INSPECTION OF HEAT EXCHANGER
WORK INSTRUCTION
UIS-I-42

An inspection plan should be agreed upon prior to inspection, loading and shipping with the seller's representative.

Hereafter an outline of main inspection steps, which can be followed to conduct pre-shipment inspection for heat exchanger such as, internal tubes, shall side, welding joints, structure body, Fittings, connected flanges, control levels, impingement plates, , … etc

1. Meeting & Documents Review:

1.1 Review of inspector assignment and relevant documents (Contract, L/C, Proforma Invoice, Technical Specification and any special instructions), also to acquire and review any additional relevant standards such as ASME, API standard and / or regulations.

1.2 A meeting is to be held with the supplier representative at the inspection site in order to meet the supplier's representative in charge of inspection, to review the documents and to discuss the implementation of the inspection test plan and to request any assistance, if necessary.

1.3 Inspector is to be informed by the supplier on main quality system & standards applied for production and testing of items subject to inspection.

1.4 For both shell side and tube side review all the material chemical composition, welding procedures specification (WPS), procedure qualification record (PQR), all the welders qualification record, hydrostatic test report, NDT reports(x-ray, MP, DP, UT..etc), mechanical test reports such as tensile testing, yield strength, elongation, hardness and heat treatment chart record if applicable, etc.. Check test result records of routine and daily analysis and tests done by quality control personnel.

1.5 Review records and certificates for calibration of the instruments & devices used for testing, measuring or weighing to assure their accuracy as well as the NDT personal qualification certificates levels such as PCN, ASNT…Etc.

1.6 Inspector shall ask for and obtain technical specifications and certificates of components and materials and their sub suppliers to ensure they meet the requirements and that they are from the specified origins and according to the approved vendor list.

2. Visual and Dimensional Inspection

2.1 Inspector visually checks goods for appearance, newness, and physical defects; such as dents, cracks, undercuts, porosity, imperfections, rust or any mechanical damage on all external and internal parts such as structure steel, connected parts, tubes/coils, tube plate, legs, inlet and outlet nozzles, flanges...Etc.

2.2 Inspector dimensionally check all the connected parts physically locations as per approved drawings, length, diameter, connected flanges, flange rating, nozzles ...etc.

2.2 Discrepancies to be recorded photographed and reported on the daily and final inspection reports indicating extent and number or percentage of detected discrepancies.

2.3 Check for proper packaging (wrap, insulation handling etc.) All markings are to be checked such as name plate which consist leak test, heat exchanger model, design code, material specification, year of manufacture...etc.

3. Sampling & Testing

3.1 Random sampling of material used for manufacture of heat exchanger (shell side and tube side) should be reviewed and to make sure are to be according the agreed contract standards (if mentioned) or to any applicable National and / or International Standards, inspection test plan ITP, manufacture procedure specifications MPS and/or quality control procedure QCP.

3.2 Check the class of insulation, protection type, name plate, types of painting and its specification, review applied painting procedure, heat exchanger preservation....etc.

3.3 According to applicable standards, a certain number of samples are subjected to relevant tests; results should be clearly recorded on adequate form or sheet mentioning the method applied and must be reviewed by the inspector. Shell side and tube side shall be free from any water after leak test to avoid any signs of possible corrosion. All test forms and sheets should be jointly signed by inspector and seller's representative.

3.4 The results of tests carried out or witnessed should be checked to determine conformity with contract requirements. If a certain degree of non-conformity is detected, the UIS technical department supplier and buyer should be immediately informed.

4. Packing

4.1 The inspector shall follow UIS common practice for packing and /or any international standard agreed by the buyer and seller.

4.2 The inspector should make sure that packaging is suitable and give adequate protection during transporting and handling. Inspector must note that many goods need special protection from wet weather conditions by proper wrapping, silica gel bags…etc.

4.3 The inspector should check for O.M. manuals, spare part ref and any requirement mentioned in PO …etc.

5. Reporting to Technical Department

5.1 Daily reporting directly to Technical Department shall be made on UIS-F-29 form and should cover clearly the progress of inspection, testing activities non-conformities and any other remarks, with photos. Photos and supporting documents shall be included with Daily Inspectors' Reports.

5.2 Upon completion of any given inspection, final inspection reports should be forwarded to the Technical Department by fax or email, as soon as possible but not later than (24) hours of inspection completion, together with the packing list, calibration certificates and any other document, signed, stamped and dated by the inspector.