

PV Elite®

Product: PV Elite (PVE)

Version: 23 (23.00.01.0000)

Date: April 2021

Description: PV Elite analyzes and design pressure vessels and heat exchangers in accordance with U.S. National and International codes and standards, such as ASME, PD 5500, and EN 13445.

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System Requirements

Important: Beginning with Windows 10, Microsoft will enforce the Internet Host Table Specification RFC 952 which mandates that component hostname labels can contain only alphanumeric characters. Hostnames using underscores ('_') are not allowed. Refer to Microsoft KB 101785. Intergraph PV Elite is compatible with Windows desktop operating systems listed below

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Note: The operating system compatibility details that follow refer to the latest released version of this software. Previous versions of the software might not work with newer operating systems.

Version Compatibility

For up-to-date information on the software compatibility of this product in a standalone or integrated environment, please refer to the Compatibility Matrix on the Hexagon PPM Support Web site at <https://smartsupport.intergraph.com/>.

Log on and perform the following steps:

1. Click the **View Downloads** tab.
2. Click the **Product Compatibility** link under **Useful Links** on the right side.
3. On the **PPM Compatibility Matrix - Product Report** page, from the Select Product list, select PV Elite.
4. From the **Version** list, select the version of PV Elite.



Special Instructions

PV Elite 23 Version 23.00.01.0000 is a Windows 10-based program. PV Elite may work under Windows (Vista/7/8/8.1), although this platforms have not been tested.

Documentation

General

Use the Help menu to access the Help files and Printable Guides for this product. For the latest support information for this product, connect to <https://hexagonppm.com/ppm-support>. Also, you can submit any documentation comments or suggestions you might have on the Hexagon PPM support site.

Printed documentation is not available for separate purchase.

PDF Files

The documentation is provided as .pdf files. You can use any PDF viewer to view the files.

Training

To register for training on Hexagon PPM products, call Training Registration at (800) 766-7701 in the U.S. Outside the U.S., call (256) 730-5400 or contact your local Hexagon PPM office.

For current information on training, connect to <https://hexagonppm.com/offerings/training/instructor-led-training#products=PV%20Elite> .

Customer Support

For the latest Support Services information for this product, including solutions to known software issues, connect to <https://hexagonppm.com/ppm-support>.

To open service requests outside the U.S., please contact your local Hexagon PPM office.



New Features

User Interface/Graphics

- Include code update for British Standard PD 5500:2018+A3:2020 in report calculations. Including specific Load Cases for Design Code tab, Ext. Pressure changes & Saddle Calculation updates. (CR-TX-36868)
- Added new standard flange dimensions of 2500 class to the 'ANSIFlangeDimensions.txt' so that it can automatically choose other NPS like 0.5in. (CR-TX-36635)

Output Processor & Reports

- Updated the Bill of Materials report to show the same tube dimensions in BOM report as in the tube input tab from heat exchanger input. A user file with metric units will show the tube thickness with 1 decimal place for the tube dimensions. (CR-TX-36773)
- Updated the Saddle Calcs report to show how the maximum of $\frac{2}{3} * \text{Yield}$ and the Saddle Allowable Stress value was used to determine the baseplate thickness. (CR-TX-36865)
- Updated the Lifting Lug Calculation report to add the notes and sketch for vertical vessels with lifting lug orientation as flat and lift orientation from horizontal to vertical . (CR-TX-36779)
- Updated the Vessel Design Summary report to replace the Corrosion Allowance with Total Corrosion Allowance on the Element Pressures and MAWP table. (CR-TX-36770)
- Updated the Earthquake load calculations report to show appropriate message for "Consider Rotational force effect" in output report. (CR-TX-37140)



Fixes

User Interface/Graphics

- Fixed an issue where the "Lug Distance from Base" value in the **Equipment Installation and Miscellaneous Options** dialog does not represent the actual location of the trunnions set by the user through the **Lifting Lug/Trunnion** dialog. (TR-TX-36561)
- Fixed an issue where the Beta operating value doesn't get retained after saving and reopening the file in the Wind Load data tab. (TR-TX-36006)
- Fixed an issue in the PD 5500 file models with a flat head where if next to a cylinder element and flipped orientation, it would create a gap in the 3D model. (TR-TX-37010)
- Fixed an issue in the 3D view tab to show the diagonal orientation correctly for the Leg Orientation. (TR-TX-37303)

Input Processor & Analysis

- Fixed an issue where the program will crash when you run the analysis on a specific file. The software now will not crash and show the output reports. Note that a workaround is to press 'Save as' and save the file under a different name and run the analysis. (TR-TX-36622)
- Fixed an issue with the Ultimate Tensile Strength at External Temperature shown as 0 when using the Metric database. The software now provides the Ultimate Tensile Strength at External Temperature values for metric materials that have values in US customary materials database and are available in Sec II Part D. (TR-TX-37018)
- Fixed an issue with the liquid detail creating a Fortran run time error during analysis. The software now will not generate the same error while running the analysis. (TR-TX-37287)

Output Reports

- Fixed an issue where the **Conical Section** report incorrectly displayed the "Summary of Reinforcement Area, Small End, Internal Pressure:" the "Area of reinforcement required per App. 1-5(3)" and "Area of reinforcement in shell per App. 1-5(4)". The software now correctly displays the correct equation sections per App. 1-5(5) and App. 1-5(6) respectively. (TR-TX-36634)
- Fixed an issue where the **Wind Load Calculation** report incorrectly displayed the value of Delta and Alpha under the "Table parameters based on the Terrain Category". The software now correctly displays the values above and how they are used under the equation for Corrected Wind Speed [VD]. (TR-TX-36612)



- Fixed an issue where the **ASME FI-TS Calc** report incorrectly displayed the Length of Expanded Portion of Tube [Itx], added a warning note and mislabeled the Itx value in one of the equations. The software now correctly displays the values above, compute rho value and remove the warning regarding the length of expanded portion on the floating tubesheet report when the alternative tube expansion method has been selected and dimensions specified. (TR-TX-36783)
- Fixed an issue where the analysis displayed a Division by 0 for Flanges Not Applicable to WRC 538. The software now correctly adds a note if the flange is applicable for WRC538 calculations but lacks information from Hub input fields. (TR-TX-36632)
- Fixed an issue where a nozzle proximity to tubesheet warning is shown in the **Nozzle Calcs** report and should not be there. The software now correctly removes the warning in the report. (TR-TX-36749)
- Fixed an issue where the Axial Load calculated in the lifting lug calculations is not being multiplied by the required impact factor in the **Lifting Lug Calculations** report. The software now correctly shows the Axial force should be multiplied by impact factor. (TR-TX-34353)
- Fixed an issue where the **ASME TS Calc** report incorrectly displayed UHX-12.5.4 Step 4 deltaC different for a cylinder vs a hemispherical head. The software now correctly determines deltaC using the appropriate equation listed in UHX-12.5.4 Step 4 when the tubesheet is integral with the hemispherical head and the Tubesheet Assembly is to the left. (TR-TX-36735)
- Fixed an issue where the **Leg check (filled w/water)** report incorrectly failed the occasional pressure used in leg WRC calculations for a jacketed vessel. The software now correctly pass/fail table will use the occasional pressure used from the jacket and not the shell while calculating the stress intensities. Note, the issue is only with the pass/fail table and not the final calculations. (TR-TX-36909)
- Fixed an issue when the “custom” flange was introduced and attached to a nozzle located towards the bottom of the vessel, the weight of the liquid was distributed to the shell elements. This is causing higher axial stress on elements and load cases that consider axial stress with liquid to be higher than expected. The software now correctly address the excessive stresses generated when attaching a custom flange to a vessel that has liquid defined. (TR-TX-36942)
- Fixed an issue where the **Saddle Calcs** report is using the Unstiffened Shell equations instead of the Stiffened Shell equations. The software now correctly compute longitudinal stress, sigma3 and sigma4, as per ASME Sec VIII Div 2, 4.15.3.3(b)(1) when the placement of rings is according to acceptability listed in Sec VIII Div 2, 4.15.3.3 (b). (TR-TX-36986)



- Fixed an issue where the **Nozzle Calcs** report is showing a warning message when the Minimum Req'd. Effective width adjacent to Nozzle (L_s) is smaller than actual L_s value calculated based on input. The software now correctly removes the warning when L_s is greater than minimum required L_s . (TR-TX-37015)
- Fixed an issue where the **Quick Results calc** report in the Nozzle analysis considers the static head in the output and not in the quick calcs for a bottom head nozzle. This is occurring where the Design Pressure option 4 was selected "MAWP + Static Head to Nozzle. The software now correctly uses the pressure for the Reinforcement Calculations in the Nozzle. (TR-TX-37032)
- Fixed an issue where the **Flange Calc** report uses an incorrect Table reference in a note. The software now correctly refers to table 1.1 from ASME Sec VIII Div 2 instead of table 1-1. (TR-TX-37033)
- Fixed an issue where the **Nozzle Calc** report has the Weld Stress Value [τ] calculation with the L43T value shown incorrectly as 0. The software now correctly displays the appropriate value for L43T in the Weld Stress Value [τ] calculation. (TR-TX-37159)
- Fixed an issue where the **Leg Check Calc** report shows no calculations were performed as per EN 13445 Section 16.11 Vertical Vessels on Support Legs. The software now correctly performs EN 13445 Section 16.11 Vertical Vessels on Support Leg for non-splayed legs (dimensions d_1 and d_4 are equal). (TR-TX-37186)
- Fixed an issue where the **External Pressure Calculation** report do not show detail external pressure calculations when using Division 2 code design. The software now correctly show detail external pressure calculations in the External Pressure Calculations report. (TR-TX-37199)
- Fixed an issue where the **Nozzle Summary** report show a 0.8 factor in the equation for Credit Height for each Nozzle Outside [L_o] calculation. The software now correctly remove the 0.8 factor from the Credit Height for each Nozzle Outside [L_o] equation and display the appropriate resultant values for each nozzle. (TR-TX-37242)
- Fixed an issue where the PWHT checkbox is not being considered for a Flange element. The software now correctly finds the material which should use the correct curve for MDMT calculation when PWHT option is chosen. (TR-TX-37245)
- Fixed an issue where the C11 parameter for a perpendicular lug attached to a vertical vessel is incorrect. It seems to be using a longitudinal dimension instead of the circumferential



dimension. The software now correctly sets the Parameter C11 correctly for perpendicular lifting lugs attached to a vertical vessel. (TR-TX-37278)

- Fixed an issue where the **Lifting Lug Calculation** report is using the incorrect formula substitution values for the Pin Hole Bearing Stress. The software now correctly corrects the cosmetic issue in the formula substitution. Note that the final result was correct. (TR-TX-37285)
- Fixed an issue where the **Vessel Design Summary** report is using In case of vertical vessels with skirt, the skirt length is added to tangent to tangent length in vessel design summary. The software is now not using the skirt length to the tangent to tangent distance in vessel design summary. (TR-TX-37288)
- Fixed an issue where the **Support Lug Calculation** report is missing the final stress S1 & S2 calculation result line equations. The software now correctly adds missing final stress result lines in Support Lug Calculation report. (TR-TX-37310)
- Fixed an issue where the **Nozzle Calcs** report displays a warning message that a nozzle is too close to a tubesheet. The software now correctly will only display the warning when the nozzle is close to the tubesheet. (TR-TX-37093)
- Fixed an issue where the **Element and Detail Weights** report shows that the mass of upper 1/3rd of vessel is very high compared to field test weight. The software is now calculating the mass of upper 1/3rd of vertical vessel correctly. (TR-TX-36209)
- Fixed an issue where the **Saddle Calcs** report final value of minimum saddle baseplate thickness is not printed in test case. The software is now printing the final value after calculation for Minimum thickness of baseplate per Moss in test case condition. (TR-TX-37365)
- Fixed an issue where the **Heat Exchanger TEMA** report analysis shows errors during the FEA analysis. The software is now analyzing the second load case without any material property errors. (TR-TX-37729)

Open Problems

None



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Documentation

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