

Pump Foundation & Pre-Installation Checks I

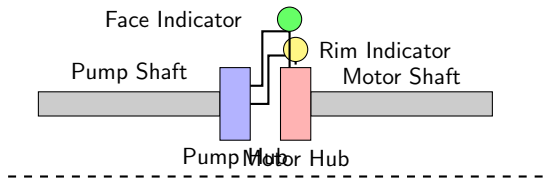
Civil foundation preparation and leveling standards under API RP 686 requirements.

Pump Foundation & Pre-Installation Checks II

Key Points

- Concrete foundations must cure for a minimum of 28 days and achieve 75% of design compressive strength before equipment placement.
- Concrete surface laitance is removed by chipping/scabbling to expose sound aggregate and ensure robust epoxy grout bonding.
- Baseplate or soleplate leveling is done using stainless steel shims or leveling jackscrews on flat metal plates.
- The baseplate must be leveled to within 0.4 mm per meter (0.005 in/ft) across longitudinal and transverse planes before grouting.

Shaft Alignment & Dial Indicator Method I



Shaft Alignment & Dial Indicator Method II

Key Points

- Rim and face dial indicator method isolates parallel offset (rim) and angular misalignment (face) across the coupling hubs.
- Reverse dial indicator method uses indicators mounted on opposing shafts to eliminate indicator sag errors on long-span couplings.
- Standard field tolerance limits parallel offset to 0.05 mm (0.002 in) and angular deviation to 0.05 mm per 100 mm coupling diameter.
- Thermal growth compensation adjusts the driver (motor) shaft height lower than the pump to account for thermal expansion at operational temperatures.

Piping Connections & Pipe Strain Management I

Guidelines for pipe fit-up to prevent static and dynamic nozzle loads as per API 686 Chapter 6.

Key Points

- Suction and discharge piping must be independently supported, guided, and anchored to prevent weight transfer to pump nozzles.
- To check pipe strain, dial indicators are mounted on coupling hubs while the suction and discharge flange bolts are fully torqued.
- Allowable shaft deflection at the coupling during flange bolt tightening is strictly capped at 0.05 mm (0.002 inches).
- Temporary suction strainers (witch's hat type, minimum 40 mesh) must be installed to capture debris during initial line flushing.

Grouting Procedures for Pump Baseplates I

Execution of baseplate epoxy grouting to ensure rigid, vibration-damping mechanical support.

Grouting Procedures for Pump Baseplates II

Key Points

- Epoxy grout is preferred over cementitious grout due to high compressive strength (90+ MPa), chemical resistance, and zero shrinkage.
- Grout pour must be continuous from one side of the baseplate to the other using a headbox to maintain hydrostatic head and prevent air voids.
- Baseplates require vent holes (12-25 mm) at corners and compartments to verify complete grout flow and release trapped air.
- A post-cure hammer-tap test checks for hollow spots; any detected voids are vacuum-injected with low-viscosity liquid epoxy.

Erection of Process Vessels at Site I

Lifting and vertical alignment of heavy industrial columns, reactors, and storage vessels.

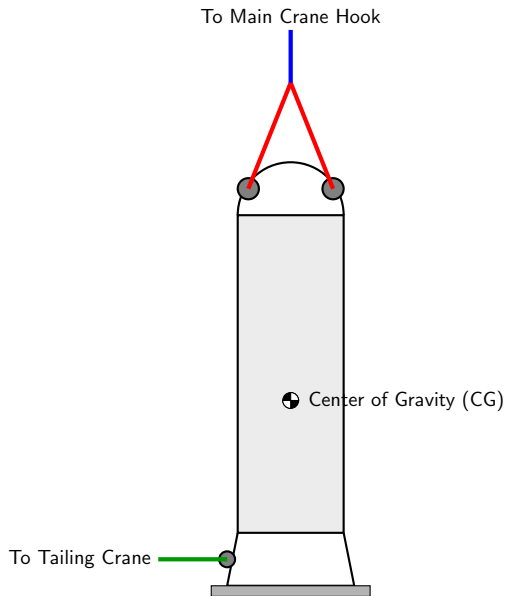
Erection of Process Vessels at Site II

Key Points

- A detailed lifting plan must specify crane load charts, rigging configurations, center of gravity, and maximum allowable wind speed.
- Lifting is conducted using the tail-dogging method, where the main crane lifts the top head and a tailing crane manages the skirt rotation.
- Vertical plumbness tolerance for column erection is set at 1 in 1000 of the height, or a maximum of 25 mm as per ASME Section VIII.
- Foundation anchor bolts are torqued in a cross-pattern sequence according to ASME PCC-1 guidelines to prevent uneven stress.

Vessel Erection & Lifting Hookup Schema I

Vessel Erection & Lifting Hookup Schema II



Pre-commissioning Checks and Handover I

Final field testing, cleaning, and documentation requirements prior to start-up.

Pre-commissioning Checks and Handover II

Key Points

- Pump pre-start checks include bearing lubrication, mechanical seal flush plan alignment (e.g. Plan 11/53), and shaft rotation direction (motor solo run).
- Vessels must undergo final internal inspection for cleanliness, tray levelness verification, and demister pad installation.
- Cold and hot alignment reports, torque logs, and field weld NDT records must be compiled into the final installation dossier.
- Piping systems undergo hydrotesting, followed by air blowing or chemical cleaning, before final removal of isolation blinds.