



INDUSTRIAL FRP FIELD REFERENCE / 2026 FIELD EDITION

THE FRP TANK INSPECTION FIELD WORKBOOK

Inspection planning, condition documentation, and a 99-condition visual reference for facility engineers and maintenance teams.



E4

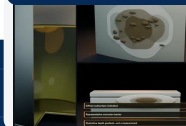
External crazing
and fine surface
cracking



E7

Nozzle weeping or
leakage

99 CONDITIONS



I3

Presented by Plastech Services, Inc.

www.plastechservices.com

(410) 737-4700

EDUCATIONAL PLANNING AND DOCUMENTATION AID

START HERE

Use one consistent workflow from records to field observations.

FRP tanks can develop visible changes at the surface, connections, supports, corrosion barrier, and structural laminate. Use this workbook to prepare records, document what is visible, organize photographs, and create a clearer handoff for qualified evaluation.

01 Prepare

Complete tank data and gather drawings, service history, prior reports, and repair records.

02 Coordinate

Review the inspection objective, access, operating state, facility controls, and required personnel.

03 Observe

Follow a consistent route and record location, extent, surface state, photograph IDs, and comparison with prior records.

04 Reference

Use the 99-condition visual atlas to improve terminology and identify questions - never as a diagnosis.

05 Handoff

Summarize observations and route follow-up through facility procedures and qualified evaluation.

Educational limitation

This workbook is an educational planning and documentation aid. It does not diagnose damage, determine fitness for service, authorize confined-space entry, define a repair, or replace manufacturer instructions, facility procedures, applicable requirements, or qualified professional judgment. Educational illustrations may not match every field condition.

FIELD RESPONSE

Record observations without turning appearance into a verdict.

Use neutral language that another person can verify. Avoid pass, fail, safe, unsafe, acceptable, and remaining-life conclusions unless they come from an authorized evaluation with a defined acceptance basis.

Observation status

- Not observed
- Observed
- Not accessible
- Not evaluated
- Not applicable

Follow-up status

- Documented for record
- Compare with prior records
- Schedule qualified evaluation
- Prompt qualified evaluation
- Facility emergency procedure activated
- Work order opened
- Completed

Precise location example

Lower shell, exterior, 3 o'clock, approximately 18 inches above the bottom knuckle and 10 inches clockwise from nozzle N3.

Active leak or sudden change

An active leak, spray, rapid deformation, fire or heat exposure, unstable attachment, or other sudden change may require the facility's emergency procedures. Keep personnel away from an uncontrolled condition and follow site requirements. Once site controls are in place, Plastech can provide emergency fiberglass repair response support. Remember, a contractor call is not a substitute for the facility's emergency plan.

[Emergency response services](#)

ASSET IDENTIFICATION

Start with the tank, its construction, and its service.

Complete what is known and mark unknown information for follow-up. Drawings, manufacturer data, service history, and prior inspection records can change how an observation is interpreted.

FACILITY NAME

SITE ADDRESS

AREA, UNIT, OR PROCESS

TANK ID AND ASSET NUMBER

TANK TYPE

MANUFACTURER

MODEL OR DRAWING NUMBER

SERIAL NUMBER

YEAR MANUFACTURED / INSTALLED

ORIENTATION AND NOMINAL CAPACITY

DIAMETER / SHELL HEIGHT / VESSEL LENGTH

ROOF OR HEAD CONFIGURATION

BOTTOM CONFIGURATION

SINGLE-WALL OR DOUBLE-WALL

SECONDARY CONTAINMENT DESCRIPTION

WORKBOOK REFERENCE NUMBER

CONSTRUCTION AND SERVICE

Record materials and operating conditions.

Compatibility and significance depend on the full service environment - not only the visible surface.

RESIN SYSTEM, IF KNOWN

REINFORCEMENT TYPE, IF KNOWN

CORROSION BARRIER OR LINER CONSTRUCTION

STRUCTURAL LAMINATE CONSTRUCTION

EXTERIOR OR UV PROTECTION SYSTEM

DESIGN PRESSURE AND VACUUM

DESIGN TEMPERATURE AND SPECIFIC GRAVITY

WIND, SEISMIC, OR ANCHORAGE RECORDS

NOZZLE SCHEDULE OR DRAWING REFERENCE

MANUFACTURER INSTRUCTIONS AVAILABLE

CURRENT PRODUCT

CHEMICAL CONCENTRATION OR COMPOSITION

NORMAL / MAXIMUM OPERATING TEMPERATURE

NORMAL LIQUID LEVEL

FILL AND EMPTY FREQUENCY

AGITATION, SOLIDS, SLURRY, OR ABRASION

CONNECTED SYSTEMS AND HISTORY

Document the forces and events around the tank.

Piping loads, support movement, venting, prior repairs, service changes, and unusual events can be as important as the visible condition itself.

OPERATING PRESSURE OR VACUUM

VENTING ARRANGEMENT

PRIOR PRODUCTS OR SERVICE CHANGES

KNOWN CHEMISTRY / TEMPERATURE / PRESSURE EXCURSIONS

CONNECTED PIPING AND SUPPORTS

VALVES, INSTRUMENTS, OR OTHER NOZZLE WEIGHT

MIXER, AGITATOR, LADDERS, AND PLATFORMS

DATE OF LAST EXTERNAL INSPECTION

DATE OF LAST INTERNAL INSPECTION

PRIOR REPORTS AND PHOTOGRAPHS AVAILABLE

PREVIOUS LEAK OR RELEASE

PREVIOUS REPAIRS OR RELINING

NOZZLE OR FITTING MODIFICATIONS

FOUNDATION, ANCHOR, OR SUPPORT WORK

IMPACT, FIRE, FREEZE, FLOOD, WIND, SEISMIC, OR VACUUM EVENT

CURRENT CONCERNS FROM OPERATIONS OR MAINTENANCE

PRE-INSPECTION PLANNING

Assemble the evidence and coordinate the work.

Define the inspection objective, assemble available records, and coordinate the facility personnel responsible for operations, safety, access, and environmental controls.

- ☐ Manufacturer drawings and data
- ☐ Material and laminate specifications
- ☐ Resin certificates or material records
- ☐ Chemical service and concentration history
- ☐ Temperature history and known excursions
- ☐ Pressure, vacuum, and venting information
- ☐ Prior inspection reports
- ☐ Prior photographs and condition maps
- ☐ Repair and reline records
- ☐ Nozzle and piping drawings
- ☐ Foundation and anchorage drawings
- ☐ Change-management records
- ☐ Work orders and recurring maintenance notes

PAGE NOTES / PHOTO IDS / FOLLOW-UP

PRE-INSPECTION PLANNING

Assemble the evidence and coordinate the work. / continued

Continue the same route and documentation method. Record location, photographs, extent, comparison, and follow-up for every observed condition.

- ☐ Relevant facility procedures
- ☐ Facility operations contact assigned
- ☐ EHS or safety contact assigned
- ☐ Tank operating state confirmed by the facility
- ☐ Product and hazard information available
- ☐ Area access requirements reviewed
- ☐ Lighting and visibility needs reviewed
- ☐ Exterior working-at-height access addressed
- ☐ Weather and environmental conditions considered
- ☐ Secondary containment access addressed
- ☐ Nearby piping and equipment hazards reviewed
- ☐ Photography restrictions reviewed
- ☐ Required permits and authorizations identified

PAGE NOTES / PHOTO IDS / FOLLOW-UP

EXTERNAL WALKDOWN

Follow a repeatable route from the surroundings to the roof.

Begin with the surrounding area and support condition, then document the tank from bottom to top. Include connections, attachments, prior repairs, and connected piping. Record what is visible without assuming a cause or structural significance.

☐ Standing liquid, staining, deposits, or product in secondary containment

☐ Foundation cracking, settlement, unevenness, or support voids

☐ Tank tilt, movement, uplift, or flotation evidence

☐ Damaged anchors, lugs, saddles, skirts, or hold-downs

☐ Corroded, loose, or missing metallic hardware

☐ Color change, staining, fading, chalking, or loss of gloss

☐ Fiber blooming, fiber prominence, or exposed glass

☐ Crazeing, matrix cracks, larger shell cracks, or whitening

☐ Scratches, gouges, cuts, grinding, impact, or crushing

☐ Blisters, bubbles, porosity, or voids

☐ Delamination, hollow areas, or disbonded secondary laminates

☐ Chemical spill or vapor exposure

☐ Softness, resin loss, unusual roughness, or abnormal surface texture

PAGE NOTES / PHOTO IDS / FOLLOW-UP

EXTERNAL WALKDOWN

Follow a repeatable route from the surroundings to the roof. / continued

Continue the same route and documentation method. Record location, photographs, extent, comparison, and follow-up for every observed condition.

- ☐ Wrinkles, waviness, print-through, or geometric irregularity
- ☐ Bulging, out-of-roundness, buckling, or creep deformation
- ☐ Nozzle-to-shell or manway-to-shell cracking
- ☐ Nozzle-neck or flange laminate cracking
- ☐ Leakage, seepage, staining, or deposits at a connection
- ☐ Flange-face damage, forced fit-up, or gasket-related leakage
- ☐ Unsupported pipe, valve weight, misalignment, vibration, or thermal movement at a nozzle
- ☐ Cracking or movement at ladders, platforms, handrails, mixer mounts, or roof attachments
- ☐ Condition of repairs, patches, and exterior overlaminates
- ☐ Roof cracking, deformation, or collapse
- ☐ Evidence of pressure or vacuum damage
- ☐ Wind, flood, freeze, heat, fire, or seismic damage
- ☐ Active through-wall leakage or severe deformation

PAGE NOTES / PHOTO IDS / FOLLOW-UP

INTERNAL INSPECTION PLANNING

Document internal conditions only within the facility's approved program.

Qualified personnel select inspection methods and direct the inspection. Record authorized observations in a consistent route from the access opening to the roof, shell, knuckle, bottom, nozzles, internals, and prior repairs.

Important

Internal inspection begins with the facility's authorization and control of the work. The owner or operator determines the operating state, isolation, cleaning, decontamination, access classification, atmospheric evaluation, ventilation, permits, rescue provisions, personal protective equipment, and other requirements. This workbook does not authorize entry and is not an entry permit or safety procedure.

- ☐ Discoloration, deposits, staining, or loss of gloss
- ☐ Roughness, softening, swelling, embrittlement, or other material change
- ☐ Resin loss, veil erosion, corrosion-barrier thinning, or washout
- ☐ Chemical attack, permeation, or absorption indicators
- ☐ Crazeing, pinholes, pitting, matrix cracks, or liner cracks
- ☐ Blisters, blister rupture, bubbles, or porosity
- ☐ Exposed fibers, fiber attack, or fiber-matrix debonding
- ☐ Knuckle cracking or erosion
- ☐ Bottom degradation, cracking, sediment-related wear, or standing residue
- ☐ Drain-neck erosion or degradation
- ☐ Jet impingement opposite an inlet, return, sparger, or mixing device
- ☐ Abrasion, worn tracks, scraping, or cleaning damage

PAGE NOTES / PHOTO IDS / FOLLOW-UP

INTERNAL INSPECTION PLANNING

Document internal conditions only within the facility's approved program. / continued

Continue the same route and documentation method. Record location, photographs, extent, comparison, and follow-up for every observed condition.

- ☐ Liner-to-structure disbondment or peeling
- ☐ Interlaminar delamination
- ☐ Voids, dry glass, incomplete wet-out, resin starvation, or resin-rich areas
- ☐ Wrinkles, folds, bridging, or reinforcement distortion
- ☐ Foreign inclusions or contamination
- ☐ Abnormal cure or hardness indications identified by qualified testing
- ☐ Uneven corrosion-barrier or structural thickness
- ☐ Chemical attack at nozzle bores, flange faces, necks, or transitions
- ☐ Nozzle-to-shell internal bond cracking
- ☐ Nozzle, manway, repad, or transition delamination
- ☐ Manway edge, neck, flange, or internal-surface degradation
- ☐ Abrasion, impact, or cracking from internal hardware, baffles, or mixers

PAGE NOTES / PHOTO IDS / FOLLOW-UP

INTERNAL INSPECTION PLANNING

Document internal conditions only within the facility's approved program. / continued

Continue the same route and documentation method. Record location, photographs, extent, comparison, and follow-up for every observed condition.

- ☐ Structural cracks
- ☐ Fiber fracture
- ☐ Wall thinning or structural-laminate loss
- ☐ Thermal or mechanical fatigue indicators
- ☐ Repair, patch, liner, or reline deterioration
- ☐ Through-wall seepage, leakage, or severe structural change

PAGE NOTES / PHOTO IDS / FOLLOW-UP

CONDITION ATLAS

A shared vocabulary for 53 external and 46 internal conditions.

Each entry separates what may be visible, why it matters, what qualified inspection should confirm, and a possible next step. The ranking is practical guidance, not a statistical incident rate. Frequency and severity are different.

Educational illustrations

Use these images to support inspection planning and documentation. They are not a visual diagnosis, fitness-for-service determination, or repair specification. Actual appearance and scale vary, and qualified inspection is required to confirm the condition and significance.

99

RANKED CONDITIONS

External / E1-E53

Surface, connections, load paths, supports, and outcomes

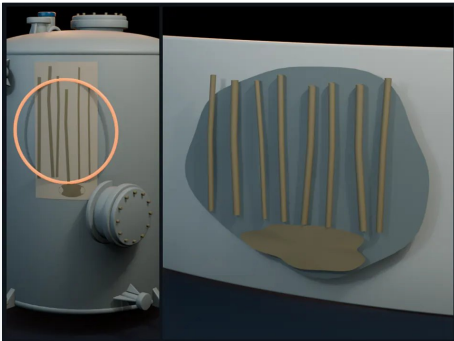
Internal / I1-I46

Corrosion barrier, laminate, bottoms, nozzles, and prior work

- **Look** Record exactly what is visible and where.
- **Compare** Use prior photographs, maps, reports, and operating history.
- **Question** Use the entry to prepare questions for qualified personnel.
- **Route** Link the observation to inspection, repair, relining, or another appropriate service path.

E1 Exterior discoloration, staining, and loss of gloss

EXTERIOR SURFACE CONDITION



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Color change, streaks, deposits, or dull patches indicate exposure or aging but do not prove structural damage.

WHY IT MATTERS

Deposits can conceal deeper deterioration.

INSPECTION SHOULD CONFIRM

Whether the change is superficial, chemically active, or associated with softness, cracking, or fiber exposure.

POSSIBLE NEXT STEP

Clean and reassess; restore compatible exterior surfacing if damage is shallow, or repair affected laminate if deterioration extends deeper.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

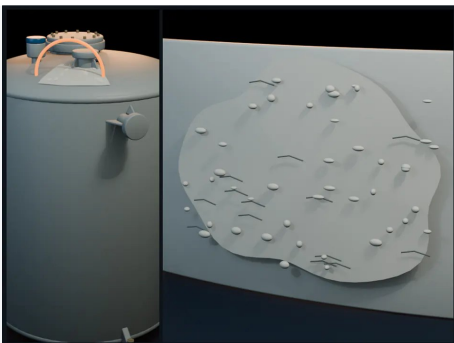
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank repair](#)

E2 UV degradation, chalking, and exterior resin weathering

EXTERIOR SURFACE CONDITION



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Fading, powdery chalk, roughness, and shallow cracks develop in the resin-rich exterior.

WHY IT MATTERS

Progressive resin loss can expose reinforcement.

INSPECTION SHOULD CONFIRM

Degradation depth, fiber condition, cracking, and whether structural laminate is involved.

POSSIBLE NEXT STEP

Renew a compatible UV-resistant resin surface or exterior overlaminate after qualified evaluation; deeper loss may require laminate reconstruction.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank repair](#)

E3 Fiber blooming, fiber prominence, and exposed glass

EXTERIOR SURFACE CONDITION



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

White, threadlike glass becomes visible or raised as surface resin recedes or microcracks.

WHY IT MATTERS

Exposed reinforcement has reduced environmental protection, although blooming alone is not a through-wall failure.

INSPECTION SHOULD CONFIRM

Whether fibers are merely prominent or chemically, mechanically, or structurally damaged.

POSSIBLE NEXT STEP

Restore the resin-rich protective surface when shallow; remove and rebuild damaged laminate where fiber integrity is affected.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

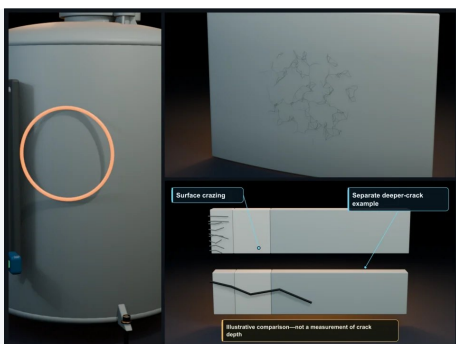
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank repair](#)

E4 External crazing and fine surface cracking

EXTERIOR SURFACE CONDITION



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

A network of fine hairline cracks appears in the exterior resin surface.

WHY IT MATTERS

Crazing can remain superficial or become an entry path for moisture and further deterioration.

INSPECTION SHOULD CONFIRM

Crack depth, distribution, growth, and relation to loads or chemical exposure.

POSSIBLE NEXT STEP

Restore compatible surface protection if confined to the resin-rich layer; reconstruct laminate if cracks extend beneath it.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank repair](#)

E5 Nozzle-to-shell bond cracking

NOZZLES, FLANGES, AND LOAD TRANSFER



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Curved or radial cracks form at the nozzle fillet, secondary bond, or shell transition.

WHY IT MATTERS

Cracking can weaken the connection and develop into leakage or separation.

INSPECTION SHOULD CONFIRM

Circumferential extent, depth, bond integrity, surrounding shell condition, and imposed piping loads.

POSSIBLE NEXT STEP

Remove external loads and rebuild the secondary bond or nozzle connection where qualified assessment supports repair.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[FRP tank nozzle and flange repair](#)

E6 Nozzle-neck cracking

NOZZLES, FLANGES, AND LOAD TRANSFER



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Axial, circumferential, or localized cracks develop in the exposed nozzle neck.

WHY IT MATTERS

The neck carries piping and containment loads and may leak or fracture as damage grows.

INSPECTION SHOULD CONFIRM

Crack depth, fiber involvement, nozzle geometry, and connected-system loads.

POSSIBLE NEXT STEP

Correct the imposed load and reconstruct or replace the damaged nozzle neck as engineering evaluation directs.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

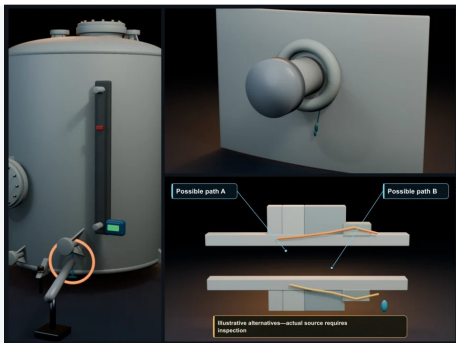
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[FRP tank nozzle and flange repair](#)

E7 Nozzle weeping or leakage

NOZZLES, FLANGES, AND CONTAINMENT



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Dampness, droplets, or a narrow liquid trail appears at the neck, repad, flange, or shell bond.

WHY IT MATTERS

Any weep is a loss-of-containment indication and may conceal wider laminate damage.

INSPECTION SHOULD CONFIRM

Exact leak path, chemical exposure, damaged area, remaining laminate, and connection loads.

POSSIBLE NEXT STEP

Isolate and make the tank safe, then remove unsound material and rebuild the qualified connection or replace it if damage is extensive.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

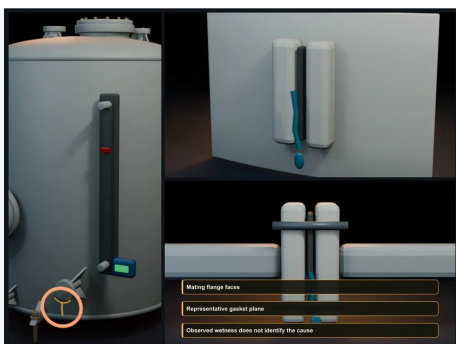
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[FRP tank nozzle and flange repair](#)

E8 Flange leakage

NOZZLES, FLANGES, AND CONTAINMENT



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Wetness or droplets emerge between mating flange faces.

WHY IT MATTERS

Leakage can expose the flange, nozzle, shell, and nearby equipment to chemical attack.

INSPECTION SHOULD CONFIRM

Face condition, flatness, gasket compatibility, bolt condition, alignment, and laminate integrity.

POSSIBLE NEXT STEP

Correct alignment and sealing components, or rebuild the flange if the FRP laminate itself is damaged.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

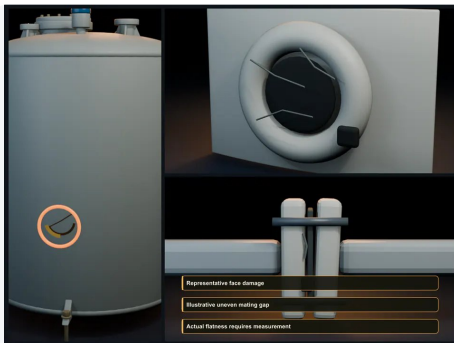
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[FRP tank nozzle and flange repair](#)

E9 Flange-face damage and non-flatness

NOZZLES AND FLANGES



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Scratches, chips, cracks, warpage, or an uneven mating gap interferes with gasket seating.

WHY IT MATTERS

An uneven face can prevent reliable sealing and concentrate bolt load.

INSPECTION SHOULD CONFIRM

Damage depth, flatness, gasket contact, bolt pattern, and hub condition.

POSSIBLE NEXT STEP

Restore or rebuild the qualified sealing surface, or replace the flange when geometry or laminate damage cannot be acceptably recovered.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

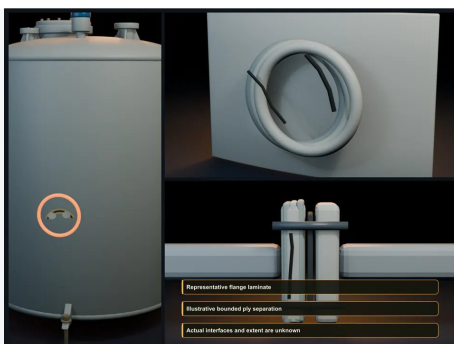
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[FRP tank nozzle and flange repair](#)

E10 Flange laminate cracking or delamination

NOZZLES AND FLANGES



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Cracks or separated laminate plies appear in the ring, hub, neck, or transition.

WHY IT MATTERS

The flange may lose sealing stiffness or structural continuity.

INSPECTION SHOULD CONFIRM

Ply separation, crack depth, affected circumference, bolt-seat damage, and connected piping loads.

POSSIBLE NEXT STEP

Unload the connection and rebuild or replace the damaged flange assembly based on qualified engineering evaluation.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

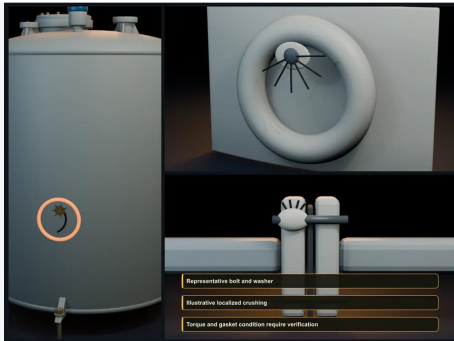
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[FRP tank nozzle and flange repair](#)

E11 Improper bolt-torque damage or leakage

NOZZLES AND FLANGES



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

FRP is crushed or radially cracked below a washer, a gasket is extruded, or compression is visibly uneven.

WHY IT MATTERS

Local crushing reduces flange capacity while uneven compression defeats the seal.

INSPECTION SHOULD CONFIRM

Bolt loading, gasket condition, flange-face damage, laminate crushing, and alignment.

POSSIBLE NEXT STEP

Correct the bolting and gasket system and reconstruct damaged FRP where required by the governing connection design.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

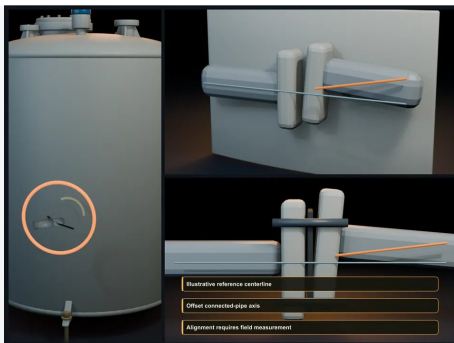
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[FRP tank nozzle and flange repair](#)

E12 Flange misalignment and forced fit-up

NOZZLES, FLANGES, AND LOAD TRANSFER



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Pipe and nozzle axes are offset, flange faces meet unevenly, or the pipe appears pulled into position.

WHY IT MATTERS

Forced fit-up imposes sustained bending and axial stress on the nozzle and shell.

INSPECTION SHOULD CONFIRM

Actual alignment, support condition, displacement source, bond damage, and allowable loads.

POSSIBLE NEXT STEP

Realign and independently support the piping before repairing any damaged flange, neck, or shell bond.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

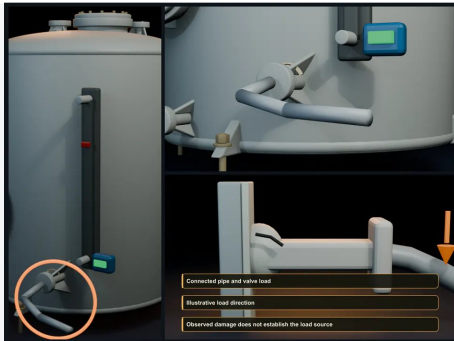
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[FRP tank nozzle and flange repair](#)

E13 Connected-pipe dead-load damage at nozzles

NOZZLES AND LOAD TRANSFER



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

A nozzle sags or distorts, often with whitening or cracking near the loaded side of its bond.

WHY IT MATTERS

Sustained load can cause creep, cracking, bond failure, or nozzle separation.

INSPECTION SHOULD CONFIRM

Pipe support, imposed forces, permanent deformation, crack depth, and surrounding shell condition.

POSSIBLE NEXT STEP

Transfer piping weight to proper supports, then rebuild or replace the damaged connection as qualified analysis permits.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

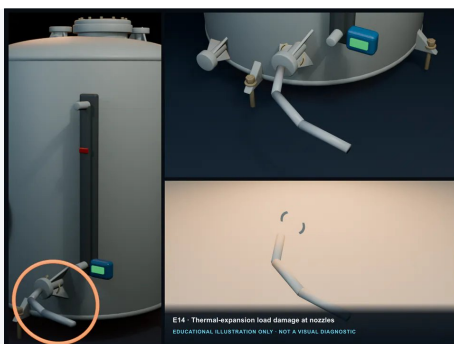
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[FRP tank nozzle and flange repair](#)

E14 Thermal-expansion load damage at nozzles

NOZZLES AND LOAD TRANSFER



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Directional nozzle displacement, opposing bond cracks, or localized stress whitening indicates restrained movement.

WHY IT MATTERS

Repeated or sustained thermal load can fatigue the nozzle and shell bond.

INSPECTION SHOULD CONFIRM

Operating temperature range, movement direction, restraint system, crack depth, and nozzle capacity.

POSSIBLE NEXT STEP

Correct the piping flexibility or restraint condition and reconstruct the affected connection if it remains repairable.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

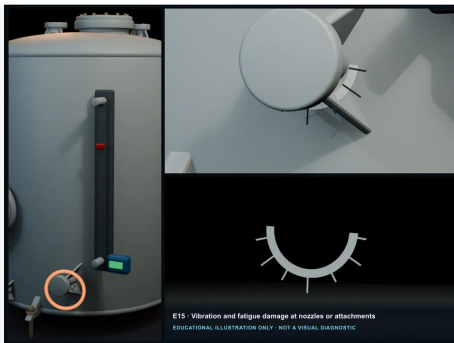
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[FRP tank nozzle and flange repair](#)

E15 Vibration and fatigue damage at nozzles or attachments

CONNECTIONS AND CYCLIC LOADING



WHAT YOU MAY NOTICE

Multiple short, similarly oriented cracks or a whitening halo develops around a nozzle or attachment.

WHY IT MATTERS

Repeated loading can progressively grow matrix cracks, delamination, and bond damage.

INSPECTION SHOULD CONFIRM

Vibration source, frequency and history, crack growth, delamination, and load path.

EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

POSSIBLE NEXT STEP

Eliminate or isolate the cyclic load, then rebuild affected laminate or replace the connection where required.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

LOCATION / PHOTO ID / NOTE

[Inspection support](#)

| [FRP tank nozzle and flange repair](#)

E16 External chemical attack from spills, overflow, or vapors

EXTERIOR CHEMICAL EXPOSURE



WHAT YOU MAY NOTICE

A spill path shows bleaching, roughness, softened gloss, resin loss, or exposed fibers.

WHY IT MATTERS

External exposure can degrade structural laminate, attachments, base areas, and connected piping.

INSPECTION SHOULD CONFIRM

Chemical identity, concentration, exposure duration, affected depth, and fiber condition.

EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

POSSIBLE NEXT STEP

Decontaminate and stop the exposure, then restore compatible surfacing or rebuild degraded laminate according to qualified material selection.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

LOCATION / PHOTO ID / NOTE

[Inspection support](#)

| [Fiberglass tank relining](#)

E17 Surface scratches, gouges, cuts, and grinding damage

EXTERNAL MECHANICAL DAMAGE



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Linear scratches or localized gouges remove smooth resin and may reveal pale reinforcement.

WHY IT MATTERS

Cut fibers or lost resin protection can create a stress concentration and exposure path.

INSPECTION SHOULD CONFIRM

Depth, fiber severance, location, wall thickness, and any hidden delamination.

POSSIBLE NEXT STEP

Seal or restore shallow resin loss; remove and reconstruct laminate when reinforcement has been damaged.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

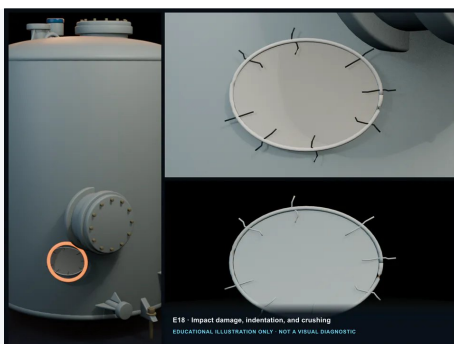
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank repair](#)

E18 Impact damage, indentation, and crushing

EXTERNAL MECHANICAL DAMAGE



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

A dent, white stress halo, radial cracks, or crushed surface marks a concentrated impact.

WHY IT MATTERS

Subsurface delamination may extend beyond the visible mark.

INSPECTION SHOULD CONFIRM

Impact extent, delamination, fiber fracture, residual shape, and remaining laminate.

POSSIBLE NEXT STEP

Reconstruct a localized area if damage is bounded and repairable; extensive crushing or loss of shape may require section or tank replacement.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

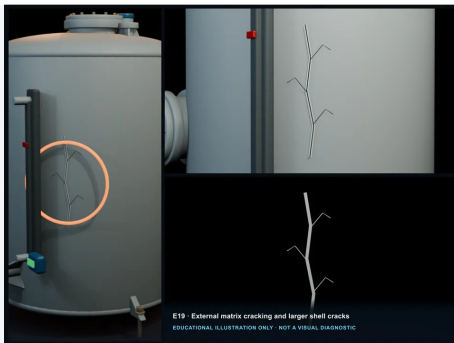
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank repair](#)

E19 External matrix cracking and larger shell cracks

SHELL LAMINATE DAMAGE



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

A distinct crack extends beyond fine surface crazing and may branch across the shell.

WHY IT MATTERS

A larger crack can connect to delamination, fiber damage, or leakage.

INSPECTION SHOULD CONFIRM

Depth, length, orientation, growth, fiber involvement, and initiating load.

POSSIBLE NEXT STEP

Correct the cause and perform engineered laminate reconstruction where remaining structure qualifies; replace where damage is extensive.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

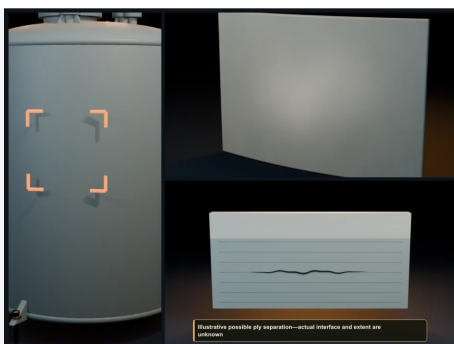
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank repair](#)

E20 External delamination and hollow areas

SHELL LAMINATE DAMAGE



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

A subtly raised, whitened, or hollow-sounding area indicates separation between laminate plies.

WHY IT MATTERS

Visible surface change may understate the separated area and reduced load transfer.

INSPECTION SHOULD CONFIRM

Delamination perimeter, depth, interfaces, moisture, and structural significance.

POSSIBLE NEXT STEP

Remove and rebuild separated laminate when localized; widespread or deep delamination may require larger reconstruction or replacement.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank repair](#)

E21 Repad or secondary-laminate disbonding

SECONDARY BONDS AND ATTACHMENTS



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

An edge lifts from a nozzle pad, manway pad, lug overlay, platform pad, or repair laminate.

WHY IT MATTERS

The attachment may no longer transfer load as intended.

INSPECTION SHOULD CONFIRM

Bonded area, substrate condition, load path, cure history, and cause of separation.

POSSIBLE NEXT STEP

Remove the disbonded work, correct the load or preparation issue, and rebuild the qualified secondary laminate.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank repair](#)

E22 Manway-neck and manway-to-shell cracking

MANWAYS AND PENETRATIONS



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Curved or radial cracks appear at the manway neck, fillet, or shell transition.

WHY IT MATTERS

The opening interrupts shell continuity and can develop leakage or local structural failure.

INSPECTION SHOULD CONFIRM

Crack depth, bond extent, shell deformation, flange loading, and access-related damage.

POSSIBLE NEXT STEP

Rebuild the transition or manway connection after correcting the contributing load and confirming surrounding laminate integrity.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[FRP tank nozzle and flange repair](#)

E23 Manway flange, cover, gasket, or fastener leakage

MANWAYS AND CONTAINMENT



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Wetness emerges at the cover gasket, often near unevenly seated bolts or an extruded gasket.

WHY IT MATTERS

Leakage exposes a large opening and adjacent shell to chemical attack.

INSPECTION SHOULD CONFIRM

Cover and flange geometry, gasket compatibility, bolt loading, cracks, and neck condition.

POSSIBLE NEXT STEP

Correct sealing and hardware deficiencies; rebuild or replace damaged FRP manway components where necessary.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

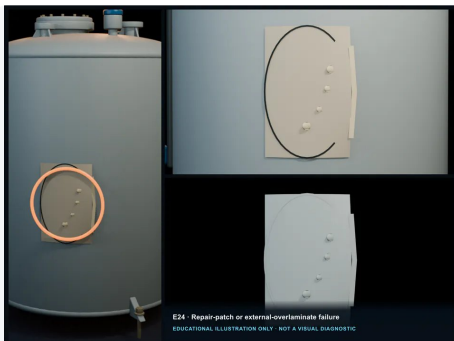
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[FRP tank nozzle and flange repair](#)

E24 Repair-patch or external-overlamine failure

PRIOR REPAIR FAILURE



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

A previous patch cracks, peels, blisters, lifts, or differs sharply from the surrounding laminate.

WHY IT MATTERS

The repair may conceal continuing deterioration or transfer stress to adjacent laminate.

INSPECTION SHOULD CONFIRM

Original damage, substrate condition, compatibility, bond extent, and present loads.

POSSIBLE NEXT STEP

Remove the failed repair, reassess the complete damage zone, and redesign the repair-or replace the affected component-using a qualified system.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

LOCATION / PHOTO ID / NOTE

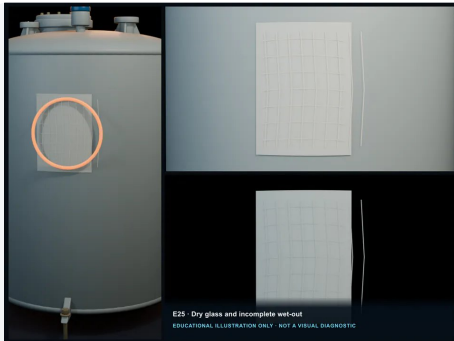
[Inspection support](#)

[Fiberglass tank repair](#)

E25

Dry glass and incomplete wet-out

FABRICATION AND LAMINATE QUALITY



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Cloudy white or opaque reinforcement remains visibly under-saturated with resin.

WHY IT MATTERS

The area has reduced chemical protection and interlaminar continuity.

INSPECTION SHOULD CONFIRM

Size, depth, ply location, surface connectivity, and structural or barrier significance.

POSSIBLE NEXT STEP

Remove and rebuild unacceptable defective laminate; disposition of minor indications requires governing criteria and qualified evaluation.

FIELD RECORD

☐ Observed

☐ Not observed

☐ Needs review

LOCATION / PHOTO ID / NOTE

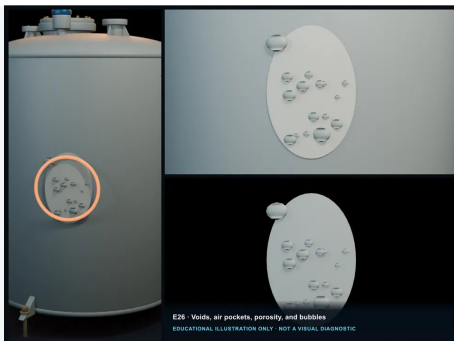
[Inspection support](#)

[Fiberglass tank repair](#)

E26

Voids, air pockets, porosity, and bubbles

FABRICATION AND LAMINATE QUALITY



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Small subsurface cavities or larger irregular air pockets interrupt an otherwise continuous laminate.

WHY IT MATTERS

Voids reduce continuity and may seed moisture entry, blistering, delamination, or leakage.

INSPECTION SHOULD CONFIRM

Size, density, depth, interfaces, and connection to either surface.

POSSIBLE NEXT STEP

Locally remove and rebuild significant defects; widespread porosity may require broader laminate reconstruction or replacement.

FIELD RECORD

☐ Observed

☐ Not observed

☐ Needs review

LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank repair](#)

E27 Resin-starved or resin-rich areas

FABRICATION AND LAMINATE QUALITY



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

A matte, fiber-prominent region lies beside a glossy or amber resin pocket, sometimes with shrinkage cracks.

WHY IT MATTERS

Starved zones expose reinforcement; resin-rich zones can be brittle and glass-deficient.

INSPECTION SHOULD CONFIRM

Area, depth, reinforcement content, cracking, and effect on barrier or structural performance.

POSSIBLE NEXT STEP

Remove and rebuild materially deficient laminate where qualified acceptance criteria are not met.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

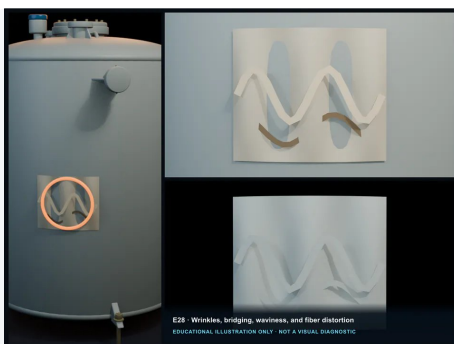
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank repair](#)

E28 Wrinkles, bridging, waviness, and fiber distortion

FABRICATION AND LAMINATE QUALITY



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Raised folds, bridged hollows, or distorted fiber paths interrupt smooth laminate geometry.

WHY IT MATTERS

The condition can create resin pockets, thin zones, weak directions, and stress concentrations.

INSPECTION SHOULD CONFIRM

Ply distortion, thickness, voiding, affected area, and load orientation.

POSSIBLE NEXT STEP

Reconstruct localized defective laminate or provide engineered reinforcement when the surrounding structure and governing design permit it.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

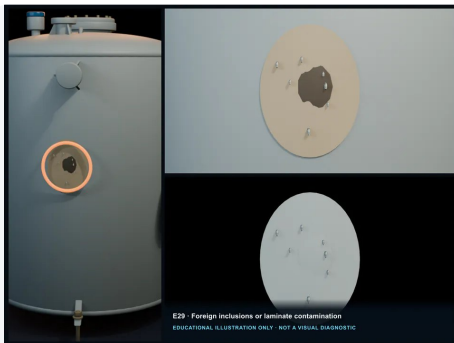
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank repair](#)

E29 Foreign inclusions or laminate contamination

FABRICATION AND BOND QUALITY



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Dirt, moisture, wax, dust, or another inclusion is trapped beneath resin, sometimes with a discolored halo or nearby voids.

WHY IT MATTERS

Contamination can reduce adhesion, cure quality, and durability.

INSPECTION SHOULD CONFIRM

Material, size, depth, interface, and whether a bond or structural ply is interrupted.

POSSIBLE NEXT STEP

Remove contaminated material and rebuild the affected laminate when its location or extent is unacceptable.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank repair](#)

E30 Improper cure, low hardness, or exterior softness

CURE AND MATERIAL CONDITION



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Uneven gloss, amber color, softness, impressions, burn discoloration, shrinkage cracks, or voids indicate abnormal cure.

WHY IT MATTERS

The laminate may have inadequate chemical or mechanical properties.

INSPECTION SHOULD CONFIRM

Affected depth and area, hardness pattern, resin condition, service exposure, and associated cracking or delamination.

POSSIBLE NEXT STEP

Remove and rebuild unsound undercured or heat-damaged laminate unless a qualified material evaluation establishes another acceptable disposition.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank repair](#)

E31 Uneven thickness, thin laminate, or missing reinforcement

FABRICATION AND STRUCTURAL CAPACITY



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Local depressions or geometry changes may mark a thin area or absent reinforcement.

WHY IT MATTERS

Local capacity and stiffness may fall below the intended load path.

INSPECTION SHOULD CONFIRM

Actual thickness, ply content, affected dimensions, design loads, and deformation.

POSSIBLE NEXT STEP

Add engineered compatible reinforcement or reconstruct the area only after confirming the original design basis; replacement may be necessary if deficiency is widespread.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank repair](#)

E32 Print-through, waviness, and geometric irregularity

SURFACE AND FABRICATION CONDITION



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Fiber patterns, ripples, or low-amplitude geometry become visible under glancing light.

WHY IT MATTERS

The condition may be cosmetic or may accompany local thinness or load concentration.

INSPECTION SHOULD CONFIRM

Whether thickness, stiffness, bonding, or structural shape is affected.

POSSIBLE NEXT STEP

Refinish a verified cosmetic condition; reconstruct or reinforce only when assessment identifies material or structural deficiency.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank repair](#)

E33 Shell deformation, bulging, and out-of-roundness

GLOBAL STRUCTURAL CONDITION



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

A broad shell quadrant moves outward or loses cylindrical geometry.

WHY IT MATTERS

Deformation redistributes load to nozzles, attachments, and adjacent laminate.

INSPECTION SHOULD CONFIRM

Geometry, progression, pressure history, support, wall construction, cracks, and delamination.

POSSIBLE NEXT STEP

Correct the initiating load or support condition and use engineered reinforcement, reconstruction, or replacement according to remaining capacity.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank repair](#)

E34 Creep deformation

GLOBAL STRUCTURAL CONDITION



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Permanent sagging or smooth long-term bulging appears near sustained shell, nozzle, attachment, or roof loads.

WHY IT MATTERS

Increasing strain can precede cracking, delamination, or rupture.

INSPECTION SHOULD CONFIRM

Deformation history, sustained loads, temperature, laminate condition, and residual geometry.

POSSIBLE NEXT STEP

Reduce the sustained load and evaluate engineered reinforcement or replacement; a cosmetic surface treatment does not address creep.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

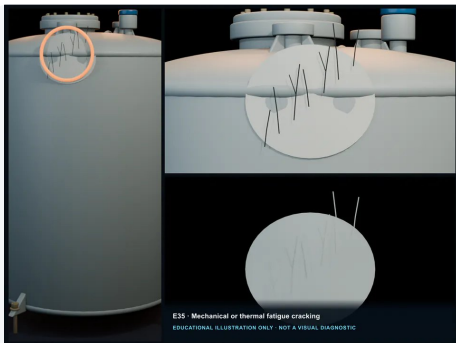
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank repair](#)

E35 Mechanical or thermal fatigue cracking

CYCLIC STRUCTURAL DAMAGE



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Families of short cracks grow near a repeatedly loaded nozzle, attachment, roof transition, or shell zone.

WHY IT MATTERS

Damage can continue below the visible surface and enlarge with each cycle.

INSPECTION SHOULD CONFIRM

Load history, crack growth, delamination, fiber condition, and affected stress path.

POSSIBLE NEXT STEP

Control the cyclic source, then reconstruct or replace damaged laminate based on engineered remaining-capacity evaluation.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank repair](#)

E36 Foundation settlement and tank tilt

FOUNDATION AND SUPPORT



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

The tank leans, one knuckle is compressed, a base gap opens, or piping becomes misaligned.

WHY IT MATTERS

Settlement overloads the bottom, knuckle, anchors, nozzles, and connected piping.

INSPECTION SHOULD CONFIRM

Tank geometry, foundation condition, bottom support, anchor loads, and secondary laminate damage.

POSSIBLE NEXT STEP

Stabilize and restore the support condition before repairing affected tank components or replacing the tank if distortion is unrecoverable.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

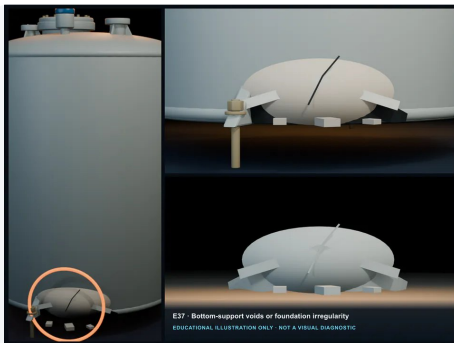
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank repair](#)

E37 Bottom-support voids or foundation irregularity

FOUNDATION AND SUPPORT



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

A localized base gap, washout, debris point, or missing support permits bottom flexure.

WHY IT MATTERS

Concentrated bottom and knuckle stresses can create cracks or delamination.

INSPECTION SHOULD CONFIRM

Full support profile, bottom deformation, knuckle damage, foundation drainage, and settlement.

POSSIBLE NEXT STEP

Correct the continuous support condition, then repair damaged bottom or knuckle laminate if qualified assessment confirms reparability.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

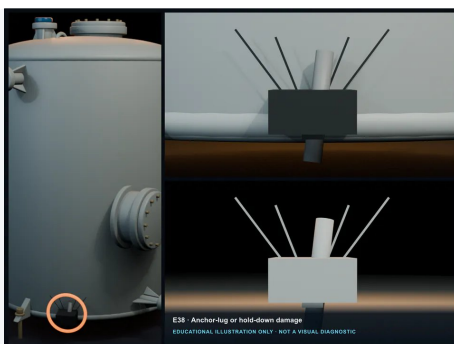
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank repair](#)

E38 Anchor-lug or hold-down damage

ANCHORS AND SUPPORTS



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Cracked overlays, lifted lug laminates, elongated holes, or damaged bolts appear at a hold-down.

WHY IT MATTERS

Anchor failure can damage the parent shell or permit tank movement.

INSPECTION SHOULD CONFIRM

Anchor design, load history, bolt condition, overlay bond, shell damage, and foundation attachment.

POSSIBLE NEXT STEP

Rebuild the engineered lug and overlay, renew hardware, and correct restraint deficiencies where the surrounding shell remains suitable.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

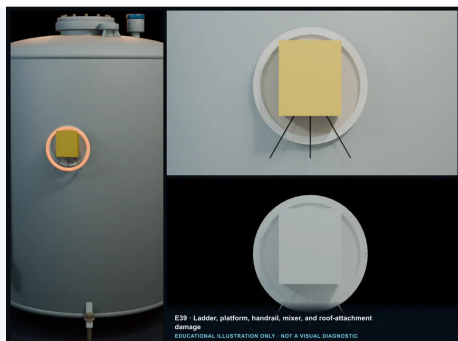
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank repair](#)

E39 Ladder, platform, handrail, mixer, and roof-attachment damage

ATTACHMENTS AND LOCAL LOAD TRANSFER



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Indentation, whitening, cracks, or shifted pads appear around an attachment.

WHY IT MATTERS

Attachment loads can crack the pad and underlying shell or roof.

INSPECTION SHOULD CONFIRM

Actual load path, hardware stability, bond condition, crack depth, and parent-laminate damage.

POSSIBLE NEXT STEP

Remove or redistribute the load, then rebuild the qualified attachment laminate or supporting tank area.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

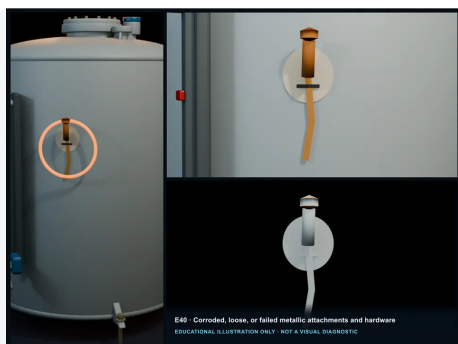
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank repair](#)

E40 Corroded, loose, or failed metallic attachments and hardware

ATTACHMENTS AND HARDWARE



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Metal bolts, clips, supports, or ladder parts show corrosion, looseness, or failure, sometimes staining the FRP.

WHY IT MATTERS

Failed hardware can lose function or impose point loads and abrasion on the composite.

INSPECTION SHOULD CONFIRM

Metal loss, remaining attachment function, FRP contact damage, and load transfer.

POSSIBLE NEXT STEP

Replace compatible hardware and repair any locally crushed, worn, or cracked FRP after confirming the attachment design.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank repair](#)

E41 Shell buckling or wrinkling

GLOBAL STRUCTURAL INSTABILITY



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Broad circumferential or localized folds alternate inward and outward in the shell.

WHY IT MATTERS

Buckling indicates loss of geometric stability and may damage multiple laminate layers.

INSPECTION SHOULD CONFIRM

Cause, residual shape, cracking, delamination, stiffness, and affected circumference.

POSSIBLE NEXT STEP

Correct the destabilizing condition; engineered reconstruction is possible only where residual laminate qualifies, otherwise replacement may be required.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank repair](#)

E42 Vacuum buckling or implosion

PRESSURE/VACUUM FAILURE



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

The upper shell or roof is pulled inward with broad concave deformation and buckle ridges.

WHY IT MATTERS

Global collapse can damage shell, roof, nozzles, and laminate interfaces simultaneously.

INSPECTION SHOULD CONFIRM

Venting event, full deformation, cracking, delamination, and remaining structural geometry.

POSSIBLE NEXT STEP

Correct the venting cause and obtain engineered disposition; extensive implosion damage commonly points toward major reconstruction or replacement.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank repair](#)

E43 Overpressure bulging and cracking

PRESSURE/VACUUM FAILURE



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

The upper shell or roof bulges outward and may crack around transitions or fittings.

WHY IT MATTERS

An atmospheric or low-pressure tank may have exceeded its intended load capability.

INSPECTION SHOULD CONFIRM

Pressure event, venting, deformation, crack and fiber damage, and global tank geometry.

POSSIBLE NEXT STEP

Correct process and venting deficiencies; use engineered reconstruction only if remaining structure qualifies, otherwise replace.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

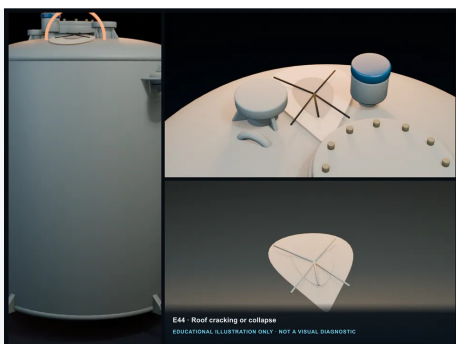
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank repair](#)

E44 Roof cracking or collapse

ROOF AND GLOBAL STRUCTURE



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

A roof depression, radial cracking, or displaced fitting indicates localized or broad roof failure.

WHY IT MATTERS

Roof damage can compromise venting, openings, weather protection, and shell-transition loads.

INSPECTION SHOULD CONFIRM

Crack depth, deformation, attachments, roof-support design, and shell-joint condition.

POSSIBLE NEXT STEP

Remove the initiating load and rebuild or replace the roof and transition according to a qualified structural assessment.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank repair](#)

E45

Wind damage

ENVIRONMENTAL AND GLOBAL LOADING



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Directional shell or roof buckling, strained anchors, or displaced attachments follows a wind event.

WHY IT MATTERS

Damage can affect the tank, anchors, foundation, roof, and piping as one system.

INSPECTION SHOULD CONFIRM

Alignment, shell and roof damage, anchor loads, foundation condition, and connected piping.

POSSIBLE NEXT STEP

Restore anchorage and load paths, then perform engineered repairs or replace components according to the full-system assessment.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank repair](#)

E46

Uplift or flotation

ENVIRONMENTAL AND FOUNDATION LOADING



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

The base lifts, anchors stretch or fail, and lower piping moves out of alignment.

WHY IT MATTERS

Uplift can damage the bottom, knuckle, anchors, nozzles, and piping simultaneously.

INSPECTION SHOULD CONFIRM

Bottom shape, anchor and foundation condition, piping displacement, and hidden laminate damage.

POSSIBLE NEXT STEP

Reestablish support and buoyancy restraint, then repair or replace affected tank and connection components as engineering evaluation directs.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

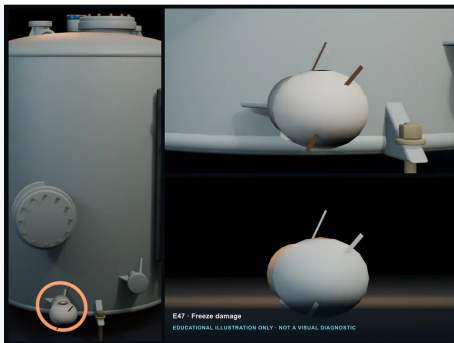
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank repair](#)

E47 Freeze damage

ENVIRONMENTAL AND LOCALIZED PRESSURE



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

A nozzle, drain, jacket, or low point bulges or splits, sometimes with a crack into adjacent laminate.

WHY IT MATTERS

Local expansion can fracture a connection or create a through-wall path.

INSPECTION SHOULD CONFIRM

Full crack extent, trapped-volume location, surrounding laminate, and recurring freeze exposure.

POSSIBLE NEXT STEP

Eliminate the liquid trap or freezing condition and rebuild or replace the affected connection and adjacent laminate.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

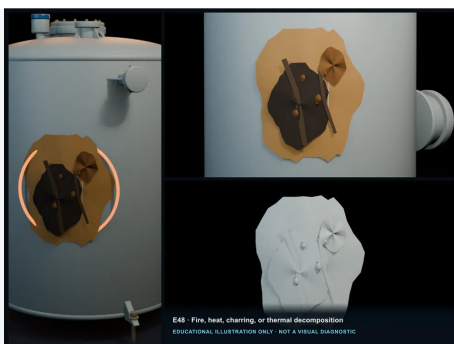
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank repair](#)

E48 Fire, heat, charring, or thermal decomposition

THERMAL DAMAGE



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Tan-to-black discoloration, charring, blistered resin, distortion, or exposed fibers follows external heat.

WHY IT MATTERS

Resin properties and laminate bonds can be lost beyond the visible charred area.

INSPECTION SHOULD CONFIRM

Temperature exposure, damage depth and area, softness or embrittlement, delamination, and fiber condition.

POSSIBLE NEXT STEP

Remove all heat-damaged material and reconstruct only where qualified evaluation confirms sound surrounding laminate; extensive exposure may require replacement.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank repair](#)

E49

Seismic damage

ENVIRONMENTAL AND GLOBAL LOADING



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Tank shift, anchor cracking, knuckle whitening, and nozzle or piping misalignment occur in a common direction.

WHY IT MATTERS

Multiple components can be damaged even when the shell remains standing.

INSPECTION SHOULD CONFIRM

Global alignment, bottom, anchors, shell, roof, nozzles, attachments, and piping.

POSSIBLE NEXT STEP

Reestablish foundation, restraint, and piping conditions, then use engineered component repairs or replacement based on the complete system inspection.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

LOCATION / PHOTO ID / NOTE

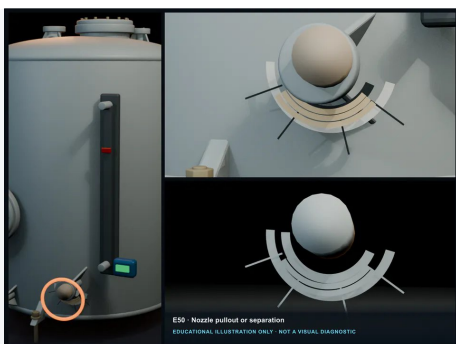
[Inspection support](#)

[Fiberglass tank repair](#)

E50

Nozzle pullout or separation

SEVERE CONNECTION FAILURE



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

The nozzle bond opens or the connection partially separates, exposing layered FRP edges and radial shell cracks.

WHY IT MATTERS

Structural continuity and containment at the penetration are substantially reduced.

INSPECTION SHOULD CONFIRM

Surrounding shell damage, separation extent, remaining bond, pipe loads, and chemical exposure.

POSSIBLE NEXT STEP

Isolate the tank, support the piping, and reconstruct or replace the nozzle and affected shell only under an engineered repair design.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

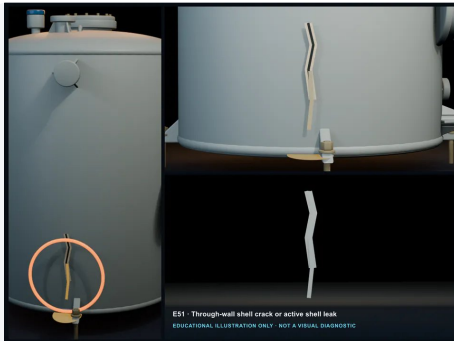
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[FRP tank nozzle and flange repair](#)

E51 Through-wall shell crack or active shell leak

CONTAINMENT FAILURE



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Seepage, a stream, or spray emerges from a crack that crosses the corrosion barrier and structural wall.

WHY IT MATTERS

The tank has lost containment and may have broader unseen damage.

INSPECTION SHOULD CONFIRM

Safe isolation, crack extent, surrounding wall condition, root cause, and remaining structural capacity.

POSSIBLE NEXT STEP

Keep the asset out of service until an engineered laminate repair, reline, major reconstruction, or replacement is selected.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

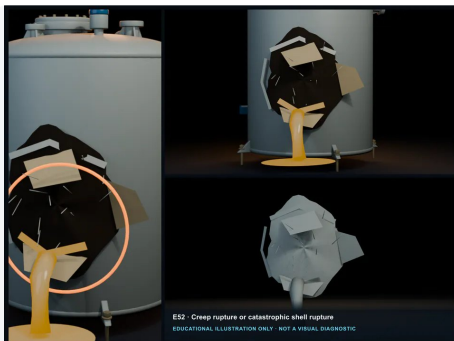
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank repair](#)

E52 Creep rupture or catastrophic shell rupture

CATASTROPHIC CONTAINMENT FAILURE



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

A large irregular opening with peeled laminate plies and broken fibers follows rapid structural separation.

WHY IT MATTERS

Major containment and structural integrity are lost.

INSPECTION SHOULD CONFIRM

Event cause, full tank damage, foundation and connection effects, and whether any structure remains reusable.

POSSIBLE NEXT STEP

Replacement is generally the primary consideration; any proposed reconstruction requires a qualified, asset-specific engineering basis.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

LOCATION / PHOTO ID / NOTE

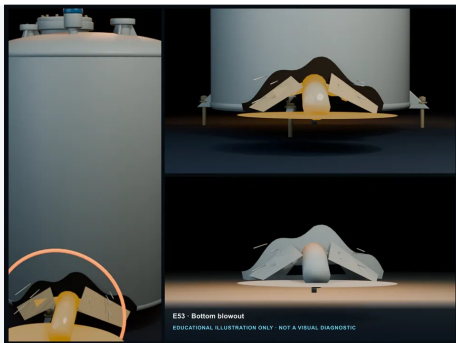
[Inspection support](#)

[Fiberglass tank repair](#)

E53

Bottom blowout

CATASTROPHIC CONTAINMENT FAILURE



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

The bottom or bottom-to-shell joint separates, often with failed anchors and a major release at the base.

WHY IT MATTERS

The primary load-carrying and containment boundary has failed.

INSPECTION SHOULD CONFIRM

Bottom, knuckle, anchors, foundation, shell distortion, event sequence, and surrounding equipment.

POSSIBLE NEXT STEP

Tank replacement is generally indicated; major engineered reconstruction should be considered only if a comprehensive evaluation supports it.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank repair](#)

I1

Inner-surface resin attack and normal-to-abnormal resin degradation

INTERNAL SURFACE AND CORROSION BARRIER



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

The resin-rich surface becomes dull, rough, soft, discolored, or locally depleted; normal aging must be separated from progressive damage.

WHY IT MATTERS

The corrosion barrier is the first protection for the structural laminate.

INSPECTION SHOULD CONFIRM

Exposure history, affected depth and area, material change, and progression.

POSSIBLE NEXT STEP

Restore the compatible inner surface when damage is shallow; deeper or widespread deterioration may require laminate repair, relining, or replacement.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank relining](#)

I2

Chemical attack of the corrosion barrier

INTERNAL SURFACE AND CORROSION BARRIER



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Whitening, amber discoloration, roughness, pitting, or softening spreads through the veil and resin-rich liner.

WHY IT MATTERS

Continued attack can reach structural laminate.

INSPECTION SHOULD CONFIRM

Chemical compatibility, operating history, barrier thickness, attack depth, and fiber exposure.

POSSIBLE NEXT STEP

Remove degraded material and rebuild a qualified compatible barrier, or reline or replace where attack is extensive.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank relining](#)

I3

Permeation and chemical absorption

INTERNAL SURFACE AND CORROSION BARRIER



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Diffuse discoloration, subsurface darkening, swelling, softness, or blistering indicates fluid or vapor movement into resin.

WHY IT MATTERS

Damage can extend beyond visible surface change.

INSPECTION SHOULD CONFIRM

Penetration depth, material-property change, affected area, chemical service, and structural involvement.

POSSIBLE NEXT STEP

Restore the barrier if effects are shallow and bounded; deeper permeation may require relining, laminate reconstruction, or replacement.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank relining](#)

I4 Veil erosion

INTERNAL SURFACE AND CORROSION BARRIER



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

The smooth surfacing veil is worn away, revealing coarser glass texture below.

WHY IT MATTERS

Loss of veil reduces the resin-rich protective layer.

INSPECTION SHOULD CONFIRM

Remaining barrier thickness, exposed reinforcement, affected area, and active erosion source.

POSSIBLE NEXT STEP

Mitigate the exposure and restore the compatible veil and corrosion barrier where surrounding laminate remains sound.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

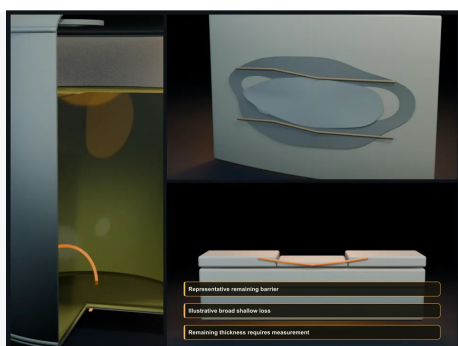
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank relining](#)

I5 Corrosion-barrier thinning, erosion, or washout

INTERNAL SURFACE AND CORROSION BARRIER



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

A worn channel or broad shallow area shows reduced liner thickness toward the structural laminate.

WHY IT MATTERS

Remaining chemical protection and service margin are reduced.

INSPECTION SHOULD CONFIRM

Residual barrier, structural-wall involvement, full extent, and continuing exposure.

POSSIBLE NEXT STEP

Rebuild the barrier or install a qualified reline after correcting the cause; widespread structural loss may require replacement.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

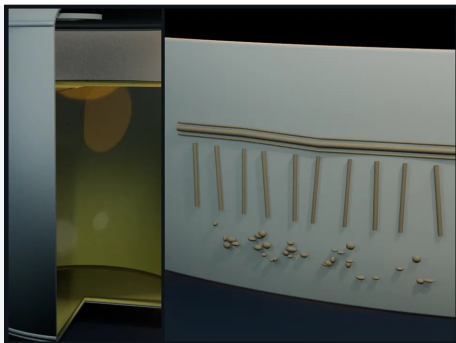
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank relining](#)

I6 Internal discoloration, staining, deposits, and loss of gloss

INTERNAL SURFACE AND CORROSION BARRIER



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Liquid-level rings, streaks, crystalline deposits, or dull zones record service exposure but may conceal the substrate.

WHY IT MATTERS

Visual appearance alone cannot establish remaining strength, and deposits may mask damage.

INSPECTION SHOULD CONFIRM

Condition after safe cleaning, substrate hardness and texture, cracking, and exposure history.

POSSIBLE NEXT STEP

Clean and reassess; repair only the confirmed underlying damage rather than treating staining itself as structural failure.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank relining](#)

I7 Craze and fine inner-surface cracks

INTERNAL SURFACE AND CORROSION BARRIER



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Dense networks of hairline cracks remain at or near the resin-rich surface.

WHY IT MATTERS

Crazing can become a pathway for deeper chemical entry.

INSPECTION SHOULD CONFIRM

Crack depth, distribution, growth, chemical exposure, and underlying laminate condition.

POSSIBLE NEXT STEP

Restore a compatible barrier where cracks are superficial; reconstruct deeper laminate where crazing has progressed.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

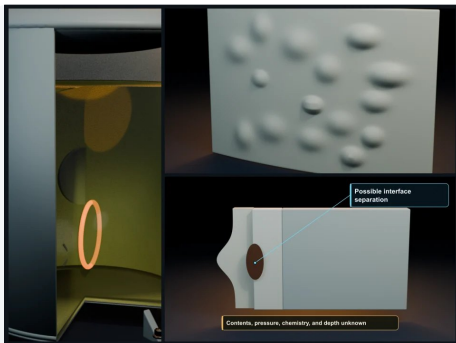
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank relining](#)

I8 Osmotic, chemical, gas, or vapor blistering

INTERNAL SURFACE AND CORROSION BARRIER



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Intact rounded or elongated blisters rise beneath the liner or inner surface.

WHY IT MATTERS

Blisters can rupture, expose reinforcement, or signal wider disbondment.

INSPECTION SHOULD CONFIRM

Number, size, depth, contents, interface, distribution, and surrounding bond condition.

POSSIBLE NEXT STEP

Remove and rebuild localized unsound blistered material; broad blistering may favor a qualified reline or replacement.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank relining](#)

I9 Blister rupture

INTERNAL SURFACE AND CORROSION BARRIER



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

An opened blister has curled resin edges and exposed glass or deeper laminate.

WHY IT MATTERS

The opening accelerates chemical entry and erosion.

INSPECTION SHOULD CONFIRM

Cavity depth, exposed fibers, surrounding blisters, chemical penetration, and structural involvement.

POSSIBLE NEXT STEP

Remove the ruptured and disbonded material and rebuild the compatible barrier or laminate after determining the full affected area.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank relining](#)

I10 Internal matrix or resin cracking

STRUCTURAL DAMAGE AND MATERIAL CHANGE



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

A distinct crack penetrates farther than crazing but may leave most fibers intact.

WHY IT MATTERS

Matrix cracks can connect to delamination or a leak path.

INSPECTION SHOULD CONFIRM

Depth, direction, fiber condition, delamination, growth, and initiating load.

POSSIBLE NEXT STEP

Correct the cause and perform engineered laminate restoration where damage is bounded; extensive cracking may require replacement.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank relining](#)

I11 Exposed glass fibers and fiber attack

INTERNAL SURFACE AND CORROSION BARRIER



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Pale reinforcement becomes visible, etched, softened, or frayed after resin loss.

WHY IT MATTERS

Direct process contact can degrade reinforcement and reduce structural capacity.

INSPECTION SHOULD CONFIRM

Fiber condition, damage depth, affected area, chemical exposure, and remaining wall.

POSSIBLE NEXT STEP

Remove attacked laminate and rebuild the barrier and structural plies, or reline or replace if damage is widespread.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

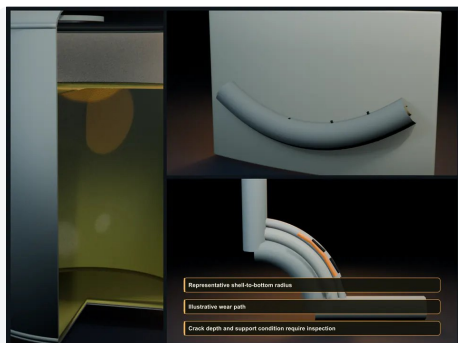
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank relining](#)

I12 Knuckle-radius erosion and cracking

STRUCTURAL DAMAGE AND MATERIAL CHANGE



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Veil loss, scoring, whitening, or cracks follow the internal shell-to-bottom radius.

WHY IT MATTERS

The knuckle is a critical geometric and load transition.

INSPECTION SHOULD CONFIRM

Crack depth, residual barrier, bottom support, settlement, and structural laminate.

POSSIBLE NEXT STEP

Correct support or abrasion causes, then rebuild the qualified knuckle barrier or laminate where reparability is established.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

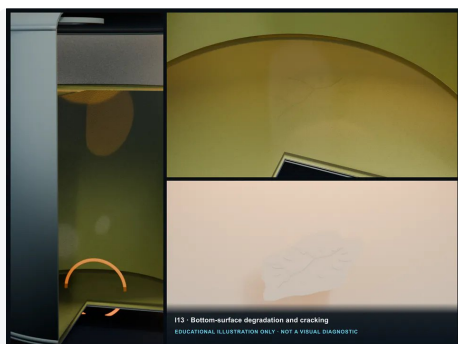
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank relining](#)

I13 Bottom-surface degradation and cracking

STRUCTURAL DAMAGE AND MATERIAL CHANGE



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Dullness, resin loss, deposits, and branching cracks affect the internal bottom.

WHY IT MATTERS

Bottom damage can progress unseen toward leakage or joint failure.

INSPECTION SHOULD CONFIRM

Foundation support, crack depth, wall loss, chemical attack, and bottom-to-shell condition.

POSSIBLE NEXT STEP

Correct the support condition and perform engineered bottom repair or relining; broad structural damage may require replacement.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

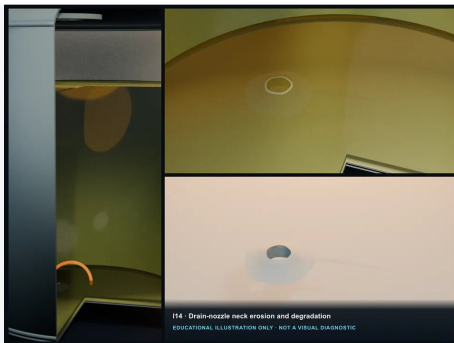
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank relining](#)

I14 Drain-nozzle neck erosion and degradation

INTERNAL CONNECTIONS AND HARDWARE



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Directional scoring, thinning, rough resin, or veil exposure affects the drain bore and transition.

WHY IT MATTERS

Concentrated damage at a drain can breach the connection or surrounding bottom.

INSPECTION SHOULD CONFIRM

Residual wall, flow path, chemical attack, bond integrity, and bottom involvement.

POSSIBLE NEXT STEP

Correct the erosive condition and rebuild or replace the drain and transition using a qualified compatible laminate system.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

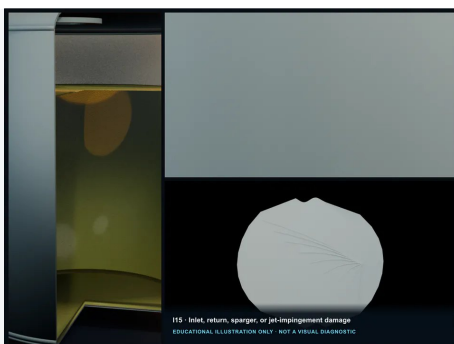
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[FRP tank nozzle and flange repair](#)

I15 Inlet, return, sparger, or jet-impingement damage

INTERNAL SURFACE AND CORROSION BARRIER



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

A fan-shaped or elongated wear patch forms directly opposite a nozzle or mixing device.

WHY IT MATTERS

Local erosion can rapidly thin the corrosion barrier.

INSPECTION SHOULD CONFIRM

Flow direction, exposure rate, depth, barrier remaining, and structural involvement.

POSSIBLE NEXT STEP

Modify the damaging flow condition where necessary and rebuild the affected barrier or laminate.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank relining](#)

I16 Internal abrasion

INTERNAL SURFACE AND CORROSION BARRIER



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Scrape marks, worn tracks, and roughened veil appear on the bottom or lower wall.

WHY IT MATTERS

Repeated wear removes resin and can expose or sever reinforcement.

INSPECTION SHOULD CONFIRM

Abrasion source, affected area and depth, fiber damage, and remaining wall.

POSSIBLE NEXT STEP

Mitigate the abrasion and restore compatible surface or laminate; widespread service exposure may justify a qualified protective reline.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

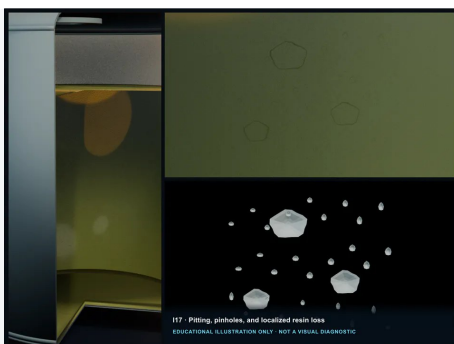
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank relining](#)

I17 Pitting, pinholes, and localized resin loss

INTERNAL SURFACE AND CORROSION BARRIER



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Small cavities or porous openings interrupt the inner resin surface.

WHY IT MATTERS

Pits can expose deeper laminate or form permeation and leak paths.

INSPECTION SHOULD CONFIRM

Whether openings are blind or through-wall, their density, depth, cause, and surrounding laminate condition.

POSSIBLE NEXT STEP

Remove and rebuild localized defective barrier; widespread pitting may require broader relining or replacement.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

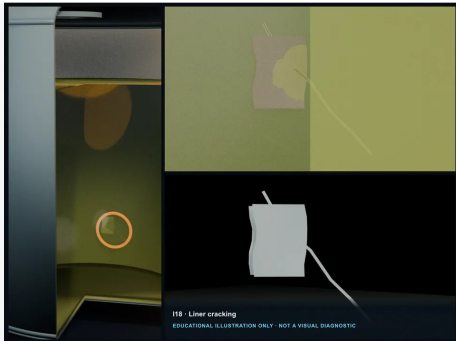
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank relining](#)

I18 Liner cracking

STRUCTURAL DAMAGE AND MATERIAL CHANGE



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

A defined crack opens through the corrosion liner while the structural wall may still appear intact.

WHY IT MATTERS

The protective liner is breached and process fluid can reach the structural laminate.

INSPECTION SHOULD CONFIRM

Crack depth, liner bond, structural-wall condition, cause, and affected extent.

POSSIBLE NEXT STEP

Reconstruct the localized liner or install a qualified reliner; repair must also address any underlying structural damage.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

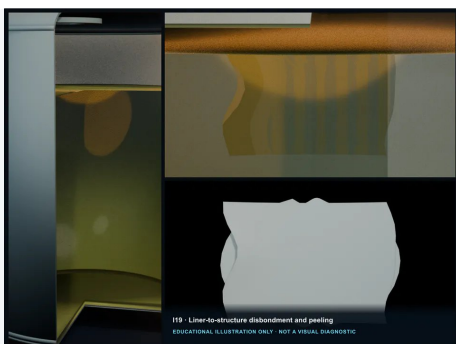
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank relining](#)

I19 Liner-to-structure disbondment and peeling

LAMINATE AND FABRICATION



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

The liner, coating, or reliner lifts, curls, flakes, or separates from the structural substrate.

WHY IT MATTERS

The separated liner no longer protects or transfers load uniformly.

INSPECTION SHOULD CONFIRM

Bonded area, substrate soundness, trapped fluid, compatibility, and full disbondment extent.

POSSIBLE NEXT STEP

Remove disbonded material and reliner only a qualified, properly prepared substrate; replace where substrate deterioration is too extensive.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank relining](#)

I20 Interlaminar delamination

LAMINATE AND FABRICATION



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

A raised or hollow area marks separation between internal wall plies.

WHY IT MATTERS

Separated plies cannot transfer load as intended.

INSPECTION SHOULD CONFIRM

Perimeter, depth, interfaces, moisture or chemical intrusion, and structural significance.

POSSIBLE NEXT STEP

Remove and rebuild localized delamination; deep or widespread separation may require major reconstruction or replacement.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

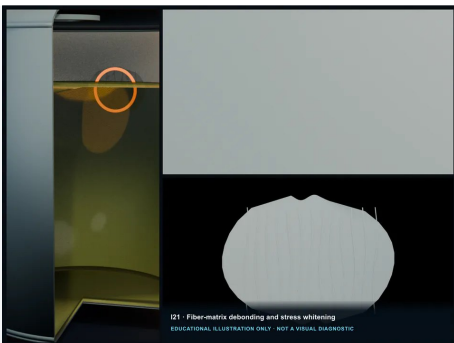
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank relining](#)

I21 Fiber-matrix debonding and stress whitening

LAMINATE AND FABRICATION



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Diffuse white regions indicate microscopic separation between resin and fibers, often near strain or cracking.

WHY IT MATTERS

Interface damage can reduce stiffness and precede cracks or fiber fracture, although whitening is not automatically rejectable.

INSPECTION SHOULD CONFIRM

Cause, depth, active load, fiber integrity, and associated delamination.

POSSIBLE NEXT STEP

Remove the load and rebuild confirmed damaged laminate when required by qualified evaluation.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

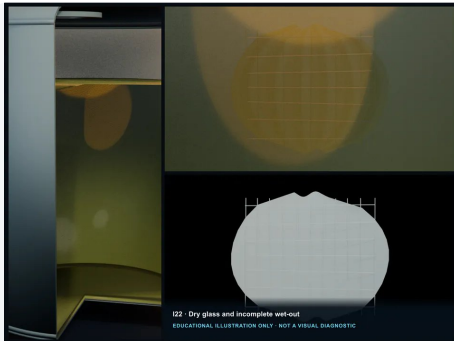
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank relining](#)

I22 Dry glass and incomplete wet-out

LAMINATE AND FABRICATION



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Cloudy white or opaque reinforcement remains insufficiently saturated with resin.

WHY IT MATTERS

The area has poor barrier continuity and interlaminar performance.

INSPECTION SHOULD CONFIRM

Size, depth, ply location, surface connection, and effect on chemical or structural service.

POSSIBLE NEXT STEP

Remove and rebuild unacceptable dry laminate; disposition of minor indications must follow the governing criteria.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank relining](#)

I23 Voids, air pockets, bubbles, and porosity

LAMINATE AND FABRICATION



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Irregular subsurface cavities or elongated air pockets interrupt the inner laminate.

WHY IT MATTERS

Voids can seed blistering, cracking, delamination, and leakage.

INSPECTION SHOULD CONFIRM

Size, density, depth, interfaces, surface connectivity, and location in the barrier or structural wall.

POSSIBLE NEXT STEP

Repair localized significant defects by qualified removal and reconstruction; widespread porosity may require broader reline or laminate replacement.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank relining](#)

I24 Resin starvation or resin-rich areas

LAMINATE AND FABRICATION



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Fiber-prominent matte zones or glossy amber resin pockets show an unbalanced resin-to-glass ratio.

WHY IT MATTERS

Starved areas are porous and exposed; resin-rich areas may be brittle and crack-prone.

INSPECTION SHOULD CONFIRM

Extent, reinforcement content, cracking, barrier continuity, and structural significance.

POSSIBLE NEXT STEP

Remove and rebuild materially deficient laminate according to qualified acceptance and design criteria.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

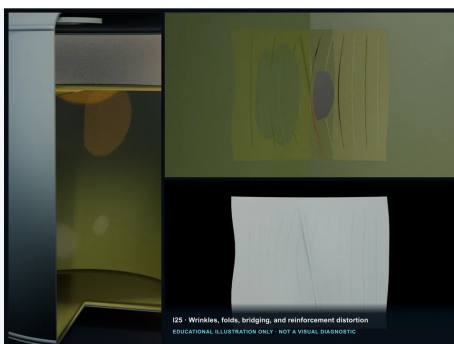
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank relining](#)

I25 Wrinkles, folds, bridging, and reinforcement distortion

LAMINATE AND FABRICATION



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Folded fibers, bridged hollows, and resin pockets disrupt the intended laminate path.

WHY IT MATTERS

The defect can create thin spots, voids, weak directions, and concentrated stress.

INSPECTION SHOULD CONFIRM

Ply geometry, missing thickness, affected area, voiding, and load orientation.

POSSIBLE NEXT STEP

Reconstruct localized defective laminate or provide engineered reinforcement only where the original design and surrounding material support it.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

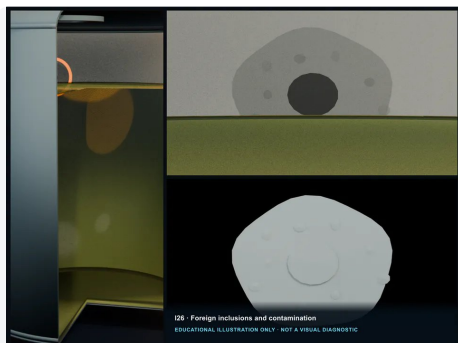
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank relining](#)

I26 Foreign inclusions and contamination

LAMINATE AND FABRICATION



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

A trapped dark or cloudy inclusion, often with nearby voids, lies beneath the resin surface.

WHY IT MATTERS

Contamination can weaken adhesion, cure, and chemical resistance.

INSPECTION SHOULD CONFIRM

Material, dimensions, depth, affected interface, and whether a structural or barrier bond is interrupted.

POSSIBLE NEXT STEP

Remove contaminated laminate and rebuild the area where qualified criteria require correction.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

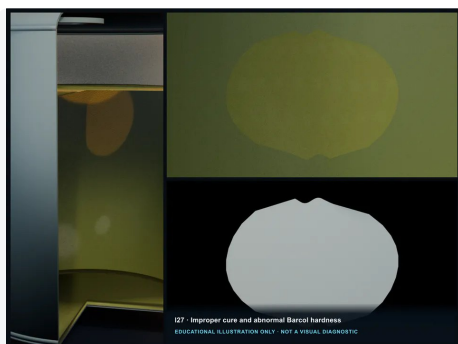
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank relining](#)

I27 Improper cure and abnormal Barcol hardness

LAMINATE AND FABRICATION



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Softness, uneven gloss, amber discoloration, impressions, burn marks, shrink cracks, voids, or delamination indicate abnormal cure.

WHY IT MATTERS

Chemical resistance and structural properties may be inadequate.

INSPECTION SHOULD CONFIRM

Hardness pattern, affected depth and area, resin condition, service exposure, and related defects.

POSSIBLE NEXT STEP

Remove and rebuild unsound undercured or exotherm-damaged laminate unless a qualified material evaluation supports another disposition.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

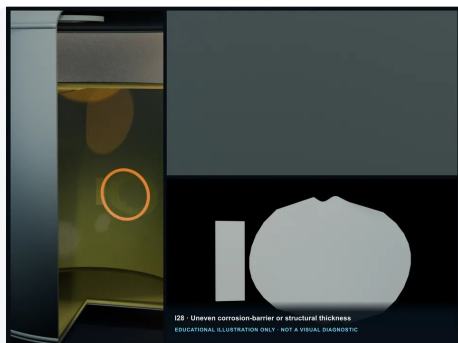
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank relining](#)

I28 Uneven corrosion-barrier or structural thickness

LAMINATE AND FABRICATION



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

The liner tapers abnormally, veil is missing, or structural plies are locally thin.

WHY IT MATTERS

Chemical life and structural capacity can both be reduced.

INSPECTION SHOULD CONFIRM

Actual barrier and wall thickness, missing plies, affected area, design loads, and service exposure.

POSSIBLE NEXT STEP

Restore the barrier and add engineered structural reinforcement where supported by the design basis; widespread deficiency may require replacement.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

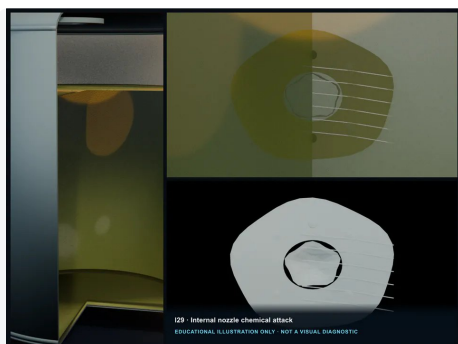
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank relining](#)

I29 Internal nozzle chemical attack

INTERNAL CONNECTIONS AND HARDWARE



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

The nozzle bore, flange face, neck, or transition becomes rough, discolored, pitted, or veil-exposed.

WHY IT MATTERS

Nozzle geometry concentrates both process exposure and external piping load.

INSPECTION SHOULD CONFIRM

Damage depth, remaining wall, bond condition, flow pattern, chemistry, and external loads.

POSSIBLE NEXT STEP

Rebuild the compatible nozzle liner or replace the nozzle and transition where deterioration is too deep or extensive.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

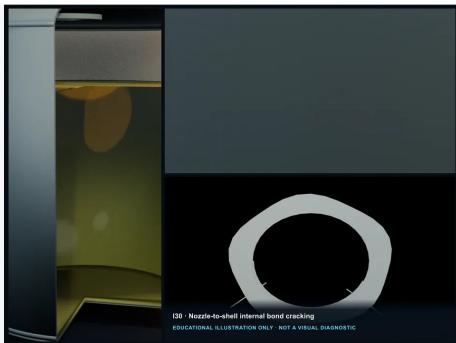
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[FRP tank nozzle and flange repair](#)

I30 Nozzle-to-shell internal bond cracking

INTERNAL CONNECTIONS AND HARDWARE



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

A crescent crack and radial branches form at the internal nozzle fillet or secondary bond.

WHY IT MATTERS

Cracking can compromise the liner, bond, and containment path.

INSPECTION SHOULD CONFIRM

Depth, circumference, bond integrity, external pipe loads, and surrounding shell condition.

POSSIBLE NEXT STEP

Correct connection loads and rebuild the bond or nozzle under a qualified repair design.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[FRP tank nozzle and flange repair](#)

I31 Internal nozzle or manway delamination

INTERNAL CONNECTIONS AND HARDWARE



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

The neck, repad, transition, or field laminate lifts or separates between plies or from the parent wall.

WHY IT MATTERS

The penetration may lose structural continuity and barrier protection.

INSPECTION SHOULD CONFIRM

Interface, extent, substrate condition, load path, and related cracking.

POSSIBLE NEXT STEP

Remove and rebuild the affected secondary laminate or replace the connection when the parent structure cannot support repair.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[FRP tank nozzle and flange repair](#)

I32 Manway internal-surface degradation

INTERNAL CONNECTIONS AND HARDWARE



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Scuffing, rough edge sealing, chemical staining, chips, or transition cracking affects the manway interior.

WHY IT MATTERS

Damage occurs at a large opening and may extend beneath the cover or into the shell bond.

INSPECTION SHOULD CONFIRM

Neck and flange condition, edge sealing, crack depth, bond integrity, and access-related damage.

POSSIBLE NEXT STEP

Restore compatible sealing and laminate or rebuild the manway connection where required.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

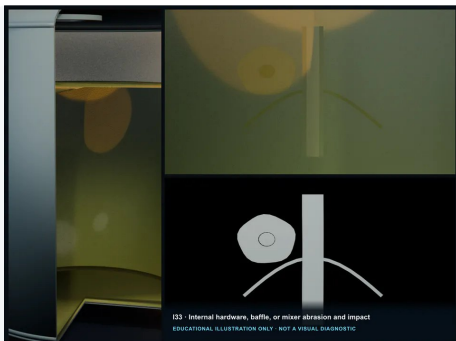
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[FRP tank nozzle and flange repair](#)

I33 Internal hardware, baffle, or mixer abrasion and impact

INTERNAL CONNECTIONS AND HARDWARE



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Rub tracks, impact marks, whitening, or cracking aligns with a loose or moving internal component.

WHY IT MATTERS

Repeated contact can damage both the hardware attachment and tank wall or bottom.

INSPECTION SHOULD CONFIRM

Hardware stability, contact path, attachment bond, wall damage, and cyclic loading.

POSSIBLE NEXT STEP

Secure, modify, or replace the responsible component and reconstruct affected tank laminate under qualified design.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank relining](#)

I34 Radial, axial, circumferential, or helical structural cracks

STRUCTURAL DAMAGE AND MATERIAL CHANGE



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Larger cracks follow load paths around penetrations, transitions, supports, or principal shell stresses.

WHY IT MATTERS

Orientation can signal structural involvement beyond the inner liner.

INSPECTION SHOULD CONFIRM

Direction, depth, length, fiber breakage, delamination, growth, and initiating load.

POSSIBLE NEXT STEP

Correct the load and perform engineered structural reconstruction or replace the affected section where remaining laminate is insufficient.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

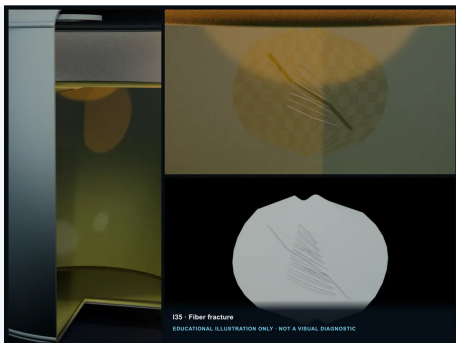
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank relining](#)

I35 Fiber fracture

STRUCTURAL DAMAGE AND MATERIAL CHANGE



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Broken glass bundles cross a crack or damaged zone rather than remaining continuous.

WHY IT MATTERS

Reinforcement capacity has been directly lost.

INSPECTION SHOULD CONFIRM

Fracture area, ply orientations, remaining wall, connected delamination, and load history.

POSSIBLE NEXT STEP

An engineered structural rebuild may be possible when localized; extensive fiber fracture generally favors component or tank replacement.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

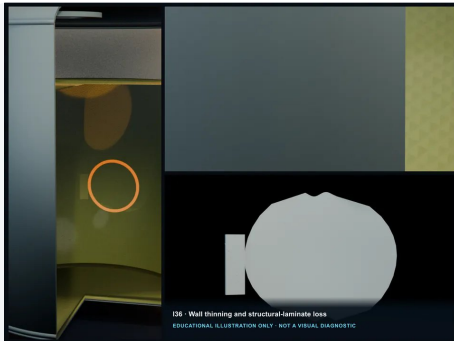
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank relining](#)

I36 Wall thinning and structural-laminate loss

STRUCTURAL DAMAGE AND MATERIAL CHANGE



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

A broad internal depression shows loss beyond the corrosion barrier into structural plies.

WHY IT MATTERS

Effective load-carrying wall thickness is reduced.

INSPECTION SHOULD CONFIRM

Remaining thickness, full area, fiber condition, design loads, and active deterioration source.

POSSIBLE NEXT STEP

Restore structure and barrier under an engineered repair or relined design when localized; widespread wall loss may require replacement.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank relining](#)

I37 Swelling, softening, embrittlement, or dimensional change

STRUCTURAL DAMAGE AND MATERIAL CHANGE



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Resin becomes swollen and soft or dry, brittle, and shrink-cracked, with local dimensional change.

WHY IT MATTERS

Changed material properties create secondary stress and uncertain remaining performance.

INSPECTION SHOULD CONFIRM

Affected depth and area, chemical and temperature history, fiber condition, and structural involvement.

POSSIBLE NEXT STEP

Remove altered laminate and rebuild or relined if bounded; deep or widespread material change may require replacement.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

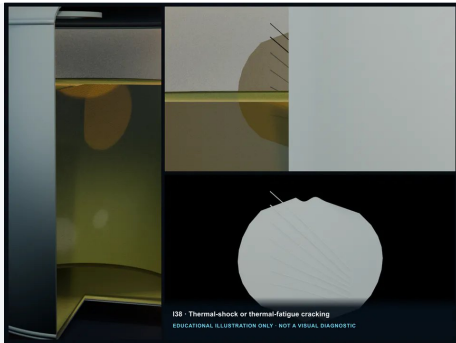
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank relining](#)

I38 Thermal-shock or thermal-fatigue cracking

STRUCTURAL DAMAGE AND MATERIAL CHANGE



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Closely spaced cracks develop along a temperature-transition zone, often progressing from hairlines to a longer crack.

WHY IT MATTERS

Thermal cycling can damage the liner, resin, bonds, and laminate interfaces.

INSPECTION SHOULD CONFIRM

Temperature history, crack depth, interface damage, affected area, and continuing operating cycle.

POSSIBLE NEXT STEP

Correct the thermal transition and rebuild damaged barrier or laminate under a qualified repair design.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank relining](#)

I39 Mechanical fatigue cracking

STRUCTURAL DAMAGE AND MATERIAL CHANGE



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Multiple progressively sized cracks and a possible delamination halo appear at a cyclic stress location.

WHY IT MATTERS

Damage may continue growing even when no single overload occurred.

INSPECTION SHOULD CONFIRM

Cycle history, crack growth, delamination, fiber condition, and load source.

POSSIBLE NEXT STEP

Eliminate or reduce the cyclic load and perform engineered repair or replacement based on remaining laminate.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank relining](#)

I40 Internal repair or reline failure

LAMINATE AND FABRICATION



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

A newer patch, coating, or liner blisters, cracks, lifts, peels, disbonds, or leaks.

WHY IT MATTERS

The repair can conceal continuing attack or transfer damage to adjacent laminate.

INSPECTION SHOULD CONFIRM

Original failure, substrate soundness, bond extent, compatibility, cure, and service exposure.

POSSIBLE NEXT STEP

Remove the failed system, reassess the substrate, and redesign the repair or reline-or replace the tank-using qualified materials and engineering.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

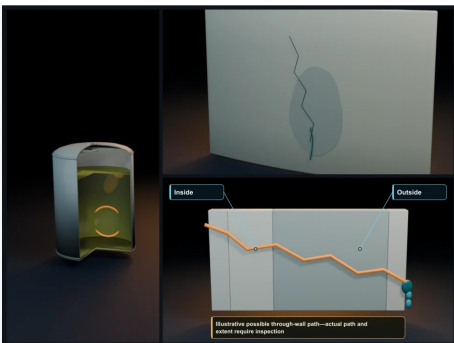
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank relining](#)

I41 Through-wall crack and seepage

CONTAINMENT AND CATASTROPHIC FAILURE



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

An internal crack crosses the complete wall and appears externally as a damp spot or slow weep.

WHY IT MATTERS

Both barrier and structural containment have been breached.

INSPECTION SHOULD CONFIRM

Safe isolation, crack and wetting extent, surrounding wall, root cause, and remaining capacity.

POSSIBLE NEXT STEP

Keep the tank out of service until an engineered repair, reline, major reconstruction, or replacement is selected.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

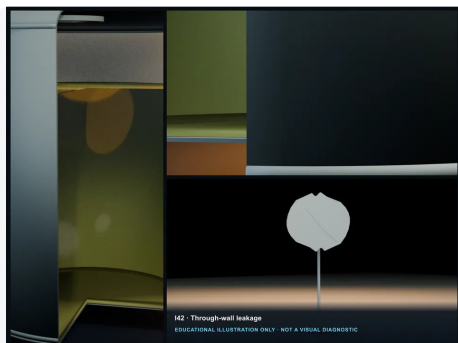
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank relining](#)

I42 Through-wall leakage

CONTAINMENT AND CATASTROPHIC FAILURE



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

A continuous liquid stream passes through a degraded or cracked lower-shell or bottom area.

WHY IT MATTERS

Active containment loss can enlarge and expose surrounding equipment and personnel.

INSPECTION SHOULD CONFIRM

Leak path, total degraded area, chemical exposure, structural wall condition, and event progression.

POSSIBLE NEXT STEP

Isolate and make safe; repair only under an engineered scope, with relining or replacement considered where deterioration is extensive.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

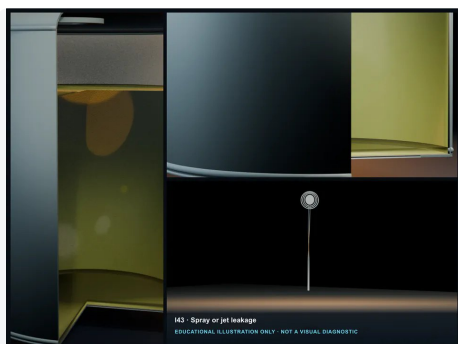
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank relining](#)

I43 Spray or jet leakage

CONTAINMENT AND CATASTROPHIC FAILURE



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Liquid head or pressure drives a narrow energetic release through a hole or crack.

WHY IT MATTERS

The release indicates a complete containment breach and may be hazardous at a distance.

INSPECTION SHOULD CONFIRM

Safe isolation, pressure or liquid head, opening geometry, surrounding damage, and root cause.

POSSIBLE NEXT STEP

Keep the tank out of service; select engineered reconstruction or replacement only after full damage assessment.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

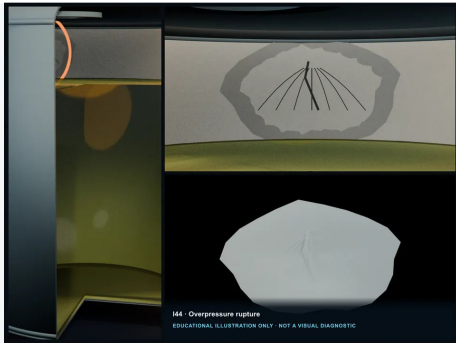
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank relining](#)

I44 Overpressure rupture

CONTAINMENT AND CATASTROPHIC FAILURE



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

Outward bulging, stretched laminate, radial cracking, or a developing split follows excessive internal pressure.

WHY IT MATTERS

The load may have exceeded the intended capability of the whole tank.

INSPECTION SHOULD CONFIRM

Pressure event, venting, shell and roof deformation, fiber damage, and global geometry.

POSSIBLE NEXT STEP

Correct the pressure and venting cause; extensive rupture generally requires replacement, while any reconstruction needs a complete engineering basis.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

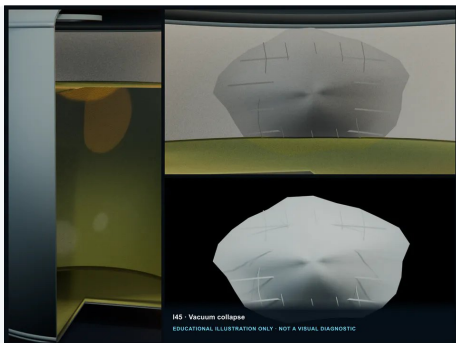
LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank relining](#)

I45 Vacuum collapse

CONTAINMENT AND CATASTROPHIC FAILURE



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

The shell or roof pulls inward with compressed liner wrinkles and buckle ridges.

WHY IT MATTERS

Global instability can damage multiple plies, nozzles, roof, and shell geometry.

INSPECTION SHOULD CONFIRM

Venting event, full deformation, cracking, delamination, and remaining structural shape.

POSSIBLE NEXT STEP

Correct the vacuum cause and obtain engineered disposition; major collapse commonly points toward large reconstruction or replacement.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

LOCATION / PHOTO ID / NOTE

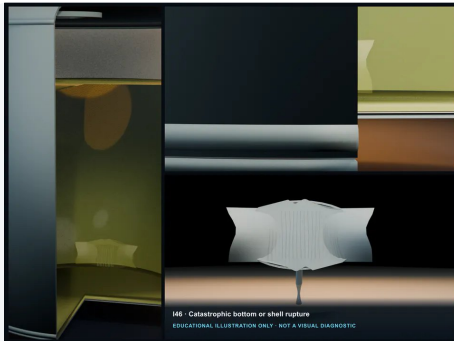
[Inspection support](#)

[Fiberglass tank relining](#)

I46

Catastrophic bottom or shell rupture

CONTAINMENT AND CATASTROPHIC FAILURE



EDUCATIONAL ILLUSTRATION - APPEARANCE AND SCALE VARY

WHAT YOU MAY NOTICE

A large opening with peeled laminate layers, broken glass bundles, and separated corrosion barrier causes a major release.

WHY IT MATTERS

Primary containment and structural continuity are lost.

INSPECTION SHOULD CONFIRM

Event cause, complete tank and foundation damage, connections, and whether any material remains reusable.

POSSIBLE NEXT STEP

Replacement is generally the primary consideration; exceptional reconstruction requires comprehensive qualified engineering.

FIELD RECORD

☐ Observed ☐ Not observed ☐ Needs review

LOCATION / PHOTO ID / NOTE

[Inspection support](#)

[Fiberglass tank relining](#)

ATLAS REVIEW COMPLETE

Turn observations into traceable records.

Transfer every observed condition to the observation register with a precise location, photograph ID, visible extent, comparison with prior records, and follow-up status. Use qualified evaluation to confirm the condition and its significance.

Need help with the next step?

Plastech provides fiberglass tank inspection, repair planning, localized repair, relining, nozzle and flange work, onsite FRP services, and underground storage tank support.

[Schedule a fiberglass tank inspection](#)

[Request a project review](#)

AST SUPPLEMENT

Aboveground storage tank

Aboveground tanks expose the exterior laminate, supports, attachments, and connections to weather, process spills, mechanical loads, and foundation movement. Photograph the whole tank from fixed viewpoints before recording close details.

FOCUSED CHECKLIST

- ☐ Foundation settlement, cracking, drainage, and support continuity
- ☐ Bottom-edge and lower-knuckle condition
- ☐ Shell plumbness, roundness, bulging, or buckling
- ☐ Anchor lugs, hold-downs, saddles, skirts, and metallic hardware
- ☐ UV exposure, weathering, exterior resin condition, and fiber blooming
- ☐ Nozzle loading from piping, valves, equipment, and thermal movement
- ☐ Roof, vent, overflow, mixer, ladder, platform, and handrail attachments
- ☐ Secondary containment staining, standing liquid, and drainage
- ☐ Flood, uplift, wind, freeze, fire, heat, or seismic history
- ☐ Prior repairs, overlaminates, and recurring locations

SUPPLEMENT NOTES / RECORD REFERENCES

UST SUPPLEMENT

Underground storage tank

Much of an underground tank may be inaccessible during a routine walkdown. Document accessible components and available records without assuming the condition of buried surfaces. The method, testing scope, access plan, and acceptance basis must fit the tank and service.

FOCUSED CHECKLIST

- ☐ Accessible risers, sumps, vaults, covers, and penetrations
- ☐ Fill, vent, withdrawal, and monitoring connections
- ☐ Settlement, movement, loading, or damage at accessible piping
- ☐ Groundwater, flood, uplift, or flotation history
- ☐ Leak-detection or monitoring records
- ☐ Product inventory or reconciliation concerns
- ☐ Access or excavation history
- ☐ Prior lining, relining, patching, or nozzle work
- ☐ Available installation, backfill, anchorage, and test records
- ☐ Buried or inaccessible surfaces identified as not accessible

SUPPLEMENT NOTES / RECORD REFERENCES

TANKER SUPPLEMENT

FRP tanker trailer

A tanker trailer combines chemical service with cyclic road loading, vibration, impact exposure, repeated filling and emptying, and equipment connections. This supplement supports documentation and does not replace manufacturer, carrier, inspection, testing, or regulatory requirements.

FOCUSED CHECKLIST

- ☐ Overall shell shape and exterior laminate
- ☐ Impact, abrasion, gouging, stress whitening, and exposed fibers
- ☐ Saddles, frame interfaces, supports, and attachment points
- ☐ Manways, hatches, gaskets, covers, and fasteners
- ☐ Inlets, outlets, valves, vents, hoses, and connected piping
- ☐ Baffles and internal attachments, when inspection is authorized
- ☐ Road-debris, tire, jackknife, rollover, and collision damage
- ☐ UV and weather exposure
- ☐ Cargo compatibility, cleaning history, and temperature history
- ☐ Prior repairs and recurring conditions

SUPPLEMENT NOTES / RECORD REFERENCES

PHOTOGRAPH LOG

Build a sequence that explains the tank, location, and detail.

Take an overall view for orientation, a medium view for the component and fixed features, and a close view for the condition. Preserve the original file and record annotations separately.

PHOTO 01	PHOTO ID / FILE NAME	TANK ID	EXTERIOR / INTERIOR
	COMPONENT AND PRECISE LOCATION	CONDITION ID	VIEW / DIRECTION
CAPTION / SHORT NOTE			

PHOTO 02	PHOTO ID / FILE NAME	TANK ID	EXTERIOR / INTERIOR
	COMPONENT AND PRECISE LOCATION	CONDITION ID	VIEW / DIRECTION
CAPTION / SHORT NOTE			

PHOTO 03	PHOTO ID / FILE NAME	TANK ID	EXTERIOR / INTERIOR
	COMPONENT AND PRECISE LOCATION	CONDITION ID	VIEW / DIRECTION
CAPTION / SHORT NOTE			

PHOTO 04	PHOTO ID / FILE NAME	TANK ID	EXTERIOR / INTERIOR
	COMPONENT AND PRECISE LOCATION	CONDITION ID	VIEW / DIRECTION
CAPTION / SHORT NOTE			

PHOTOGRAPH LOG

Photograph log / continued

Use the same file naming, location, and view conventions throughout the inspection record.

PHOTO 05	PHOTO ID / FILE NAME	TANK ID	EXTERIOR / INTERIOR
	COMPONENT AND PRECISE LOCATION	CONDITION ID	VIEW / DIRECTION
CAPTION / SHORT NOTE			

PHOTO 06	PHOTO ID / FILE NAME	TANK ID	EXTERIOR / INTERIOR
	COMPONENT AND PRECISE LOCATION	CONDITION ID	VIEW / DIRECTION
CAPTION / SHORT NOTE			

PHOTO 07	PHOTO ID / FILE NAME	TANK ID	EXTERIOR / INTERIOR
	COMPONENT AND PRECISE LOCATION	CONDITION ID	VIEW / DIRECTION
CAPTION / SHORT NOTE			

PHOTO 08	PHOTO ID / FILE NAME	TANK ID	EXTERIOR / INTERIOR
	COMPONENT AND PRECISE LOCATION	CONDITION ID	VIEW / DIRECTION
CAPTION / SHORT NOTE			

PHOTOGRAPH LOG

Photograph log / continued

Use the same file naming, location, and view conventions throughout the inspection record.

PHOTO 09	PHOTO ID / FILE NAME	TANK ID	EXTERIOR / INTERIOR
	COMPONENT AND PRECISE LOCATION	CONDITION ID	VIEW / DIRECTION
CAPTION / SHORT NOTE			

PHOTO 10	PHOTO ID / FILE NAME	TANK ID	EXTERIOR / INTERIOR
	COMPONENT AND PRECISE LOCATION	CONDITION ID	VIEW / DIRECTION
CAPTION / SHORT NOTE			

PHOTO 11	PHOTO ID / FILE NAME	TANK ID	EXTERIOR / INTERIOR
	COMPONENT AND PRECISE LOCATION	CONDITION ID	VIEW / DIRECTION
CAPTION / SHORT NOTE			

PHOTO 12	PHOTO ID / FILE NAME	TANK ID	EXTERIOR / INTERIOR
	COMPONENT AND PRECISE LOCATION	CONDITION ID	VIEW / DIRECTION
CAPTION / SHORT NOTE			

PHOTOGRAPH LOG

Photograph log / continued

Use the same file naming, location, and view conventions throughout the inspection record.

PHOTO 13	PHOTO ID / FILE NAME	TANK ID	EXTERIOR / INTERIOR
	COMPONENT AND PRECISE LOCATION	CONDITION ID	VIEW / DIRECTION
CAPTION / SHORT NOTE			

PHOTO 14	PHOTO ID / FILE NAME	TANK ID	EXTERIOR / INTERIOR
	COMPONENT AND PRECISE LOCATION	CONDITION ID	VIEW / DIRECTION
CAPTION / SHORT NOTE			

PHOTO 15	PHOTO ID / FILE NAME	TANK ID	EXTERIOR / INTERIOR
	COMPONENT AND PRECISE LOCATION	CONDITION ID	VIEW / DIRECTION
CAPTION / SHORT NOTE			

PHOTO 16	PHOTO ID / FILE NAME	TANK ID	EXTERIOR / INTERIOR
	COMPONENT AND PRECISE LOCATION	CONDITION ID	VIEW / DIRECTION
CAPTION / SHORT NOTE			

OBSERVATION REGISTER

Turn each visible condition into a traceable record.

Assign a record number, precise location, condition ID when useful, photograph references, surface state, comparison, and follow-up. This register organizes communication; it does not assign a structural rating or fitness-for-service decision.

OBS 01	CONDITION / LOCATION	PHOTO IDS	STATUS / FOLLOW-UP
	WHAT IS VISIBLE / EXTENT / COMPARISON / ACTION		
OBS 02	CONDITION / LOCATION	PHOTO IDS	STATUS / FOLLOW-UP
	WHAT IS VISIBLE / EXTENT / COMPARISON / ACTION		
OBS 03	CONDITION / LOCATION	PHOTO IDS	STATUS / FOLLOW-UP
	WHAT IS VISIBLE / EXTENT / COMPARISON / ACTION		
OBS 04	CONDITION / LOCATION	PHOTO IDS	STATUS / FOLLOW-UP
	WHAT IS VISIBLE / EXTENT / COMPARISON / ACTION		
OBS 05	CONDITION / LOCATION	PHOTO IDS	STATUS / FOLLOW-UP
	WHAT IS VISIBLE / EXTENT / COMPARISON / ACTION		
OBS 06	CONDITION / LOCATION	PHOTO IDS	STATUS / FOLLOW-UP
	WHAT IS VISIBLE / EXTENT / COMPARISON / ACTION		
OBS 07	CONDITION / LOCATION	PHOTO IDS	STATUS / FOLLOW-UP
	WHAT IS VISIBLE / EXTENT / COMPARISON / ACTION		

OBSERVATION REGISTER

Observation register / continued

Continue the same neutral language and traceable references.

OBS 08	CONDITION / LOCATION	PHOTO IDS	STATUS / FOLLOW-UP
	WHAT IS VISIBLE / EXTENT / COMPARISON / ACTION 		
OBS 09	CONDITION / LOCATION	PHOTO IDS	STATUS / FOLLOW-UP
	WHAT IS VISIBLE / EXTENT / COMPARISON / ACTION 		
OBS 10	CONDITION / LOCATION	PHOTO IDS	STATUS / FOLLOW-UP
	WHAT IS VISIBLE / EXTENT / COMPARISON / ACTION 		
OBS 11	CONDITION / LOCATION	PHOTO IDS	STATUS / FOLLOW-UP
	WHAT IS VISIBLE / EXTENT / COMPARISON / ACTION 		
OBS 12	CONDITION / LOCATION	PHOTO IDS	STATUS / FOLLOW-UP
	WHAT IS VISIBLE / EXTENT / COMPARISON / ACTION 		
OBS 13	CONDITION / LOCATION	PHOTO IDS	STATUS / FOLLOW-UP
	WHAT IS VISIBLE / EXTENT / COMPARISON / ACTION 		
OBS 14	CONDITION / LOCATION	PHOTO IDS	STATUS / FOLLOW-UP
	WHAT IS VISIBLE / EXTENT / COMPARISON / ACTION 		

OBSERVATION REGISTER

Observation register / continued

Continue the same neutral language and traceable references.

OBS 15	CONDITION / LOCATION	PHOTO IDS	STATUS / FOLLOW-UP
	WHAT IS VISIBLE / EXTENT / COMPARISON / ACTION 		
OBS 16	CONDITION / LOCATION	PHOTO IDS	STATUS / FOLLOW-UP
	WHAT IS VISIBLE / EXTENT / COMPARISON / ACTION 		
OBS 17	CONDITION / LOCATION	PHOTO IDS	STATUS / FOLLOW-UP
	WHAT IS VISIBLE / EXTENT / COMPARISON / ACTION 		
OBS 18	CONDITION / LOCATION	PHOTO IDS	STATUS / FOLLOW-UP
	WHAT IS VISIBLE / EXTENT / COMPARISON / ACTION 		
OBS 19	CONDITION / LOCATION	PHOTO IDS	STATUS / FOLLOW-UP
	WHAT IS VISIBLE / EXTENT / COMPARISON / ACTION 		
OBS 20	CONDITION / LOCATION	PHOTO IDS	STATUS / FOLLOW-UP
	WHAT IS VISIBLE / EXTENT / COMPARISON / ACTION 		
OBS 21	CONDITION / LOCATION	PHOTO IDS	STATUS / FOLLOW-UP
	WHAT IS VISIBLE / EXTENT / COMPARISON / ACTION 		

REPAIR READINESS

Prepare a complete record before scope development.

A complete condition record helps the owner, inspector, engineer, manufacturer, and repair contractor understand the asset. Repair planning should address the mechanism, affected area, compatibility, laminate requirements, connected loads, access, cure, inspection, documentation, and return-to-service requirements.

- ☐ Tank identification and drawings
- ☐ Manufacturer and laminate information
- ☐ Current and historical product
- ☐ Chemical concentration and contaminants
- ☐ Operating and design temperatures
- ☐ Operating and design pressure or vacuum
- ☐ Specific gravity and liquid level
- ☐ Agitation, flow, solids, abrasion, and impingement
- ☐ Venting and overflow configuration
- ☐ Condition map and observation records
- ☐ Original, unedited photographs

PAGE NOTES / PHOTO IDS / FOLLOW-UP

REPAIR READINESS

Prepare a complete record before scope development. / continued

Continue the same route and documentation method. Record location, photographs, extent, comparison, and follow-up for every observed condition.

- ☐ Measurements and test records from qualified personnel
- ☐ Prior inspection, repair, and reline records
- ☐ Connected piping, valve, equipment, and thermal-movement information
- ☐ Foundation, anchorage, support, and settlement information
- ☐ Facility-controlled access and site-work requirements
- ☐ Required quality records and acceptance basis
- ☐ Required project schedule and outage window

PAGE NOTES / PHOTO IDS / FOLLOW-UP

NEXT-STEP DIRECTORY

Match the observation to the right Plastech service.

Share drawings, service conditions, operating history, photographs, and inspection records. Plastech can help facilities plan the next step for inspection, localized repair, broader relining, nozzle or flange work, onsite FRP service, underground tanks, connected piping, or urgent response after site controls are active.

Inspection and reports

Plan project-specific condition assessment, documentation, and repair planning.

[Fiberglass tank inspection](#)

Tank repair

Discuss localized shell, bottom, roof, support, connection, or laminate damage.

[Fiberglass tank repair](#)

Tank relining

Evaluate broader corrosion-barrier deterioration and internal relining needs.

[Fiberglass tank relining](#)

Nozzle and flange repair

Address reinforced openings, flange faces, nozzle necks, manways, vents, and fittings.

[FRP tank nozzle and flange repair](#)

Onsite FRP services

Coordinate field evaluation, repair, modification, reinforcement, or installation.

[Onsite FRP services](#)

Underground tanks

Explore UST repair, relining, modification, and accessible-component support.

[Underground tank repair and relining](#)

Fiberglass piping

Review connected FRP pipe repair, modification, and installation needs.

[Fiberglass pipe repair](#)

Emergency response

Contact Plastech after facility emergency and site-control procedures are active.

[Emergency response services](#)

TALK WITH PLASTECH

Industrial FRP inspection, repair planning, repair, relining, and field service support.

[\(410\) 737-4700](tel:(410)737-4700)

www.plastechservices.com

[Request a project review](#)

FURTHER READING

Published references for project-specific review.

Standards and regulations apply only within their stated scope, and editions can change. Confirm the requirements that govern the actual tank, stored product, location, and project.

- 01 [ASTM D3299 - FRP corrosion-resistant tanks](#)
- 02 [ASME RTP-1 - Reinforced thermoset plastic equipment](#)
- 03 [ASTM C582 - Contact-molded corrosion-resistant laminates](#)
- 04 [ASTM C581 - Chemical resistance of thermosetting resins](#)
- 05 [ASTM E1067/E1067M - Acoustic emission examination of FRP tanks](#)
- 06 [FRPI standards and AST inspector resources](#)
- 07 [OSHA 29 CFR 1910.146 - Permit-required confined spaces](#)
- 08 [U.S. EPA underground storage tank requirements](#)
- 09 [U.S. Bureau of Reclamation - Condition Assessment of FRP Composite Pipe and Tanks](#)
- 10 [U.S. DOT cargo tank specifications](#)
- 11 [Transport Canada - CSA B620 highway tanks and portable tanks](#)

Use with qualified judgment

This workbook supports inspection planning, consistent documentation, and clearer communication. It does not replace the tank manufacturer's instructions, facility procedures, applicable standards, regulatory requirements, or asset-specific engineering and inspection decisions.