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1.0 SCOPE

① The present specification is applied to piping and vessels made in carbon steel and stainless steel.

The scope is to eliminate oxides and possible wastes of machining present on the surface.

2.0 EXECUTION OF THE WORK

2.1 General

Pickling is composed by following operation:

- DEGREASING
- RINSING
- ACID WASHING
- ① - NEUTRALIZATION AND PASSIVATION (EXCLUDED STAINLESS STEEL)
- DRYING
- PREPARATION FOR SHIPMENT

2.2 Degreasing

①2.2.1 It is carried out by immersion in suitable pickling vat containing an alkaline solution with PH ranging from 10.5 to 12. The alkaline solution must contain compounds such as:

- | | |
|--------------------------------|------|
| - TRISODIUM PHOSPATE | 0.4% |
| - SODIUM CARBONATE | 0.8% |
| - CAUSTIC SODA | 0.2% |
| - SODIUM SILICATE | 0.2% |
| - NON - IONIC SURFACE - ACTIVE | 0.1% |

The temperature of the bath must range from 45 to 50°C while the time of immersion must not be shorter than 120 minutes, anyway sufficient to eliminate any trace of oil substance.

- ①2.2.2 For stainless steel the solutions utilized is an aqueous solution based on surface - actives on ionics and anfoterics at low foam.

2.3 Rinsing

It must be executed by immersion or using high pressure pumps. The duration of the operation is determined by the PH of the waste water, which should be near to neutral value (about 7).

2.4 Acid washing

- ①2.4.1 It must be executed by immersion in suitable vats containing an acid solution formed as follows:

- CLORHYDRIC ACID 5% weight
- INHIBITOR RODINE 213 OR EQUIVALENT 0.2% weight
- WATER

The temperature of the bath must range from 50 to 80° C while the immersion time depends both on the type and quantity of oxides on piping and on the iron analysis carried out during washing. Please note that the washing is finished when the iron values (determined) result constant.

- ①2.4.2 For stainless steel the solution utilized is a solution based of strong mineral acids.

①2.5 Rinsing

It must be executed by immersion or using high pressure pumps. The duration of the operation is determined by the PH of the waste water, which should be near to the neutral value (about 7).

2.6 Neutralization and passivation

①2.6.1 It must be executed by immersion in suitable vats containing a solution of:

- TRISODIUM PHOSPHATE 2% weight
- NITRITE SODIUM 4% weight

The bath temperature must range from 45 to 50°C while the immersion time must not be shorter than 80 minutes.

①2.6.2 This step is not applicable for stainless steel.

2.7 Drying

It must be executed using oil - free dry air or nitrogen

2.8 Preparation to shipment

It must be executed on all shipping using suitable polyethylene taps and sealing them by adhesive film in order to avoid any possible contact with atmospheric agents.

①3.0 INSPECTION AND ACCEPTABILITY CRITERIA

Item cleaned with pickling methods shall be inspected by direct visual inspection. Visible grease or oil films, particulate matter such as filings, chips, loose or loosely adherent rust or millscale, contaminants, are not acceptable.

①4.0 CERTIFICATION

A certification of conformity must be supplied for each lot of material handled.