REFERENCE BRIEF

Why Tanks Corrode Under Insulation

A short technical reference on corrosion under insulation (CUI), how traditional jacketing fails, and what a sealed standing-seam envelope changes.

What CUI Is

Corrosion under insulation refers to corrosion of the metal substrate that occurs beneath an insulation system, typically driven by moisture trapped between the insulation and the metal surface. Because the corrosion is hidden by the jacketing, it usually progresses for years before it is detected — most commonly during a scheduled inspection or, less favourably, when the asset fails.

CUI is widely understood as one of the most aggressive failure modes for insulated industrial assets, particularly on carbon steel between approximately –12 °C and +175 °C, where moisture can enter, condense, and remain in liquid form against the steel.

How Traditional Jacketing Lets It Start

Lap seams. Overlapping panels rely on sealants, mastic and fasteners to keep water out. Each lap is a potential entry point.

Penetrations. Screws, rivets and bolts that fasten the jacket through the weather face create a permanent moisture pathway. Sealants degrade. The penetration remains.

Vapour drive. Even on a well-sealed system, ambient humidity can drive moisture inward through the insulation when temperatures cycle.

Insulation that retains moisture. When water finds its way into a non-sealed insulation envelope and isn't given a way out, the insulation can hold moisture against the substrate. Open-fibre insulation systems (loose mineral-wool blanket or unprotected fibreglass batt) are particularly prone to this without a continuous, sealed jacket.

What a Sealed Standing-Seam Envelope Changes

A pre-fabricated standing-seam panel system replaces the lap-and-fastener approach with a continuous mechanical seam. Instead of overlapping panels held together by sealants and fasteners through the weather face, adjacent panels are joined by a folded seam — created by tooling on-site — that locks the panels together without penetrations.

No fasteners on the sidewall weather face. Removes the most common moisture entry pathway.

Mechanical seal, not chemical. The double-lock fold creates the seal — no sealant aging to manage.

Surlyn moisture barrier inside the jacket. Heat-laminated to the interior face of the aluminum jacketing to prevent moisture contact with the jacket interior.

Insulation core selected to the application. Closed-cell polyisocyanurate (PIR) does not absorb moisture, so K-value remains stable — the typical choice for cold and cryogenic service. Mineral wool or fibreglass cores are used where the operating temperature requires them, and the sealed standing-seam envelope is what keeps moisture out of the insulation in either case.

Continuous envelope. The result is a sealed envelope around the tank that prevents the conditions CUI requires to start.

Field Implications

For asset operators, the practical consequence is that inspection and remediation cycles change. Where traditional jacketing typically requires periodic re-sealing, partial re-jacketing, and (eventually) substrate inspection following CUI events, a sealed standing-seam envelope is designed to remain in place — without those interventions — across a multi-decade service life.

The Enerpro Tank Panel System is designed around this principle. The panels are pre-fabricated in Edmonton, custom-cut to your tank dimensions, and installed without scaffolding and without welding on the tank sidewall.

This is a high-level reference brief. For specifics on a project, contact us at maxfab.ca or call 1-780-717-2956 — we will scope a system to your tank dimensions, operating profile, and site conditions.

