

Cryogenic Liquid Tank Fabrication, Erection & Inspection Guide

Overview of Factory Prefabrication and Field Construction



FACTORY WORK



Material traceability and verification



Cutting and edge preparation



Forming and rolling



Prefabrication and sub-assembly



Dimensional checks and fit-up



FIELD WORK



Foundation and civil acceptance



Bottom assembly and installation



Shell plate erection



Roof construction



Welding and NDT



Insulation installation



System integration and testing



Plate Processing & Prefabrication

From Raw Material to Formed Tank Shell Segments

01 Material Inspection



Verify material certificate, heat traceability, plate dimensions and surface condition.



02 Cutting and Bevel Preparation



Cut plates to required shape and prepare weld bevels according to joint design and WPS.



03 Plate Forming



Cold forming of shell plates to required curvature, with shape control and edge roundness check.



04 Dimensional Inspection



Check plate curvature, dimensions and fit-up to ensure compliance with design requirements.



Key Inspection Items

Inspection Item	Content	Purpose	Reference Basis
Material Identity	Material Certificate / Heat Traceability	Confirm material grade and traceability	Approved specification and project requirements
Plate Dimensions	Length, width, thickness	Ensure compliance with design drawings	Approved drawings
Forming Geometry	Curvature / Fit-Up	Verify forming quality and assembly fit	Approved drawings
Weld Preparation	Bevel angle, land, root face	Meet joint design and WPS requirements	Joint drawing / WPS
Surface Condition	Surface quality, defects, repairs	Ensure suitability for fabrication and welding	Approved fabrication procedure



Fabrication Control

All fabrication activities, including material handling, cutting, forming and weld preparation, shall be carried out in accordance with approved specifications, drawings and welding procedures, with documented inspection and traceability.

Foundation & Tank Erection

Step-by-Step Construction for Cryogenic Liquid Storage Tanks

01 Foundation Acceptance

Completed foundation with verified dimensions, elevation and anchor arrangement.



02 Bottom Plate Installation

Bottom plates are assembled according to design layout with proper fit-up and welding.



03 Shell Erection

Prefabricated shell plates are lifted and assembled in courses with temporary support.



04 Roof or Shell Lifting

Roof structure or shell sections are lifted using engineered lifting arrangement.



Key Construction Checks

Foundation Elevation



Verify elevation, levelness and anchor bolt position according to approved drawings.

Shell Roundness



Check shell roundness during erection to ensure proper fit-up.

Shell Verticality



Monitor shell verticality at each course during erection.

Weld Alignment



Confirm weld alignment, fit-up and joint preparation before welding.

Lifting Arrangement



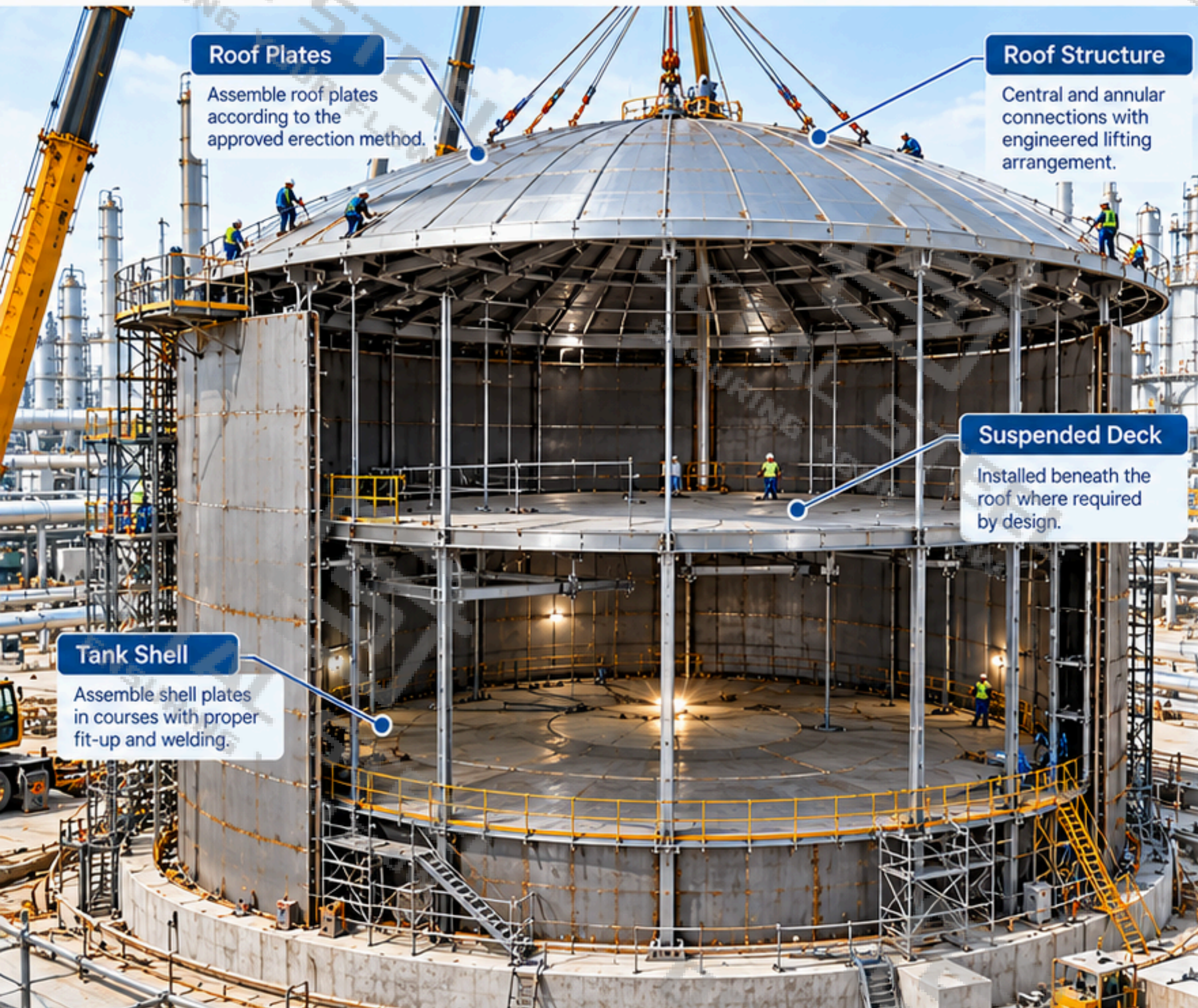
Check lifting lugs, rigging and lifting plan according to engineering design.



Construction activities shall be carried out in accordance with the approved engineering design, applicable codes and project-specific procedures.

Roof Assembly & Welding

Controlled Construction for Safe and Reliable Cryogenic Service

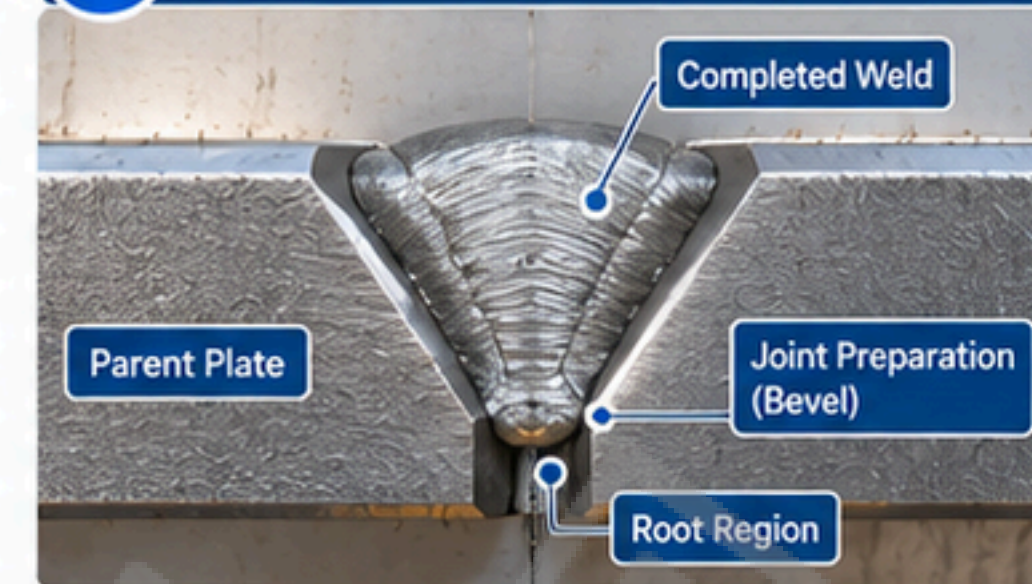


A Tank Shell Welding



Qualified welders perform welding according to approved WPS, with proper access, protection and working platform.

B Weld Joint Detail



Joint fit-up and weld geometry shall be in accordance with approved joint drawings and WPS.

Key Welding and Assembly Controls

	Welding Procedure Specification (WPS)	Define welding process, joint design, filler materials and essential parameters.
	Procedure Qualification Record (PQR)	Qualify the welding procedure according to applicable codes and project requirements.
	Welder Qualification	Ensure welders are qualified for the approved WPS.
	Joint Fit-Up Inspection	Verify joint preparation, alignment and cleanliness before welding.
	Weld Identification	Maintain weld traceability according to project requirements.
	Required NDT Release	Welds shall be examined and released according to the approved NDT plan and applicable codes.



Roof assembly, suspended deck installation and shell welding are separate and controlled tasks. The actual installation sequence shall follow the approved erection method, project specifications and applicable codes.

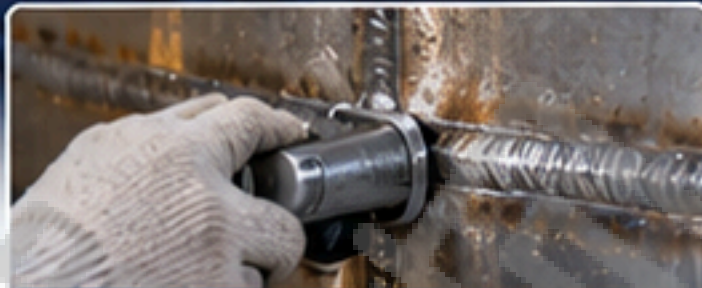


Welding, assembly and installation shall be carried out by qualified personnel in accordance with approved procedures, applicable codes and project-specific requirements.

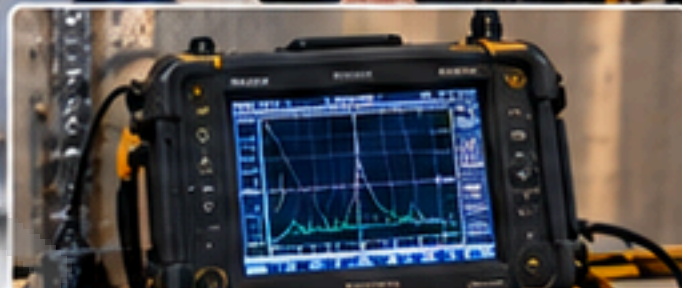
Inspection, NDT & Insulation

Quality Control for Safe and Reliable Cryogenic Tank Construction

A Weld Examination

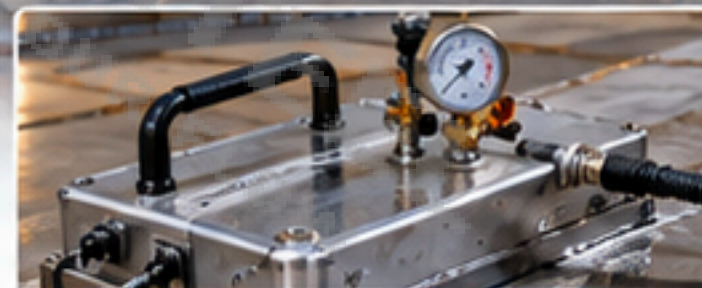


UT transducer on weld



UT equipment

B Tank Bottom Leak Testing



Vacuum box for bottom weld test



Sealed chamber with water or other medium

C Bottom Insulation Installation



Cellular glass blocks (load-bearing)



Tight joints and proper arrangement

Inspection and Test Plan

Inspection Item	Scope / Content	Reference Basis	Purpose
Material Verification	MTC / Identification	Approved material specifications	Confirm material grade and traceability
Dimensional Inspection	Length, width, thickness, geometry	Approved drawing	Ensure compliance with design requirements
Weld Examination	VT / RT / UT / PT / MT as applicable	Code requirements and approved ITP	Verify weld quality and integrity
Bottom Leak Testing	Vacuum box test / Other approved method	Approved test procedure	Confirm bottom weld tightness
Insulation Verification	Material / Continuity / Moisture Protection	Approved specification and procedure	Ensure insulation quality and proper installation



NDT and Inspection Note

NDT extent, acceptance criteria and test methods are determined by the governing code, weld category and approved ITP.

Testing, Commissioning & Handover

From Mechanical Completion to Safe and Stable Operation



Engineering Acceptance Checklist

- ☒ Mechanical completion verified
- ☒ Instruments calibrated and tested
- ☒ System flushing and cleanliness verified
- ☒ Welds inspected and released
- ☒ Safety devices functional
- ☒ Ready for commissioning and operation
- ☒ Insulation installation completed
- ☒ Leak / tightness test completed

01 Final Testing

Tightness testing is carried out according to the approved procedure using gas or other specified medium.



02 Instrument & Safety Verification

Verify the function and calibration of level, pressure, temperature, relief and isolation systems.



03 Controlled Cooldown

Introduce cryogenic liquid under approved commissioning procedure with continuous monitoring.



Handover Documentation

	Document Item	Content / Description
	Approved Drawings	As-built drawings and relevant design documents
	Material Test Certificates	MTC for plates, pipes, fittings and other materials
	Weld Maps and Welding Records	Weld location maps, WPS, PQR and welder qualification records
	NDT Reports	RT / UT / PT / MT reports as applicable
	Leak / Tightness Test Records	Bottom and shell leak or tightness test records
	Insulation Inspection Records	Material, installation and continuity inspection records
	Instrument Calibration / Functional Test Records	Level, pressure, temperature, relief and isolation valve test records
	Commissioning and Handover Documentation	Pre-commissioning, commissioning and final handover records

! Important Note

The test sequence, allowable temperature changes, acceptance criteria and operating limits are defined by the approved design and commissioning procedures.

⚙️ Oxygen Service Consideration

For liquid oxygen service, oxygen-compatible cleaning and cleanliness verification shall be performed as applicable.



Testing, commissioning and handover shall be carried out in accordance with the approved design, applicable codes and project-specific procedures.