

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 Ex.1

Semi-Elliptical Head Design Ex. 2

Design and Analysis of a Vertical tower to US Code ASME VIII Division 1 Ex. 3

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 Ex. 4

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

Day 2

Horizontal Vessel to British Code PD 5500 Ex. 5

+

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 Basering 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, Europe and UK

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*