

PV Elite®

Product: PV Elite (PVE)

Version: 2019 (21.00.00.0000)

Date: November 2019

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.

Operating System	Compatibility Information
Windows 7/8/8.1* Professional (64 bit) Windows 7/8/8.1* Ultimate (64 bit) Windows 7/8/8.1/10* Enterprise (64 bit) Windows 10 Pro (64 bit) Windows Server (all versions)	PV Elite Development tests these operating systems. PV Elite does not support Windows 7/8/8.1/10 Starter, Home Basic, and Home Premium. The software does not support Windows Vista Starter, Home Basic, Home Premium, Enterprise, Business, and Ultimate. *Windows 8/8.1 – Enable .Net 3.5 prior to installing PV Elite. Only tested by Intergraph for the installation of network licensing systems (NetHASP License Manager).



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 2019 Version 21.00.00.0000 is a Windows (7/8/8.1/10)-based program. PV Elite may work under Windows Vista, although this platform has not been tested.

Important:

If you are moving to Version 2019 from a version of PV Elite prior to Version 2008, your existing ESL may require a Firmware update to permit Version 2019 to run. You can find instructions on the program DVD in the Firmware.pdf document.

This version of PV Elite should be started by invoking the program, pve.exe.

For more information on installing PV Elite, refer to the PV Elite Quick Start, located with the delivery media.

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 <http://www.intergraph.com/ppm/training/>.



Customer Support

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

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New Features in this Version

Code Updates

- Updated to support **IBC 2018** wind & seismic code. (RI-TX-24759)
- Updated to support **Mexican MDOC 2015** seismic code. (RI-TX-22221)
- Updated to support **PD 5500:2018+A1** code update. (RI-TX-24841)
- Updated to support **KHK 2012** seismic code. (RI-TX-1443)
- Updated to support **Type 2 Jackets** for PD 5500 & EN 13445. (RI-TX-23191)

Configuration

- Updated PV Elite to allow the option to make the external length L for cylinders connected to weld neck flanges. (CR-TX-26285)
- Updated PV Elite to allow users in Europe to enter through the keyboard a decimal comma instead of the decimal point in the input. The software should convert the comma to a period automatically. (CR-TX-27346)
- Normally MDMT's are computed using hoop stress because hoop is twice longitudinal. But in a low-pressure column with high bending stress longitudinal might govern. (CR-TX-28335)

Input Processor & Analysis

- Updated PV Elite to show the help topics through a WPF help .NET desktop application. WPF help is designed to be a modern, easy-to-use help application that can run from any folder without formal installation. (CR-TX-24837)
- Updated PV Elite to allow long description names for nozzles so that users can keep description names of longer than 16-character names. (CR-TX-25730)
- Updated PV Elite to consider table UHX-8.1 of ASME Sec VIII Div 1 to determine W^* value used in tubesheet calculations and consider full bolt load $W^*=S_a \cdot A_b$, in the tubesheet calculation. (CR-TX-25353)
- Updated PV Elite to add a checkbox to allow the option to make the external length L for cylinders connected to weld neck flanges include the Flange overall length. (CR-TX-26285)
- Updated PV Elite to add a "service type" and "Radiography" input field in case of a heat exchanger component, so it that will be useful to apply different minimum thickness as per UG-16(b) as per service for shell side, as well as tube side and will comply Code requirements.



(RI-TX-21488)

- Updated PV Elite to include an option to enter allowable shear stress for anchor bolts based on ASD, Steel Construction Manual, not ASME Sec II, for shear stress analysis. (CR-TX-12919)
- Updated PV Elite to add bolting data for 3P metric bolting designs. Bolt data is per Table H-1 of ASME PCC-1. (CR-TX-24815)
- Updated PV Elite to show the fabricated section ring on the inside or outside of the vessel as specified. (CR-TX-15558)
- Updated PV Elite to allow the user to specify that the Pressure (Design) only cases are to be used to compute the MAWP for hydrotest for ASME heat exchangers. (CR-TX-26654)
- Updated PV Elite to add a check box that allows the user to force the VIII-1, 1-5 calculation to happen when delta is greater than alpha, and the cone is connected to a flange. (CR-TX-27162)
- Updated PV Elite to set the allowable for Pm+Pi+Q to be changed to 3*Sh if there are no thermal expansion loads provided, also the user can specify a cyclic temperature to calculate the allowable for Pm+Pi+Q stress based on the rules of ASME VIII-2 Part 4, 4.1.6.3 (a) and (b). (CR-TX-26685)

Output Processor & Reports

- Updated PV Elite to show all the data points in both Point Thickness Readings and Critical Thickness Profiles in the output report to verify that they are correct without having to go back to the input file. (CR-TX-4668)
- Updated PV Elite to show the total wind deflection that includes user defined forces, so that users do not have to add them together by hand. A line will be included after the deflection stating, "Total deflection, including wind and user applied forces". A user force must be specified. (CR-TX-25243)
- Updated PV Elite to support and show UW-16.1 sketches v-1 through w-2, so that users can see the weld representations in the nozzle calculation report. (CR-TX-26306)
- Updated PV Elite to add a note to show that ambient temperature is used instead of design temperature for WRC 107/ 537 in the Lifting Lug calculation report. (CR-TX-26267)
- Updated PV Elite to report correctly the lifting lug placement detail for horizontal vessels. Currently, lifting lug report for horizontal vessels shows as "Design reaction force at the tailing lug". It must be Left or Right lug. (CR-TX-26242)
- Updated PV Elite to see the title of the weight type in the Element and Detail Weights report so that it can more easily identify where the weights are coming from. (CR-TX-26592)



- Updated PV Elite to clean up printout for Electric Immersion Heaters in the Internal Pressure Calculations report while running a PED hydrostatic test. (CR-TX-26656)
- Updated PV Elite to suppress a Flange governing being flagged in the Failures Summary and only show the warning during the analysis run time iteration. (CR-TX-26607)
- Updated the API 579 report to show all the data points in the output to verify that they are correct without having to go back to the input file. (CR-TX-26254)
- Updated the WRC 297 allowable stress for $P_m + P_I + Q$ to $3 \cdot S$ (which is taken from ASME section VIII, Division 2), shown in the Vessel Stress Summation Comparison table stress. (CR-TX-10228)

Fixes

User Interface/Graphics

- Fixed an issue in PV Elite when the model has a large nozzle with a re-pad. The re-pad graphics is cut off near the seam of the vessel. The software has been updated to show the full reinforcement pad even if the nozzle re-pad diameter is beyond the cylindrical element weld seam. (TR-TX-20163)
- Fixed an issue in PV Elite where on some machines generates an error message "Failed to load driver. Setting default driver to ..". This was caused in the new device driver implementation in PV Elite 2018. The driver returned by Hoops graphics library was only checked for part of the name like directX and ignore the part "hardware" or "software". This will prevent this error message from coming up. (TR-TX-24546)
- Fixed an issue in PV Elite where it shows "Appendix 1-10 Passed" as an incorrect status message shown in the nozzle input dialog box of a large opening since Appendix 1-10 calculations were not chosen when we save and close the nozzle dialog box. The software has been updated and the status message shown is "Large Opening Analysis Passed". (TR-TX-26150)
- Fixed an issue in PV Elite where the software is not warning for the right ranges of bolt materials when the metric box is checked. The software has been updated and when the bolt diameter is within the range of the material spec, bolt diameter should be in black font. (TR-TX-26931)
- Fixed an issue in PV Elite where the Support Lug input shows the representation of the gussets in the correct parallel position, but the 3D graphics show gussets aligned radially. The software has been updated and the lug pad graphics show parallel to the shell surface. (TR-TX-1017)
- Fixed an issue in PV Elite where installing PV Elite with SPLM licensing will not allow the program to use the feature of older versions of the ASME code (2013 and 2015) because the required file for running with a SPLM license is not included in the program subfolder for



previous versions. The software has been updated and the required files will be placed in the 2015 and 2013 subfolders when the program opens. (TR-TX-25087)

- Fixed an issue in PV Elite where the T notes in Table 2A, 2B, and 5A, 5B are different than for customary tables; e.g. a material with note T5 will have a completely different creep range for metric than customary. The material databases have been updated and the material creep temperatures in PV Elite match their respective listed creep temperatures in ASME, Section II, Part D. (TR-TX-26798)

Output Reports

- Fixed an issue in PV Elite adding the static head pressure to the Pmax value shown in the input echo section of the **EN 13445 Local Stress Analysis** found in the **Nozzle Calcs** report. The software has been updated to reflect the permissible pressure plus the static head pressure in the report, considering that the other results were already including the static pressure except for that line in the input echo. (TR-TX-22219)
- Fixed an issue in PV Elite to calculate correctly the MAWP for a cone in the **Conical Section** report, so that the MAWP is computed correctly in the EN 13445 code shown in the **Internal Pressure Calculation** report. The software has updated the computed MAWP which should reflect the entered design pressure. (TR-TX-24386)
- Fixed an issue in PV Elite where it was taking the incorrect **gasket inside diameter** according to Table 9, B16.20 and instead using the dimensions for Class 600, which is incorrect. It should be using Class 1500 dimensions. The software has been updated to use the correct dimensions for the gasket inside diameter for **class 900** standard flanges. (TR-TX-24341)
- Fixed an issue in PV Elite the calculation on the support lug report, shows the **weight** Load at the top of one **Lug** is less than the vessel operating weight value. The software has been updated to show the correct operating weight vs weight of one lug in both the **Sup. Lug Calcs Ope** report and the **Element and Detail Weights** report. (TR-TX-24602)
- Fixed an issue in PV Elite where the **Element and Detail Weights** report would show **negative values** for the element ID volume and weights for the liquid details. The software has been updated to show the weights and volumes are not negative in the **Element and Detail Weights** report. (TR-TX-24603)
- Fixed an issue in PV Elite where the **List Dialog** changes the node number of a platform detail after changing the distance 'from Datum'. The software has been updated to not change and edit the platform data in the **List Dialog**. (TR-TX-25174)
- Fixed an issue in PV Elite where the Floating Head thickness calculation was depending on just the external pressure. The software has been updated to show that the differential pressure is used rather than the full shell side pressure for the analysis on the Floating Head assembly in the **Floating Head** report. (TR-TX-25080)
- Fixed an issue in PV Elite where the calculation of the required thickness per UG-37(a) of welded flat head, Tr in the nozzle **Quick Calculation** report adds corrosion allowance to the outside diameter of the flat head; however, the outside diameter of flat head without



corrosion allowance is correctly used in the **Nozzle Calc** report. The software has been updated to calculate the required thickness per UG-37(a) of welded flat head, Tr with the same result between the **Quick Calc** report and the **Nozzle Calc** report in the output processor application. (TR-TX-25285)

- Fixed an issue in PV Elite where a warning message "Enter no more than 16 characters" shows up and doesn't allow the user to select the weld designation in the **Nozzle** dialog. The software has been updated to enable the user to select weld designation "4.2.11 4-10-D" without any issue. (TR-TX-25420)
- Fixed an issue in PV Elite to show a warning message when the nozzle is near to the knuckle region. EN 13445 Section 7.7.2 'Conditions or applicability' specifies how near a nozzle may be to the knuckle region. The software has been updated and now PV Elite issues a warning in the output results that Section 7.7.2 has been violated, axial distance from Knuckle Edge to Nozzle Edge and axial distance from dMin to Nozzle Edge. (TR-TX-25543)
- Fixed an issue in PV Elite when a flat cover is welded directly to a cylinder, the diameter of the cover is defined as the inside diameter of that cylinder and not the outside diameter of the flat head. The software has been updated and now PV Elite defines the diameter of the cover as the inside diameter of the cylinder in the **Internal Pressure** calculations report. (TR-TX-26103)
- Fixed an issue in PV Elite where the software provides a conservative number of cycles when it performs a fatigue analysis but when Ce is less than 1, the number of cycles does not match with "hand calculations" and give a much lower number of cycles. The software has been updated and now PV Elite calculates the correct max number of cycles in the **Fatigue Stress Evaluation** report. (TR-TX-26165)
- Fixed an issue in PV Elite when the Material Name is left blank, the software tends to crash if the users exit out of the Material Selection window. PV Elite doesn't know how to interpret a blank Material Name. The software has been updated and now PV Elite doesn't crash if the user decides to leave the material name blank. (TR-TX-26430)
- Fixed an issue in PV Elite where **Flange Calculation** report and the **Internal Pressure Calculation** reports do not match the MAWP when the Flange is a non-weld neck type body flange. The software has been updated and now the hub MAWP should not be computed for non-weld neck type body flanges so the reported MAWP for Flange elements will not differ between reports. (TR-TX-26717)
- Fixed an issue in CodeCalc where after viewing information in the Outer Cylinder dialog in the ASME Tubesheet component, the application would sometimes crash. The software has been updated and now CodeCalc doesn't crash after entering values in the Outer Cylinder dialog. (TR-TX-26809)
- Fixed an issue in PV Elite where the wind and seismic *.pvu data is incorrect for external interface programs like the U-Form spreadsheet, Inventor or Solidworks. The software has been updated and now the Wind and Seismic code data should be properly shown in the PVU file. (TR-TX-26600)



- Fixed an issue in PV Elite where if the user had previously defined a value (other than 0) for the “User Defined MAWP” field, that value is displayed under MAWP for all nozzles found in the **Nozzle Summary** report even though the field is grayed out. The software has been updated and now when the switch for “Is this a Heat Exchanger” is active, the fields for “User defined MAWP” should be fully disabled and any previously defined non-zero value should not be considered in the **Nozzle Summary** report. (TR-TX-26633)
- Fixed an issue in PV Elite where in a horizontal vessel with a nozzle located at the top of a shell element, there is an error stating Flange Rating < Design Pressure (MAWP + Static Head). The software has been updated and if the nozzle is located at the top of the horizontal vessel, static head should not be added to MAWP when checking the to see if the Flange Rating is less than Design Pressure in the Nozzle input dialog. (TR-TX-27126)
- Fixed an issue in PV Elite where the Terrain category selection for wind design code 'SANS 10160-3:2010' does not match the description in the **Wind Load Calculation** report. The software has been updated and the Terrain category is shown as 'B', same as the input selection in the Wind Data tab. (TR-TX-26935)
- Fixed an issue in PV Elite where when there are two mating flanges, then user is unable to select a different bolt material. The software has been updated and the user is now able to select any flange bolt material and update the mating flange as well. (TR-TX-26536)
- Fixed an issue in PV Elite where a check was being made on the size of the weld when it should not have been made when an external corrosion allowance was specified and there was no reinforcing pad. The software has been updated and it no longer displays a warning about weld sizes. (TR-TX-26409)

Open Problems

None



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