L. C. NICKEL WELDING

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INTRODUCTION

Low Carbon Nickel is extremely delicate to Sulphur attack. When in contact at temperature above 300°C, some traces of Sulphur containing materials are sufficient to destroy the nickel to a large extent.

Ni + S ---------- Nis

In Nickel Sulphide formation the nickel losses it's resistance and become unusable.

It has been found that hardly there is any substance in which Sulphur is not present in any form. Most dangerous in contact with nickel are oil, grease, dirt, pait, varnish, etc. one prime hazard of Sulphur contact to the nickel is the polluted air of cities and industrial areas, which usually reaches a great level of sulphur content. Through cleaning of nickel parts, tools, clothing and hands of the workers therefore is a necessary precaution which does not tolerate any compromise at all. The slightest carelessness or omission in nickel handling may have the worst consequences.

Storage

To exclude any possible hazard of nickel destruction and to avoid unnecesary expenses for cleaning, the nickel should be stored in a dry , clean and safe place, preferably under roof and in a closed building. Reliable & careful people only should be in charge for transport and handling of nickel. The metallic bright surface is to be protected against reactions of any kind.

Cleaning

All nickel parts must be cleaned carefully and thoroughfully before construction & welding procedures. One more time of cleaning must take place after installation in the field and immediately prior to insulation. Since Sulphur attack is related to temperature, it is obvious that all cleaning and removal of oxides must cover all sides - inside, outside, top & bottom.

Cleaning & Degreasing

For cleaning by washing, use trichloroethane which should be applied several times using a new clean rag each time. The safety regulations locally in force are to be observed strictly when working with trichloroethane. In case a metallic bright surface is not produced by this method, the top layer of the metal must be removed mechanically by grinding. For safe cleaning remove approx. 0.1 mm, but atleast as much as to reach an uninterrupted bright surface. the grinding procedure must be followed by washing with tricholoroethane as described above.

Preparation of L.C.Nickel for Welding

Since the immediate neighbourhood of the welding will be heated beyond the critical temperature of sulphur atttack, this heat influenced area, must be cleaned before all welding. To exclude all possible hazards of destruction, both sides of the welding edge must be grinded metallic bright to a width of atleast 50mm. Washing with trichloroethane must be extended beyond the grinded area to cover a width of atleast 500 mm. on both sides.

Protection of cleaned L. C. Nickel

After all cleaning activities and during interruptions of work all nickel surfaces area to be covered with polyethylene sheets to prevent new reactions.

Welding procedure

For L.C.Nickel only Tungsten intert gas welding (TIG) may be used with Argon as protective gas and root protective gas. Welding

technique TIG is welded with direct current. If possible, welding seams should be carried out in a horizontal position. Ignition of the welding arc in welding seam only. Ignitition apart the seam has to be strictly avoided. Starting & interruption points may not show any cracks, etc. Layers should be brought in straightly. The width of layers should not exceed 6 mm. When welding longitudinals seams, the welding ends have to be welded on.

Last cleaning & cleaning of Root face

Last cleaning has to be carried out immediately before tackwelding. Tacked connections which are left in the seam have to be ground at both ends. The Root face has to be protected against Oxidation with Argon. Before bringing in a new layer into the seam, the previous layer has to be cleaned which may be done by brushing or slight grinding.

Iron Contamination in L. C. Nickel

A direct contact between Carbon Steel and L. C. Nickel has to be avoided grinding, brushing, welding & erection. Tools such as Stainless Steel brushes, chisels, grinding discs may only be used for L.C.Nickel. Once they are used for Carbon Steel, they must not be utilised for L.C.Nickel any more.

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