

## Method Statement for Installation of Plate Heat Exchanger

Unless otherwise specified, all plate heat exchanger installation shall be in accordance to approved shop drawings, manufacturer instructions and contract specifications.

Drawing plans, schematics, and diagrams indicate general location and arrangement of Heat Exchangers. Install **Plate Heat Exchangers** as indicated unless deviations to layout are approved on coordination drawings.

Plate Heat Exchanger shall be installed on the concrete foundations (by main civil contractor) as per approved foundation drawings, ensure adequate space is available for valves, piping and for future maintenance. It is important that enough space around the plate heat exchanger is kept free for servicing of the unit for renewal of plates, tightening of package.

Free space around the heat exchanger unit should be 1.5 to 2 times of the width. Examine areas and conditions with requirements for installation tolerances and other conditions affecting performance, operation and maintenance of Plate heat Exchanger.

Check the heat exchanger concrete foundation should be horizontal & smooth finishes from top. Check painting if required in civil detail. The plate heat exchanger should be mounted in an upright position (top on the nameplate is up) to avoid trapping air or other gases.

### **Shifting, Lifting and Placement of Plate Heat Exchanger**

- For transportation of heat exchanger to project site permission will be agreed in advance with main contractor and client.
- Heat exchanger will be delivered at site by trailer. If plate heat exchangers are already available in the project store, shift plate heat exchanger from store to the area of installation as per manufacturer's instruction.
- Plate Heat exchanger should not be lift by connections or the stud around them. Strap should be used when lifting, place e strap according to the manufacturer's instruction.
- A level area will be cleared for the standing of the mobile crane and trailer. Existing underground services and ground conditions will be considered prior to the positioning of the mobile crane and trailer at the site.
- Prior to standing and rigging of crane on the project site, the HSE Officer will be responsible for ensuring that Plant Check List is completed and that copies of all relevant documentation is attached to this lifting plan.

- Where any non-conformance or defect is evident then the crane will be stood down, the lifting operation will be cancelled and immediately informed to the main contractor.
- Lifting Plan will be briefed (toolbox talk) prior to the commencement of lifting operations to all operatives and third parties involved in the activity.
- The lifting area will be designated “Authorized Personnel Only” and will be demarked and signage displayed to ensure that no unauthorized personnel can gain entry to the lifting area.

### **Plate Heat Exchanger Lifting Procedure with Mobile Crane**

- Outrigger mats, or suitable timbers, will be positioned under outriggers.
- The hydraulic outriggers will be extended over mats and the crane levelled.
- The cranes boom will be raised and telescoped to the required length.
- The ASLI (Automatic Safe Load Indicator) will be checked for correct operation.
- The above sequence of rigging will be in accordance with the manufacturer’s recommendations, which will be strictly adhered to all times.
- Only one Heat exchanger to be lifted one at the time.
- The slingers / banksman will attach chain sling from crane hook point, hook block.
- The banks man will attached 2 no’s web sling with heat exchanger and chain sling hook.
- Guide ropes/Tag lines will be attached by the helpers to prevent the swinging of the load.
- Once it is confirmed by the Banksman / slinger that the load is level, the lift will commence to the required position under the strict guidance of the Banks man.
- The Banksman is to be in direct line of sight with the crane operator at all times.
- If the crane operator cannot see the Banksman then he is to stop the lift immediately.
- One certified banks man / signaller will be appointed to control the crane movements and lifting operation and hand signals from other personnel will not be permitted and must be ignored.
- Ensure that set down area is clear where the load is going to be offloaded.
- Personnel remain clear of the load at all times until the load is at waist level. Tag lines are to be used to prevent swinging.

- The slinger / signaller will stand in a secure position, where they are in view of both the load and the crane operative. Each signal will be distinct and clear.
- Release lifting tackle, hoist clear and repeat until completion. On completion of lifting operations, all lifting equipment is to be removed and stored properly.

### **Heat Exchanger Lifting Procedure with fork lift truck**

- Safe access and egress for the route of the forklift will be determined. Access will be free of obstructions, and be properly maintained.
- Heat exchanger column bar & tie rod bolts to be removed as per agreed & temporary change it with a shorter length to be able to accommodate the unit in the plant room.
- The forklift utilized for the task should be safe working load capacity to lift off heat exchanger.
- The lifting load will be suitably bound or lashed to ensure it is secure and on a pallet.
- The forklift operator will only commence movement of the forklift to the pickup area under the guidance of the Banks man. Signals must be clear and precise and understood by all personnel involved in the work activity.
- The forklift operator will only take instruction and direction from the assigned
- Banksman. No other personnel are to provide guidance or instruction.
- The banks man will stand in a secure position at all times, where they are in view of both the load and the forklift truck operative. Each signal will be distinct and clear.
- The forks on the forklift truck will be adjusted to give maximum support to the load being lifted.
- The forklift operator will insert the forks under the load with the guidance of the banksman.
- The load will be lifted up until the forks take the load weight, whilst not lifting it off the ground, to ensure that the load is level.
- Once it confirmed by the forklift operative that the load is level, the lift will commence to the required position under the strict guidance of the Banksman.
- Forks will be tilted backwards during all load movements to ensure maximum stability of the load being moved.
- The load will then be moved to the agreed location i.e. plant room/plinth under the strict guidance of the Banksman.
- Cones will be set out, including barrier tape, to exclude unauthorized entry into the loading/work area.

- The load will be lifted to the height of the plinth/location and slowly moved forward and get in position to the final placement with strict guidance of banks man.
- Once the load placed in required position the forks will be released.
- Reassembly of the column bar & tie rods of heat exchanger to restore its original dimensional details will take in place.
- If supports/shock absorbers are required to be inserted under the heat exchanger, this must be done in advance to the load being offered to the final position.
- Supervisors will coordinate with the banks man for the final positioning of the heat exchanger whilst the forklift in use.
- After putting down on the foundation the *Plate Heat Exchanger* should be levelled and aligned on the foundation.
- After alignment put rubber pad between the foundation& Plate Heat Exchanger.
- Upon satisfactory positioning of Heat Exchangers, it should be covered with polythene sheet to secure &protect it from moisture and dust ingress until such time as the units are available for commissioning.

### Heat Exchanger Piping Connections



- If the connection is rubber lined, the liner will act as the flange gasket.
- Bolt the connecting flange directly to the end plate using the drilled and tapped holes provided.
- Tighten the bolts evenly, do not over tighten as this could strip the threads cut into the frame plate.

- If loose backing flanges are fitted to the heat exchanger a suitable gasket is required to seal the flange.
- The **heat exchanger** is usually connected for counter-current flow.
- The heat exchanger inter-connecting piping and piping supports should be designed such that loads and stresses on the exchanger connections are eliminated. Thermal expansion must be taken into consideration when designing the piping system.
- By-pass piping and valves should be considered to allow isolation of each side of the heat exchanger for inspection, cleaning, repairs, and replacement.
- Install flexible connections onto the follower to prevent vibrations onto the heat exchanger and also the expansion of the pipework, caused by temperature influence onto the Heat Exchanger.
- Drain piping should be designed to assure complete draining. Avoid common drain manifolds.
- The venting system design should take into account all applicable operator and environmental safety requirements.
- Install relief valves on *Heat exchanger* heated fluid connection. Install shut off valves at Heat exchanger inlet and outlet connections. Remove all plugs, shipping covers, desiccant containers, and other protection immediately prior to connecting unit.
- Avoid unnecessary exposure of internals to contaminants and moisture.
- The pipe works /piping system shall be thoroughly cleaned and flushed before connecting into the heat exchanger. After completing system installation, including outlet fitting and devices, inspect exposed finish, remove burrs, dirt and construction debris and repair damaged finishes.

### **Plate Heat Exchanger Inspection and Testing**

- In process works shall be monitored for quality of workmanship and installation against approved construction drawing by the relevant Supervisor, Project Mechanical Engineer, Construction Manager and QA/QC Engineer.
- Ensure that the installation of Plate Heat Exchanger complies with the specification requirements and notify the main contractor / consultant in advance at least 24 hours before installation inspection must be made.
- Ensure a factory authorized service representative to inspect, test and adjust field assembled components and equipment installation, including connections, and to assist in field **testing of plate heat exchangers**.