing Test Certificates, etc)

SAFETY:

All required safety precautions shall be ensured (Safety Shoes, Safety Helmet, Safety Gloves, Safety Goggles, etc). Due to use of Corrosive & Toxic Acids; Rubber Gumboot/Shoes, Plastic / Rubber Aprons, Mask, Rubber Gloves may be used. Area should be cordoned off till the operation is completed.

Follow safety instructions on the Acid Container.

Utmost care to be taken for PROPER and SAFE disposal of used Acids. These are generally returned back to the manufacturer for safe disposal.

4.0 PROCESS VALIDATION

Litmus Checks have resulted in compliances with the Standards.

5.0 RESPONSIBILITY

This procedure is the responsibility of the Production Engineer and QC Engineer.

6.0 REFERENCES

ASTM A380
MSDS - Nitric Acid
MSDS - Hydrofluoric Acid

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