



INPUT AND OUTPUT DATA (I/O)

INPUT DATA

General / Project Data

- Project name
- Client
- Location
- Design revision
- Safety factors selection
- Units system

Codes & Standards

- Seismic code parameters
- Wind code parameters
- Material standards (ASTM / EN)

Site & Environmental Data

- Seismic zone
- Site class
- Peak ground acceleration (PGA)
- Importance factor
- Wind speed
- Exposure category
- Ambient temperature (min / max)
- Ground bearing capacity



Stored Fluid Properties

- Fluid type (LNG / LIN / LOX)
- Density (operating & design)
- Vapor pressure
- Boiling temperature
- Design temperature
- Liquid height
- Thermal conductivity
- Heat capacity
- Latent heat

Tank Configuration

- Inner tank diameter
- Inner tank height
- Outer tank diameter
- Outer tank height
- Freeboard
- Number of shell courses
- Course heights

Materials

- (Inner & outer tank separately)
- Material grade
- Yield strength
- Tensile strength
- Young's modulus
- Poisson ratio
- Thermal expansion coefficient
- Allowable stresses vs temperature
- Corrosion allowance



Design Conditions

- Internal design pressure
- External pressure (vacuum)
- Test pressure
- Operating pressure
- Hydrostatic head
- Load combinations (operating / test / seismic / wind)

Thermal / Insulation Data

- Insulation thickness
- Thermal conductivity (perlite / cellular glass)
- Compaction factor
- Moisture factor
- Ambient temperature
- Tank surface area

Structural Loads

- Dead loads
- Live loads
- Snow load
- Wind pressure coefficients
- Seismic response spectra parameters

Foundation & Anchorage Inputs

- Slab thickness
- Concrete grade
- Rebar grade
- Allowable soil pressure
- Anchor material
- Anchor diameter



- Anchor spacing
- Anchor embedment length

Nozzle Data

- Nozzle diameter
- Nozzle thickness
- Location (shell course)
- Reinforcement pad material
- Corrosion allowance



OUTPUT DATA

Global Tank Outputs

- Final tank diameters
- Final tank heights
- Roof radius
- Net and gross volume
- Liquid operating level
- Freeboard verification
- Total tank mass (empty / full)

Plate & Fabrication Outputs (inner & outer)

- Shell thickness per course
- Bottom plate thickness
- Roof plate thickness
- Number of plates
- Plate dimensions
- Total steel tonnage

Stress & Code Compliance

- Hoop stress per course
- Longitudinal stress
- Allowable vs actual stress ratios
- Code compliance status (OK / NG)
- Governing load case per component

Thermal Outputs

- Heat ingress (W)



- Boil-off rate (kg/h, %/day)
- Insulation heat flux
- Temperature gradients
- Insulation adequacy check

Inner Tank Checks

- Shell thickness verification
- Bottom stress check
- Roof stress check
- Roof-to-shell junction stresses
- Compression ring check
- Stiffener ring check
- Buckling checks

Outer Tank Checks

- Shell stability (wind & seismic)
- Stiffener ring requirements
- Roof structural adequacy
- Roof-to-shell junction stresses

Seismic Outputs

- Impulsive mass
- Convective mass
- Sloshing height
- Base shear
- Overturning moment
- Hydrodynamic pressures
- OLE / CLE results

Wind Load Outputs



- Wind pressure distribution
- Resultant shear force
- Overturning moment
- Governing wind load case

Anchorage Outputs

- Required number of anchors
- Anchor tension forces
- Anchor utilization ratio
- Sliding safety factor
- Uplift safety factor

Foundation Outputs

- Slab bearing pressure
- Contact pressure distribution
- Sliding check
- Overturning check
- Rebar stress utilization

Insulation Mechanical Outputs

- Insulation compressive stress
- Allowable vs actual stress
- Settlement risk
- Insulation OK / NG

Nozzle Reinforcement Outputs

- Required reinforcement area
- Provided reinforcement area
- Stress concentration factors



- Local compliance status

Final Compliance Summary

- Governing design case
- Critical components
- Safety margins
- Code conformity statement