EK 30. STATİK EKİPMAN MONTAJ PROSEDÜRÜ (STATIC EQUIPMENT ERECTION PROCEDURE) ÖRNEĞİ

EQUIPMENT ERECTION PROCEDURE

C O N T E N T S

1. SCOPE

This Procedure covers the general requirements for the installation of static equipment, such as drums, columns, towers, vessels, heat exchangers and other static equipment. It should be read in conjunction with all specific equipment installation procedures and Contract documents. For equipment where installation manuals are provided by the manufacturer, the work, inspection and tests shall be carried out in accordance with the Vendor's manuals and Technical Documents.

2. TREATMENT OF FOUNDATION AND ANCHOR BOLTS

Preparation of Foundation

Center line marking and level marking of foundation or structural steel shall be checked prior to starting the work.

Major dimensions and position of anchor bolts or anchor pockets shall be checked. Center and alignment of anchor bolts (level and position) shall be within ± 3mm.

Cleaning and chipping shall be applied to the foundation surface, foreign materials, especially oil and rust will be removed. Chipping is; few millimeters removal of laitance from the surface, to give good adhesion to avoid cracking, peeling off, etc., of grouting mortar.

When the equipment is installed on structural steel, the contact surface of structural steel to equipment base plate shall be checked and confirmed free from foreign materials. If it is on welded joint of structural steel, welding reinforcement shall be ground off flush.

If template is used, template shall be removed.

3. PREPARATION FOR INSTALLATION

Liners and Shim Plates

In general, liners to be used shall be made of carbon steel and shim plates shall be made of austenitic stainless steel.

Dimensions of liners shall be as following:

Thickness of liner ……. Minimum 9 mm,

Width of liner …… Minimum 50 mm

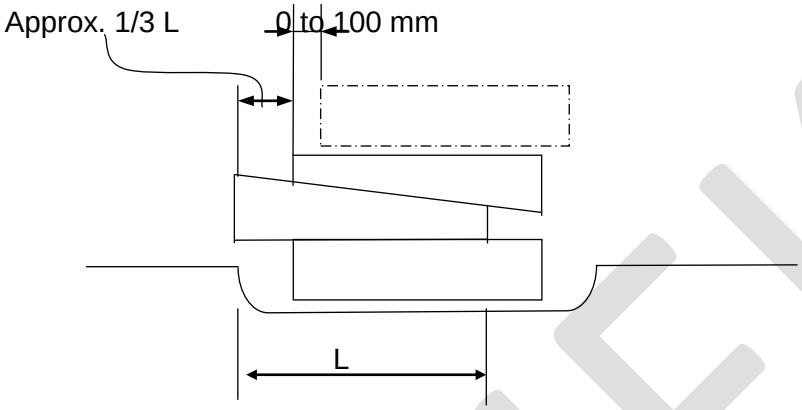
Length of liner …… 20 to 40 mm longer than the width of equipment base plate

Gradient (x/y) of wedge liner ……. 1/30 - 1/40

Liners shall be so arranged that the load of the equipment is uniformly distributed to the foundation.

Liners shall be placed as near as possible to the anchor bolt and at both sides of each anchor bolt. If placing of liners at both side of anchor bolts is not possible due to limited space, a liner

shall be placed at the center of neighboring anchor bolts.
In case where only flat liners are used for alignment, no more than a maximum of 5 pieces shall be in any one stack.
Shim plates, placed for alignment of very small adjustment shall be less than 1 mm thickness.
Where the carbon steel liners are used in multi-layers, they shall be tack welded to each other after completion of alignment of the equipment.
Surfaces of straight liners need no machining but gradient surface of wedge liners shall be finished smoothly by machining. Wedge liners shall generally be set as per following figure.

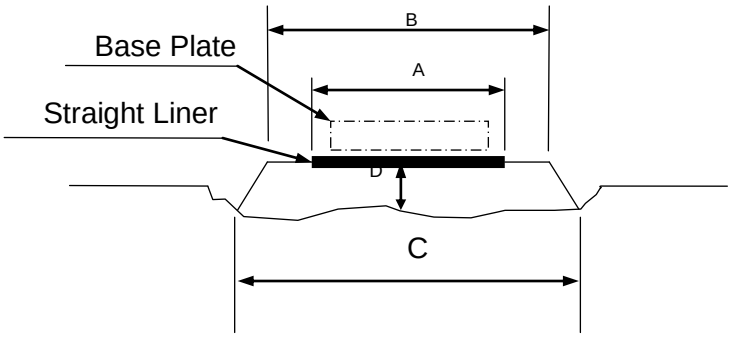


When the equipment is installed on structural steel, if required, elevation of top structural steel shall be adjusted using liners or shim plates.

Mortar Pad.
Mortar Pad may be applied in accordance with below Table

Description	Mortar Pad			Anchor Pocket Grouting			Base & frame Grouting		
	Ordinary Mortar	Non-Shrink Mortar	Epoxy Grout	Ordinary Mortar	Non-Shrink Mortar	Epoxy Grout	Ordinary Mortar	Non Shrink Mortar	Epoxy Grout
Static Equipment such as Tank, Tower and Heat Exchanger	√			√			√		
Rotating Equipment Such as Pump, Blower	√	√		√	√		√	√	
Heavy Rotating Equipment such as Compressor, Turbine, more than 100 kW capacity Pumps		√	√		√	√			√
All Equipment	By Manufacturer's Specification/Instruction (Supersedes all above)								

Mortar pad shall be as per following figure



A	:	Width of straight liner :	Minimum : Width of base plate Maximum : Width of base plate + 15 mm
B	:	Top width of mortar pad :	Minimum : Width of straight liner +50 mm Maximum : Width of straight liner + 70 mm
C	:	Bottom width of mortar pad :	Minimum : Top width of mortar pad +100 mm Maximum : Top width of mortar pad +140 mm
D	:	Mortar pad height :	Minimum : 30 mm Maximum : 70 mm

4. GENERAL REQUIREMENT FOR INSTALLATION

Installation:
To avoid the contact with grouting mortar, oil and any other foreign matter on the surface of frame shall be entirely removed.
Alignment shall be performed in accordance with the tolerance shown in the related specifications and procedures.
If there are weld-up type washers of anchor bolts, they will be welded after finishing the alignment and final tightening of anchor bolts.
Before installation of the equipment, anchor bolts' threads shall be coated with grease to prevent rusting of the thread.
After the installation, temporary attachments provided by manufacturer (if any) shall be removed.
Lifting lugs and tailing lugs shall be cut-off, when so requested in the drawing or specifications. If cutting to be done, proper protection on equipment body shall be provided before cutting-off lugs.
Welding work shall only be performed by qualified welders.

Grouting:
Before grouting, anchor bolts and anchor pockets shall be cleaned from oil, water and foreign materials.
Adequate numbers of drain pipes shall be installed inside the grouting for vertical equipment having skirt at bottom.
Before grouting, chipping and cleaning of foundation surface shall be confirmed. For better cohesion, water shall be sprayed onto concrete, soaking for 20 to 30 minutes before grouting.
The grouting mortar shall be poured into the gap between equipment and foundation as referred above. Grout mortar shall be poured in such a way, to avoid the formation of any air pocket.
Mixing ratio of grouting mortar shall be as specified by Vendor.
For open frame type skid equipment, grouting mortar shall be poured up to the level of the skid to prevent rainwater accumulating in the skid.

5. CARE FOR SPECIAL EQUIPMENT

Stainless Steel Equipment:
For the transportation, lifting, installation, etc., of stainless steel equipment (including stainless steel lined/cladded equipment) the use of galvanized and/or painted tools and tackle such as, but not limited to wire sling, wire rope, wire-net, etc., is prohibited if precaution is not taken to avoid the direct contact to the surface (either outside or inside) of the equipment.
Outside surface of stainless steel equipment shall be washed by fresh water before installation, if the equipment was ocean transported in bare condition.

Rubber Lined Equipment:
When so requested in manufacturer's installation manual to protect it from sunshine, water shall be filled in or shield cover shall be provided around the rubber lined equipment.

Nitrogen Sealed Equipment:
For the equipment supplied in nitrogen sealed condition, nitrogen indicator gauges will be periodically checked and nitrogen sealing shall be maintained until piping connection.

Accessories and instruments, which may be damaged during the works, shall be dismantled and returned to warehouse.