ENERPRO TANK PANEL SYSTEM

Installation Procedure

Field installation procedure for the Enerpro pre-fabricated standing-seam tank insulation panel system. For use by qualified industrial insulation contractors.

1. Scope and Applicability

This procedure covers field installation of the Enerpro Tank Panel System on newly constructed and existing field-erected industrial tanks and pressure vessels. It applies to all standard tank geometries: cylindrical shell, dome roof, low-pitch roof, high-pitch roof with external rafters, pie-segment roof, pie with external rafters, and bottom cone. Custom geometries are installed per project-specific drawings.

Installation shall be performed only by industrial insulation contractors with documented experience in standing-seam tank panel systems. Crews unfamiliar with the system shall complete on-site training with a Max Thermal Fabricators field representative before independent installation.

2. Personal Protective Equipment (PPE)

PPE shall be worn at all times during installation:

- Steel-toe safety boots (CSA Z195 or equivalent).
- Safety eyewear (CSA Z94.3 or equivalent).
- Cut-resistant gloves rated for sheet-metal handling.
- Hard hat (CSA Z94.1 or equivalent).
- Coveralls or long-sleeved work clothing.
- Fall-arrest harness and lanyard at any working height above 1.8 m (per provincial OHS).
- Hearing protection in proximity to powered seaming tools.

3. Tools and Equipment

- Crane or wheel system or equivalent panel-lifting apparatus.
- Powered electric seamer (rated for double-lock standing seam profile).
- #1 hand seamer (preliminary closure tool).
- #2 hand seamer (final closure tool for access-restricted areas).
- Metal shears (straight and offset).
- Sheet-metal brake.
- Hand drills (cordless preferred).
- Cable-tensioning equipment: come-a-long, cable puller, strand vise installation tool.
- Yankee screwdriver (for wire-tie twist).
- Tool lanyards for all hand tools used at height.
- Boom lift or equivalent personnel lift sized for the tank height.

4. Pre-Installation Inspection

Before installation begins, the following inspections shall be completed and documented:

- Tank foundation cleaned of debris. Foundation surface confirmed level within project specification tolerance.
- Tank chine cleaned. Any field-installed lugs, brackets, or nozzles inspected for interference with panel routing.
- All tools and lifting equipment inspected per the contractor's documented pre-use inspection program.
- Panel inventory checked against the project bill of materials. Panel identifiers verified against the panel layout drawing.
- Internal cable inventory checked. Cable lengths verified against the cable schedule on the project drawings.
- Stainless connector clips, wire-ties, strand vises, and any specified bands inventoried.

- [ ] Weather forecast reviewed. Sustained winds above 40 km/h or active precipitation shall halt installation.

5. Cable Installation

Internal wire rope cables are installed at shell elevations shown on the project drawings. Cables locate the panel attachment points and carry the wind load from the panels to the tank shell via the cable-and-clip assembly.

5.1 Cable elevations

Cable elevations shall be located within +/- 6 ft of the dimensions shown on the project drawings. Typical vertical spacing is 10 ft to 15 ft. Stick pins or weld pins shall be installed at the specified elevations to locate cable position prior to cable installation.

5.2 Cable tension

Cables shall be tensioned to 250-500 lbs using a come-a-long or cable puller. During pull-up:

- Snap the cable several times during tensioning to release surface friction at the tank shell.
- Use multiple strand vise connectors as required by the tank diameter to secure cable ends.
- Confirm cable remains under tension when the puller is removed. Loss of tension indicates strand vise jaws have not seated.
- Jerk the strand vise away from the tank three to five times to fully seat the jaws.

Cables shall be level and snug after installation. Visual inspection for sag is the final check before proceeding to panel installation.

6. Panel Handling

Laminated panels are mechanically delicate at the lamination bond line. Improper handling can delaminate the panel and render it unusable. The following handling rules are absolute:

- Handle panels on edge only. Never carry a panel flat under its own weight.
- Never reverse the panel curvature. The laminate bond is designed for the manufactured curvature only; reversing it will delaminate the panel.
- Bend the panel to perpendicular before installation to confirm proper field-seaming geometry.
- Remove the protective film from the sheathing face immediately before installation, not on receipt.
- Store panels on edge, supported at the ends, in a weather-protected area until installation.
- Do not stack panels horizontally for storage.

7. Panel Installation

Panel installation proceeds clockwise around the tank from a single starting line. The starting line is selected during the pre-install meeting and noted on the field drawings.

7.1 First panel

- Position the first panel with the female leg (right side) at the starting line.
- Temporarily secure the panel to the internal cables with clamps and strapping while the next panel is positioned.
- Verify the panel is plumb before securing.

7.2 Subsequent panels

- Each subsequent panel is positioned with its female leg over the preceding panel's male leg and over the connector clips.
- Each panel is installed in one continuous vertical length from base to top of the tank shell.
- Verify alignment at each cable elevation before seam closure.

7.3 End-of-day securement

Any panel installed but not yet seam-closed shall have its free female leg secured to prevent wind blow-off overnight. Use temporary clamps and strapping. Free legs left unsecured are at significant risk of damage from overnight wind events.

8. Seam Closure

8.1 Preliminary closure (hand seamer)

Each standing seam shall first be preliminary-closed with a #1 hand tool at every clip attachment point. This locks the female leg over the male leg and the connector clip, preventing slippage during powered seamer operation.

8.2 Final closure (powered seamer)

The powered electric seamer completes the double-fold standing seam joint in one continuous pass from base to top. Operator shall:

- Confirm seamer is rated for the panel profile and gauge.
- Begin the pass at the tank base and proceed upward.
- Maintain consistent vertical travel speed; pausing creates a visible mark at the pause point.
- Inspect the closed seam at each cable elevation. Properly closed seams are tight, with no visible gap at the fold line.

8.3 Access-restricted areas

Areas where the powered seamer cannot operate (typically near nozzles, manways, or other shell penetrations) shall be closed with the #2 hand tool. Hand-tool closures shall be inspected for completeness; partial closures shall be re-worked before sign-off on the panel.

9. Clip and Wire-Tie Attachment

9.1 Stainless connector clips

Formed stainless steel connector clips shall be installed on the male leg (left side) over each crossing internal cable. The clip seats against the male leg and over the cable; the female leg of the next panel then fits over the clip during installation.

9.2 Wire-ties

16-gauge stainless steel wire-ties shall secure each clip to the cable. Twist with a Yankee screwdriver, three-twist minimum. Care shall be taken not to over-tighten the wire-tie:

- Over-tightening produces visible dimpling on the panel face. Dimpling indicates over-torque and is a cosmetic and structural defect.
- Stop tightening as soon as the clip is firmly seated against the cable and the wire-tie has the required minimum three twists.

9.3 Alternative connector (strapping)

Where wire-tie installation is not feasible, a 1/2" wide x 0.020" thick stainless steel strapping ("clip and wire" assembly) may be substituted. The strap is hand-formed around the wire cable and over the male panel leg. Strap shall be tensioned firm but not so tight as to dimple the panel face.

10. Roof Panel Installation

Roof panel installation follows the same principles as shell installation, with the following geometry-specific considerations:

- **Dome roof:** Custom-cut pie segments radiate from the centre. Panels are installed beginning at one edge and working circumferentially. The centre apex is closed last with a custom-fabricated cap.
- **Low-pitch roof:** Standard panel application with pie-segment cuts. Drainage slope shall be confirmed before panel layout.
- **High-pitch roof with external rafters:** Panels are cut to fit between rafter lines. Each panel is secured to the rafters per project drawings.
- **Pie segment:** Each segment is a custom-cut panel meeting at the apex. Segment-to-segment seams are standing seams; segment-to-shell transitions follow the closure detail in the project drawings.
- **Pie with external rafters:** Panel layout matched to rafter spacing. Standing seams follow the rafter lines.

11. Bottom Cone and Underside

Bottom cones, hopper bottoms, and tank undersides are installed with custom-cut panels matched to the base geometry per the project drawings. Installation sequence and attachment hardware follow the same principles as shell installation. Confirm clearance for any bottom-side instrumentation, nozzles, or drain points before panel layout.

12. Penetrations and Trim

Panels are field-cut for nozzles, manways, stair brackets, and other shell penetrations per the project drawings. Field-cut edges shall be:

- Trimmed cleanly with metal shears or a powered shear. Burred edges shall be filed smooth.
- Closed at the penetration with a manufacturer-supplied flashing or a field-fabricated closure per the project drawings.
- Inspected for any moisture-ingress pathway at the penetration. Closures that show light or gap at the panel-to-penetration interface shall be re-worked.

13. Inspection and Sign-off

On completion, the installed system shall be inspected for:

- All standing seams closed with no visible gap at the fold line.
- All clips installed and secured with minimum three-twist wire-ties.
- No panel dimpling, surface damage, or delamination.
- All penetrations closed with flashings or fabricated closures per the project drawings.
- Cable tension confirmed at each elevation (verify against pre-install tension readings).
- Roof panels confirmed for positive drainage where applicable.
- Job site cleanup complete; all installation debris removed.

Sign-off documentation shall include: panel inventory reconciliation, cable tension log, photographs of representative seam closures, photographs of all penetration closures, and any deviations from the project drawings with associated change-order documentation.

14. Safety Notes

- Working at height requires a documented fall-protection plan and approved fall-arrest equipment.
- Powered seamers produce kickback; operator shall maintain firm grip and clear footing throughout each seam pass.
- Sheet-metal edges are sharp; cut-resistant gloves shall be worn whenever panels or trim are handled.
- Wind events during installation require panel securement before crew leaves the tank.
- Provincial OHS regulations supersede this procedure in any case of conflict.

15. Manufacturer Contact

Field installation questions, panel inventory discrepancies, or any deviation from this procedure shall be directed to Max Thermal Fabricators before proceeding:

- Phone: 1-780-717-2956
- Email: office@maxfab.ca
- Address: 24511 - 34 Street NW, Edmonton, AB T5Y 6B4