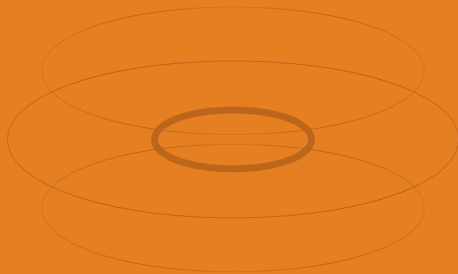


OWNER

Mechanical Equipment Setting

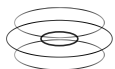


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TORUS

[REDACTED], [REDACTED] County, [REDACTED]

ISSUE SUMMARY AND APPROVAL

This page records each issue of SPC-SPC-017. The preparer, reviewer and approver sign for each revision.

Rev.	Date	Issue purpose	Description
A	2026-09-29	Issued for Review	First issue

Contributors

Rev.	Discipline	Prepared by	Reviewed by	Approved by
A	Specifications			

SECTION PC-SPC-017 MECHANICAL EQUIPMENT SETTING

PART 1 GENERAL

1.01 SUMMARY

A. Section includes receiving, inspection, preservation, storage, handling, lifting, setting, leveling, anchoring, grouting, final alignment, mechanical completion checks and vendor coordination for the Owner-furnished equipment listed in Table 1-1.

Table 1-1: Equipment Covered by This Section

Tag	Equipment	Plot position, ft	Datasheet
V-101	Horizontal two-barrel filter separator, 42 in ID x 15 ft with NPS 24 x 14 ft liquid barrel, 1.75 in shell, post-weld heat treated, quick-opening closure, two saddles	(84, 40), east-west, inlet at east end	 MEC-DS-001
H-101	Indirect-fired water-bath line heater (API 12K), 6.0 MMBtu/h, 96 in x 29 ft shell, NPS 6 coil with Class 900 nozzles and companion flanges, stack, burner management system BMS-150	X 175 to 209, Y 135.25 to 144.75; about 34 ft x 9.5 ft; firebox east	 MEC-DS-003
SK-110	Meter skid: meter runs MR-110 and MR-120, headers, crossover MOV-115, canopy	(84, 97), 48 ft x 14 ft	 MEA-DS-001, MEC-DS-009
T-101	100 bbl atmospheric liquids tank (API 12F), 9 ft 6 in OD x 8 ft, PVRV-193 and FA-193 (NPS 6), EV-193 16 in emergency vent, LT-191, in a 24 x 24 ft containment with truck loadout	(30, 100)	 MEC-DS-004
PR-101	Pig receiver, NPS 12 x NPS 16 barrel, quick-opening closure with pressure warning interlock	(35, 40), barrel east-west, closure west	 MEC-DS-002
FG-101	Fuel gas skid, 8 x 6 ft, with E-161 5 kW explosion-proof electric preheater (setpoint 105 °F) and PSV-161 (set 250 psig)	(95, 55)	 MEC-LST-002, PRO-DS-012
G-101	Standby generator in enclosure, 10 x 5 ft; automatic transfer switch in B-102	(185, 22)	 ELE-DWG-001
VS-101	Vent stack, NPS 8 x 25 ft, stainless steel (class S1), helical strakes on the top 8 ft, 2 in base drain valve	(40, 160)	 MEC-DS-005

Note 1: Plot coordinates in feet from the southwest fence corner, per MEC-DWG-001, Plot Plan.

B. Related sections:

- SPC-SPC-003, Cast-in-Place Concrete and Reinforcement (foundations, cast-in anchor bolts and the T-101 containment).

2. SPC-SPC-004, Structural Steel, Canopy and Pipe Supports (SK-110 canopy if shipped loose).
3. SPC-SPC-006, Piping Fabrication and Installation; SPC-SPC-011, Hydrostatic Testing, Dewatering and Drying.
4. SPC-SPC-013, Electrical Installation in Hazardous Locations; SPC-SPC-014, Instrumentation Installation, Tubing and Calibration.
5. SPC-SPC-016, Prefabricated Buildings B-101 and B-102; SPC-SPC-018, Pre-commissioning, Commissioning and Startup.

C. Work by others: vendor representative services (supervision and startup) are purchased by the Owner under the equipment purchase orders. The Contractor shall schedule and support them.

1.02 REFERENCES

A. Codes and standards, latest edition in force on the date of the contract unless an edition is stated:

1. ASME Boiler and Pressure Vessel Code, Section VIII Division 1 (2023), including the requirements for quick-actuating (quick-opening) closures.
2. National Board Inspection Code, NB-23 (repairs and alterations of stamped vessels).
3. API Specification 12K, Indirect-type Oil-field Heaters; API Specification 12F, Shop-welded Tanks for Storage of Production Liquids.
4. API RP 686, Recommended Practice for Machinery Installation and Installation Design (grouting and alignment practice).
5. ACI 351.1R-12, Report on Grouting between Foundations and Bases for Support of Equipment and Machinery; ACI 117-10, Specification for Tolerances for Concrete Construction.
6. ASTM C1107, Packaged Dry, Hydraulic-Cement Grout (Nonshrink); ASTM C579 and C531, epoxy grout strength and shrinkage; ASTM C109, cube strength.
7. AISC 303-22, Code of Standard Practice for Steel Buildings and Bridges, Section 7.5 (anchor rod tolerances).
8. ASME PCC-1-2022, Guidelines for Pressure Boundary Bolted Flange Joint Assembly, Appendix E (flange joint alignment).
9. ASME B30.9, B30.10, B30.20 and B30.26 (slings, hooks, below-the-hook lifting devices, rigging hardware); ASME BTH-1-2020.
10. 29 CFR 1926 Subpart CC, Cranes and Derricks in Construction.
11. 40 CFR 112, Oil Pollution Prevention (T-101 secondary containment).

B. Project documents:

1. CON-CAL-001, Critical Lift Plans for H-101, V-101 and SK-110.
2. MEC-LST-002, Mechanical Equipment List; MEC-DWG-001, Plot Plan.

3. PIP-DWG-001 to PIP-DWG-003, Piping General Arrangement; PIP-SPC-001, Piping Material Specification.
4. STR-DWG-001 to STR-DWG-006, Foundation Drawings; STR-CAL-002, Foundation Design.
5. MEC-CAL-003, Hydrostatic Test Calculation; MEC-CAL-004, Piping Flexibility and Stress Screening.
6. REG-RPT-004, SPCC Plan Framework for T-101; CIV-CAL-002, Hydrology and Drainage.

1.03 DEFINITIONS

- A. Preservation: measures that protect equipment from corrosion and damage from receipt until commissioning.
- B. Fixed saddle and sliding saddle: the V-101 saddle anchored rigidly, and the saddle with slotted holes that allows thermal and pressure growth.
- C. Grout: non-shrink material placed between the foundation and an equipment base plate, saddle or skid.
- D. Vendor representative: the equipment manufacturer's field service engineer.

1.04 SUBMITTALS

- A. The Contractor shall submit the items in Table 1-2.

Table 1-2: Submittal Schedule

No.	Submittal	Timing	Action
17-01	Equipment setting execution plan: sequence, crane, access and setting procedure for each item, incorporating the vendor's instructions	30 days before the first set	EOR and Owner approval
17-02	Critical lift plan for each lift of H-101, V-101 and SK-110 and any other lift so classified, per CON-CAL-001	14 days before the lift	EOR and Owner approval
17-03	Receiving inspection report QF-17-01, with photographs	Within 2 days of receipt	Owner review
17-04	Preservation and storage log QF-17-02	Monthly	Owner review
17-05	Foundation and anchor bolt survey QF-17-03	Before each set	Owner review
17-06	Grout product data and mixing and placement procedure	14 days before grouting	EOR approval
17-07	Setting record QF-17-04: elevations, level, plumb, anchor tightening, shims	Within 3 days of setting	Owner review
17-08	Flange alignment record QF-17-05 at each equipment nozzle	At bolt-up	Owner review
17-09	Heater bath fluid product data and fill record	Before fill	EOR approval

No.	Submittal	Timing	Action
17-10	T-101 containment liner product data, seam test and integrity records	Before installation	EOR approval
17-11	Vendor representative visit reports	Within 3 days of each visit	Owner review
17-12	Vendor lifting lug calculations and lifting drawings for V-101, H-101 and SK-110	With 17-02	EOR review

1.05 QUALITY ASSURANCE

- A. Riggers and signal persons shall be qualified under 29 CFR 1926.1425 to 1926.1430, and crane operators certified under 29 CFR 1926.1427.
- B. Hold and witness points shall be as listed in 3.09 and in SPC-SPC-019.
- C. Any repair or alteration of an ASME-stamped vessel shall be made only by a holder of a National Board R stamp, with the Owner's written approval, because field work outside that program voids the stamp.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Each item shall be inspected on arrival, before unloading where possible, for shipping damage, impact and tilt indicators, nameplates (ASME U-stamp and National Board number on V-101 and PR-101, API 12K nameplate on H-101, API 12F nameplate on T-101), loose parts against the packing list, nozzle covers, paint damage and internal preservation. Equipment shipped under a nitrogen blanket shall have its pressure recorded; a pressure below 5 psig is a nonconformance.
- B. Each item shall be checked against its datasheet and vendor data book for nozzle orientation and size, flange rating, overall dimensions and weight. Nonconformances shall be reported within 24 hours. Vendor equipment shall not be repaired without the Owner's written instruction.
- C. Equipment shall be stored level on timber cribbing or on its own saddles or skid, at least 6 in above grade, on a drained area and never in standing water.
- D. Nozzle covers shall remain bolted in place until piping is connected, and a missing cover shall be replaced the same day.
- E. Nitrogen blankets shall be checked weekly and recharged to 5 to 10 psig. Vapor-phase corrosion inhibitor shall be maintained in vessels shipped with it.
- F. Space heaters in electrical items (BMS panel, valve actuators, G-101 alternator) shall be connected to temporary power within 7 days of receipt, or the items shall be stored indoors, to prevent condensation damage.
- G. The ultrasonic meters on SK-110 shall keep their end covers and transducer protection. No water shall enter the meter tubes, and no welding or grinding shall be done on or near the skid.
- H. Preservation shall be inspected monthly and recorded on QF-17-02. The vendor's preservation instructions govern where they are more stringent.

1.07 MEASUREMENT AND PAYMENT

- A. Pay items 17.01 V-101, 17.02 H-101, 17.03 SK-110, 17.04 T-101, 17.05 PR-101 and 17.06 FG-101, G-101, VS-101 and XF-101 pad: lump sum each.
- B. Each price shall include receiving, storage, preservation, crane and rigging, setting, shims, anchoring, grouting and vendor support coordination, and in addition:
1. 17.01 V-101: sliding saddle setup and closure checks.
 2. 17.02 H-101: stack and burner installation, and bath fluid supply and fill.
 3. 17.03 SK-110: the lifting frame lift, canopy erection if shipped loose (otherwise pay item 04.01) and insulation repair. Ultrasonic meter calibration is by the vendor.
 4. 17.04 T-101: tank appurtenances, water fill test, and the containment liner where the dike-and-liner option is shown. A concrete containment is paid under 03.01.
 5. 17.05 PR-101: closure checks.
 6. 17.06: G-101 fluids, VS-101 erection, and the XF-101 pad to the electric cooperative's standard. The transformer is furnished by the cooperative.
- C. Foundations (03.01), piping (06.01) and instruments (14.01) are excluded. Crane and rigging costs for critical lifts are included in the item lifted; no separate crane payment will be made.

PART 2 PRODUCTS

2.01 SHIMS AND LEVELING DEVICES

- A. Shims shall be 316 stainless steel or galvanized steel plate, full-bearing under the base and at least 4 in wide, with no more than 4 shims per stack and no stack over 1 in. Tapered shims shall not be used.
- B. Leveling nuts shall be used only where the foundation drawings show them, and shall be backed off or made grout-bearing as the design states.

2.02 GROUT

- A. Cementitious grout shall be non-shrink, non-metallic, ASTM C1107 Grade B or C, with a 28-day compressive strength of at least 7,000 psi. It shall be used for skids, saddles and static equipment.
- B. Epoxy grout shall be three-component with a compressive strength of at least 12,000 psi (ASTM C579), and shall be used under G-101 only if the vendor requires it.

2.03 SLIDING SADDLE BEARING

- A. The V-101 sliding saddle shall bear on a PTFE-on-stainless-steel slide bearing, or a greased steel wear plate, as MEC-DS-001 and the foundation drawings specify.

2.04 HEATER BATH FLUID

- A. The H-101 bath fluid shall be water with inhibited ethylene glycol to the heater vendor's specification, with a freeze point below the -5 °F minimum ambient design temperature (40 to 50 % glycol is typical; HOLD H-15). The water shall be demineralized or potable, with chlorides below the vendor's limit.

2.05 T-101 CONTAINMENT LINER

- A. Where the foundation drawings show a dike and liner rather than a coated concrete containment, the liner shall be 40 mil (minimum) HDPE or 30 mil reinforced polypropylene geomembrane on geotextile, UV-stabilized and hydrocarbon-resistant.
- B. The containment shall hold at least 110 % of the T-101 shell capacity plus the 25-year, 24-hour rainfall, as set in REG-RPT-004 and CIV-CAL-002.

2.06 ANCHOR NUTS, GASKETS AND BOLTING

- A. Anchor nuts and washers shall be ASTM A563 heavy hex and ASTM F436, galvanized where the bolts are galvanized, per the foundation drawings.
- B. Gaskets and bolting at equipment nozzles shall be Contractor-furnished to PIP-SPC-001. Shipping gaskets shall be discarded and never reused.

PART 3 EXECUTION

3.01 FOUNDATION PREPARATION AND ANCHOR BOLT CHECKS

- A. Equipment shall not be set until the foundation concrete has reached 75 % of its design strength, as shown by the test cylinders under SPC-SPC-003, and is at least 7 days old.
- B. The Contractor shall survey each foundation before setting (QF-17-03): top-of-concrete elevation, anchor bolt positions, projection, plumbness and thread condition. The tolerances in Table 3-1 apply.

Table 3-1: Anchor Bolt and Foundation Tolerances

Item	Tolerance
Center to center of any two bolts within a group	±1/8 in
Center of a bolt group to the established line	±1/4 in
Accumulated error between groups	±1/4 in per 100 ft, 1 in maximum
Bolt projection	+1/2 in, -0 in (full nut engagement plus 2 threads)
Bolt plumb	1 in 40
Top of concrete, grouted base	+0 in, -1/2 in (grout space)
Top of concrete, direct bearing	±1/8 in

Note 1: The first three rows follow AISC 303 Section 7.5; the others are Owner requirements.

- C. Out-of-tolerance bolts shall be reported by request for information. Cold bending up to 1 in 20 is permitted only with the EOR's approval. Bolts shall never be heated. Post-installed replacement bolts shall be used only to an EOR-approved detail.
- D. Concrete to be grouted shall be chipped at least 1/4 in to sound aggregate, blown clean with oil-free air, and pre-soaked for 24 hours before cementitious grouting.

3.02 HANDLING AND LIFTING

- A. Equipment shall be lifted only at the vendor's designated lugs or points, with the rigging shown on the vendor's lifting drawing and in CON-CAL-001. Nozzles, piping, instruments, the canopy, handrails and the heater stack shall never be used for lifting.
- B. Each critical lift shall have an approved lift plan (Submittal 17-02), a pre-lift meeting, a qualified rigger and signal person, and the Owner's release under hold point HP-17-02.
- C. Crane positions shall be those of CON-CAL-001: crane pad A at plot coordinates (68, 69) for V-101 and SK-110, and crane pad B at (192, 172) on road R-3 for H-101. The pad B position was chosen north of the heater because a crane south of it would stand on the outlet piping. V-101 shall be set first and SK-110 second, both from pad A and before the piping between them is installed, because that piping runs through the pad.
- D. SK-110 shall be lifted with a lifting frame or spreader bars that limit bending of the meter tubes, within the vendor's lifting drawing limits. The meter tubes and ultrasonic meters are not lifting members.
- E. H-101 shall be lifted with its coil installed and its bath empty, per the vendor's procedure. The stack shall be erected after setting.
- F. Equipment shall be lowered onto the foundation with guide pins or tag lines and shall not be dragged across anchor bolts; bolt threads shall be sleeved.

3.03 SETTING TOLERANCES

- A. Equipment shall be set within the tolerances in Table 3-2.

Table 3-2: Setting Tolerances

Item	Elevation	Level or plumb	Horizontal position	Other
V-101	±1/8 in at saddle bearing	Level within 1/8 in over the shell length, or the vendor's slope toward the sump	±1/4 in	Nozzle orientation ±1/2°
H-101	±1/8 in	Level within 1/8 in over the 28 ft shell	±1/4 in	Firebox at east end
SK-110	±1/8 in	Level within 1/16 in per 10 ft and 1/8 in overall	±1/4 in	Diagonal corner heights within 1/8 in

Item	Elevation	Level or plumb	Horizontal position	Other
T-101	±1/4 in	Shell plumb within 1/2 in over its height; bottom uniformly supported	±1/2 in	Loadout connection per arrangement
PR-101	±1/8 in	Barrel slope per MEC-DS-002 within 1/8 in	±1/4 in	Closure clear for pig handling
FG-101, G-101	±1/8 in	Level within 1/16 in per ft	±1/4 in	G-101 per vendor
VS-101	±1/4 in at base	Plumb within 1 in over 25 ft	±1/2 in	

Note 1: H-101 shall be level within the tolerance because its low bath level switch LSL-154 depends on it.

3.04 ANCHORING AND GROUTING

- A. Anchor nuts shall be tightened to the torque or turn-of-nut in the foundation drawings. Where none is given, bolts up to 1 in shall be snug-tight plus 1/6 turn and larger bolts snug-tight, subject to EOR confirmation.
- B. The V-101 sliding saddle nuts shall be finger-tight and backed off 1/4 turn (or per the vendor), with a jam nut locked against them, leaving the saddle free to slide. The slots shall be centered at the installation temperature so that movement is available in both directions, and the slide shall be clean and free of grout. The fixed saddle shall be fully tightened.
- C. Skids that piping could pull out of position shall be grouted only after the flange alignment check in 3.05.
- D. Grouting shall meet the following requirements:
 1. Forms shall be sealed and waxed, with a head box on one side, and cementitious grout under base plates shall be 1 to 2 in thick unless the manufacturer's extended mix is used.
 2. Grout shall be mixed and placed per the manufacturer at ambient and substrate temperatures of 40 to 90 °F, in a continuous pour from one side to avoid trapped air.
 3. Cementitious grout shall be wet cured for at least 3 days and protected from freezing for 7 days.
 4. Three 2 in cubes shall be made per product per day (ASTM C109).
 5. After cure, the forms shall be removed and the edges trimmed at 45°.
- E. H-101 and T-101 shall bear on their foundations as the vendor design requires. V-101 saddles shall bear on grout pads or bearing plates as the foundation drawings show.

3.05 FLANGE ALIGNMENT AT EQUIPMENT NOZZLES

- A. Piping shall be connected to equipment nozzles without forcing. Before bolt-up, with the piping on its permanent supports and all other bolts in the system slack, the Contractor shall measure flange alignment (QF-17-05) and meet Table 3-5. Springs, come-alongs, jacks and heat shall not be used to bring flanges into line, because forced alignment loads the nozzle and makes the joint leak.

- B. Misalignment shall be corrected in the piping by cutting and re-welding under SPC-SPC-006 and SPC-SPC-007, not by moving the equipment beyond its setting tolerance. Misalignment at the SK-110 skid limits shall always be corrected in the field piping, never in the skid.
- C. Nozzle loads shall not exceed the allowables in the equipment datasheets and MEC-CAL-004.

3.06 EQUIPMENT-SPECIFIC REQUIREMENTS

A. V-101 filter separator:

1. V-101 is shop hydrotested at 2,225 psig and is isolated from the field hydrotest (SPC-SPC-011). Because it is post-weld heat treated, no welding, grinding into the shell or attachment of clips shall be done in the field.
2. Internal shipping braces shall be removed as tagged. Filter elements shall not be installed until hydrotest, cleaning and drying of the upstream piping are complete.
3. The quick-opening closure shall be checked with the vendor representative: hinge or davit operation, sealing surface and O-ring groove cleaned, O-ring material and size verified, lubrication, three operating cycles, and a test showing that the pressure warning device prevents opening under pressure, as ASME VIII-1 UG-35.3 requires.
4. LG-104, LT-104, the level switches and PSV-101 shall be installed under SPC-SPC-014 and the vendor's arrangement drawing.

B. H-101 line heater:

1. After the shell is set and leveled, the stack shall be erected on the firebox flange with a new gasket and bolting, plumb within 1 in over its height, with its rain cap or flame arrestor and any guy wires.
2. The burner, pilot, fuel train (from FG-101 through line 2"-F-1051-A1) and BMS-150 shall be installed per the vendor. The burner shall not be fired before commissioning under SPC-SPC-018.
3. The coil is shop tested by the vendor and excluded from the field hydrotest. Its nozzles and companion flanges are Class 900; the Contractor shall check the Class 900 gaskets and bolting against PIP-SPC-001 and install Class 900 blinds at nozzles N1 and N2 during the station test.
4. The bath shall be filled with the specified fluid through a clean hose and filter to the level mark, after the firebox and coil are installed and the shell has shown no leaks during a 24 hour fill. Volume, glycol concentration, pH and inhibitor level shall be recorded.
5. Vendor insulation and jacketing damage shall be repaired to the vendor's specification.

C. SK-110 meter skid:

1. Ultrasonic meter protection shall stay in place until the inspection under SPC-SPC-014.

2. A canopy shipped loose shall be erected under SPC-SPC-004, anchored to the skid or to its own foundations as shown, and shall not bear on the meter tubes.
3. Meter tube insulation and weather jacketing shall be inspected and repaired after setting.

D. T-101 liquids tank:

1. The containment shall be completed first, with 100 % of liner seams tested (air lance or vacuum box, and destructive samples per the liner manufacturer) and the drain valve installed, closed and locked.
2. The tank shall be set plumb and level, with its hold-down anchors installed against wind and flotation (flotation checked with the containment full, per STR-CAL-002).
3. PVRV-193, FA-193, EV-193, the gasketed thief hatch, LT-191, LSHH-192, the loadout connection with dry-disconnect coupling and drip pan, and two grounding points (SPC-SPC-013) shall be installed.
4. The tank shall be water fill tested to the overflow level for 24 hours with no leaks, unless the Owner accepts the vendor's API 12F shop test certificate and the tank arrived undamaged.

E. PR-101 pig receiver:

1. PR-101 shall be set with the designed barrel slope and with the west closure end clear for pig removal with a tray and davit.
2. The closure shall be checked as for V-101.
3. Pig signaler XI-102 location and orientation shall be verified against the datasheet, and the reducer, kicker and drain nozzles oriented per the arrangement drawing before piping is connected.

F. FG-101, G-101 and VS-101:

1. FG-101 shall be set, leveled and anchored with no field modification. PSV-161 (set 250 psig) shall be verified tagged and sealed, and E-161 installed per the vendor and SPC-SPC-013.
2. G-101 shall be set on its foundation with any vibration isolators, filled with oil and coolant per the vendor, its battery installed and charged, and its exhaust directed away from the B-102 air intake.
3. VS-101 is stainless steel and shall be handled and supported under the stainless requirements of SPC-SPC-006, with no carbon steel slings or tools in contact. It shall be erected plumb on its drilled-pier foundation with the strakes on its top 8 ft undamaged, grounded at the base, and fitted with a 2 in plugged drain valve at the base and a portable collection pan emptied by vacuum truck. The stack base is not piped to T-101, because such a line cannot drain to the tank by gravity.

3.07 VENDOR REPRESENTATIVES

- A. The Contractor shall give the Owner 14 days' notice of each vendor visit and shall have the equipment set, accessible and powered where needed when the representative arrives. Waiting time caused by the Contractor's unreadiness shall be at the Contractor's cost.
- B. The minimum vendor attendance shall be:
1. V-101: setting check, closure and interlock test, element installation and startup.
 2. H-101: stack erection review, bath fill, BMS checkout, first fire and tuning.
 3. SK-110: setting inspection and meter and flow computer commissioning.
 4. PR-101: closure and interlock test.
 5. G-101: startup and load test.

3.08 PRESERVATION UNTIL HANDOVER

- A. Preservation under 1.06 shall continue until each system is handed over for commissioning under SPC-SPC-018. No corrosion shall be present on flange faces at handover.

3.09 FIELD QUALITY CONTROL

- A. The hold and witness points in Table 3-3 apply. Party codes: C Contractor, O Owner, E EOR, W receiving pipeline operator; H hold, W witness, R review, P perform.

Table 3-3: Hold and Witness Points

ID	Activity	C	O	E	W	Record
WP-17-01	Receiving inspection of each equipment item	P	W	-	-	QF-17-01
HP-17-01	Foundation and anchor bolt survey accepted before setting	P	H	R	-	QF-17-03
HP-17-02	Critical lift plan approved and pre-lift meeting held before each critical lift (H-101, V-101, SK-110)	P	H	R	-	Submittal 17-02, CON-CAL-001
WP-17-02	Setting, leveling and anchoring of each item	P	W	-	-	QF-17-04
HP-17-03	Flange alignment at equipment nozzles before bolt-up (PCC-1 Appendix E)	P	H	-	-	QF-17-05
WP-17-03	Grout placement	P	W	-	-	QF-17-06
WP-17-04	Quick-opening closure and pressure warning interlock tests (V-101, PR-101)	P	W	-	-	QF-17-07
WP-17-05	H-101 bath fill and fluid analysis	P	W	-	-	QF-17-08
HP-17-04	T-101 containment liner and containment integrity accepted before the tank is set	P	H	R	-	QF-17-09

- B. Records: QF-17-01 receiving inspection; QF-17-02 preservation log; QF-17-03 foundation and anchor bolt survey; QF-17-04 setting record; QF-17-05 flange alignment; QF-17-06 grout record; QF-17-07 closure and interlock test; QF-17-08 heater bath fill; QF-17-09 containment integrity.

3.10 ACCEPTANCE

A. Equipment setting is accepted when every criterion in Table 3-4 and Table 3-5 is met and the records are signed.

Table 3-4: Acceptance Criteria

Parameter	Criterion	Method
Receiving	Nameplates, stamps, dimensions and nozzle orientation match the datasheet; no transit damage; nitrogen blanket at or above 5 psig where shipped under nitrogen	Visual, measurement
Anchor bolts	Within Table 3-1	Survey
Setting	Within Table 3-2	Level, transit, tape
V-101 sliding saddle	At least 1/4 in of slot available in each direction at the installation temperature; jam nuts set	Measurement
Grout	Full bearing (sound when tapped, voids under 5 % of the area at edges); cube strength at or above the product's specified 7-day value	Tap test, ASTM C109
Quick-opening closures	Three smooth cycles; the warning device prevents opening with the vessel pressurized (low-pressure nitrogen test per the vendor)	Functional test
H-101 bath	At the vendor's level mark; glycol within ± 2 % of the specified value; freeze point below -5 °F; pH and inhibitor per the vendor	Refractometer, test kit
H-101 stack	Plumb within 1 in over its height; gasket and bolting complete	Level
T-101 containment	Capacity at least 110 % of shell capacity plus rain freeboard; all liner seams tested and repaired; drain valve locked closed	Survey, seam test
T-101 tank	No leaks after a 24 hour water fill, or an accepted API 12F shop certificate	Visual
VS-101	Plumb within 1 in over 25 ft; strakes intact; drain valve plugged and pan provided; grounded	Level, visual
Preservation	Monthly records complete; no corrosion on flange faces; covers in place	Log review

Table 3-5: Flange Alignment Limits at Equipment Nozzles

Measurement	Limit
Centerline offset	1/16 in (1.5 mm)
Face parallelism across the diameter	1/32 in (0.8 mm)
Bolt hole rotation	1/8 in (3 mm)
Gap	Gasket thickness plus 1/16 in maximum
Bolts	Insert freely by hand

Note 1: Limits per ASME PCC-1-2022 Appendix E.



END OF SECTION

