



HEXAGON

TPVE1003

PV Elite

**Course Agenda
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Day 1

Introduction to the PV Elite Interface

Options, Configuration Settings, and Design Parameters

Modelling Basics

Material Databases

Semi-Elliptical Head Design

Design and Analysis of a Vertical tower to US Code ASME VIII Division 1

- Design parameters input
- Loads & Load Cases for stresses induced in the tower
- Wind and Seismic data
- ASME (/ASTM) Materials
- Skirt Support, with openings, and Base (/ring...) analysis
- Dished heads
- Cylindrical shells
- Conical sections
- Cone to shell junction rings
- Nozzles and Manways
- Liquid Content input
- Platforms and Ladders
- Trays, Packing and Insulation
- Miscellaneous weight and Piping Detail
- Forces and Moments
- Tailing lugs and Rigging Analysis

Vertical tower to European Code EN 13445

- +
- Revised load cases
- EN Materials...
- (no cone to shell junction rings)
- Nozzle (DIN) input, including adding drain pipe
- Instrument Domes
- Non-circular platforms

Day 2

Horizontal Vessel to British Code PD 5500

- + Simple vessel (Drum) modelling
- Longitudinal Weld Seam settings
- Nozzle (ANSI) input, including Radial, Hillside, Tangential and Nozzle on Nozzle
- Sump modelling
- Stiffener Rings for External Pressure
- Liquid Content input continued
- Support Saddles
- Analysis and Results
- Output options

Convert an existing ASME VIII Div. 1 design to EN 13445

- New Design Code
- Change materials for main vessel components
- Change nozzle materials
- Change Basing and bolting materials
- Remove any cone / shell junction rings
- Reset Load Cases
- Analyze & Review results and edit vessel to pass

Comparison of code criteria USA, UK and Europe

- Allowable Stress
- Joint Factors
- Design of cylindrical shells
- Design of dished heads
- Nozzle (opening) reinforcement calculations
- Comparing ASME VIII Div. 1 and Div. 2
- Nozzle reinforcement interference

WRC 107 Local stress analysis in main program and CodeCalc

Fatigue analysis

Legs, Lugs and Half Pipe Jacket

CodeCalc Exercises;

- Jacketed Vessel
- Rectangular Vessel
- (ASME VIII) Div. 1 App. 14 Large Opening calculation
- Nozzle calculation

API 579 Fitness for Purpose Exercises;

- General metal loss to API 579 Section 4
- Groove like flaw assessment to API 579 Section 5

Composite vessel design, including;

- Welded flat heads with uniform patterned holes or large opening
- 'Nozzle' on large opening
- Body Flanges
- Nozzle on Blind flange
- Support lugs

Day 3

Heat exchanger with fixed tubesheet to ASME VIII Division 1 (UHX)

- Technical discussion
- Fixed tubesheet exchanger modelling; Shell and Channel(/Tube) sides
- Tubesheet attachment to Body Flange
- Tube Layout and Bundle design
- Load Cases input for different process scenarios, and reporting
- Alternative tube material investigation
- Expansion Joint modelling
- Shell Band modelling

Heat exchanger with immersed / submerged floating head to EN 13445

- +
 - Stationary tubesheet between Body Flanges
 - Floating tubesheet / bolted Spherical Cover design
 - Potential design issues

Heat exchanger with U-tube bundle to PD5500

- +
 - Tubesheet attachment to Body Flange

❖ *Stress definitions and some common PV Elite error messages*

❖ *EN 13445 Nozzle external loads Limit Analysis discussion*