VERSION HISTORY OF CONVAL®

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THE CONVAL® 12 SERVICE RELEASES

BUG FIXES IN BUILD 12.4.1

USER INTERFACE

- The selection of flow resistances and ζ-values has been revised.

CONTROL VALVE

- A message will be shown if the desired flow reserve for regulating Q,max cannot be reached.
- Minor improvements and fixes for stability issues.

DIFFERENTIAL PRESSURE FLOW ELEMENT

- The calculation of the permanent pressure loss Δϖ for non-standard devices has been revised.

PRESSURE RELIEF VALVE

- Pressure loss in the feeding pipe
  After adjusting certain parameters, such as the discharge temperature, pressure loss in the feeding pipe was no longer calculated. In this case, no warning was displayed for feeding pipes that were too long.
- Pressure loss in the discharge pipe
  For certain operating conditions, the pressure loss for some gases was calculated too high in the discharge pipe, resulting in an insufficient short allowable pipe length.
- The calculation of the property data at the valve outlet has been revised.
- Minor improvements and fixes for stability issues.

THERMOWELL

- Minor improvements and fixes for stability issues.

TANK DEPRESSURIZATION

- Minor improvements and fixes for stability issues.

ANALYZER

- Minor improvements and fixes for stability issues.

CHANGES IN BUILD 12.4

GENERAL

- Starting with version 12.4, you can also run CONVAL on Windows on ARM.
- Problems that were occasionally encountered when creating liquid mixtures have been fixed.
- NEW: The license server settings can be protected against changes by users.
- Various improvements have been made to export functions, including those for user-defined fields and switches.
- The help system has been revised.
- Minor improvements and fixes for stability issues.

USER INTERFACE

- NEW: Now, two separate windows can be opened for each calculation module. To open a new window, select the "Move to new window" option in the context menu of the tab, or drag the tab from the window to an empty area of the desktop.
- Clearer display of the Chinese interface through the use of an improved font.
- Occasional problems with displaying calculation information have been fixed.

CONTROL VALVE

- Revised calculation of valves with additional internal, uncontrolled stages, which are calculated as resistance structures.
- The printout of the resistance table for downstream pressure increase has been revised.
- NEW: The resistance coefficient of the valve ζ can now be calculated, for example, for a simplified pressure loss calculation.
- Improved support for valves with extended valve data that is not included in the database.
- NEW: There is now an input option for the maximum permissible sound level in the design parameters.
- Minor improvements and fixes for stability issues.

ACTUATED VALVE

- Minor improvements have been made to the display of data in the valve and actuator selection dialog.

DIFFERENTIAL PRESSURE FLOW ELEMENT

- The calculation of the permanent pressure loss $\Delta\varpi$ for venturi tubes and venturi nozzles has been revised.
- Minor improvements and fixes for stability issues.

RESTRICTION ORIFICE

- The flow coefficient C of single-hole orifices is now displayed in the table of individual stages for multi-stage configurations.
- The printout of the table of individual stages for multi-stage configurations has been revised.
- NEW: The resistance coefficient of the orifice plate ζ can now be calculated, for example, for a simplified pressure loss calculation.
- Minor improvements and fixes for stability issues.

PRESSURE RELIEF VALVE

- NEW: Calculations using direct integration are now available for compressible media and liquids from the thermodynamics module. This is especially important for compressible media near or above the critical point. A warning is issued for substances for which direct integration is unavailable in this region. Here the safety device may be undersized.
- NEW: Calculation of condensing gases and vapors is now possible if they are included in the thermodynamics module.
- Improved calculation of the back pressure that occurs when Mach exceeds 1.
- Improved calculation of outlet conditions.
- When calculating full-lift relief valves according to the AD 2000 Specification A2, a 5% overpressure instead of 10% is specified.
- Revised calculation of pressure losses in supply and discharge lines
  - Free input of the permissible pressure loss as a percentage
  - Geodetic height is now also taken into account for compressible media.
- Minor improvements and fixes for stability issues.

RUPTURE DISC

- NEW: The user interface has been extensively revised and now includes useful pre-set values.
- Revised messages, warnings, and notes.
- Improved calculation of the back pressure that occurs when Mach exceeds 1.
- Improved calculation of outlet conditions.

PRESSURE SURGE

- Minor improvements and fixes for stability issues.

TANK DEPRESSURIZATION

- Minor improvements and fixes for stability issues.

THERMOWELL

- Revised pass/fail stress analysis
- Minor improvements to messages, warnings, and notes

ANALYZER

- The selection of the flow rate (mass or volume) in the sampling line is no longer affected by the corresponding selection in the main line.

SUBSTANCE CALCULATION

- Substances from the database whose boiling point cannot be determined are now handled more efficiently.

CONTROL VALVE DATABASE

- The import function has been slightly improved, particularly when importing Excel spreadsheets.

PRESSURE RELIEF VALVE DATABASE

- The import function has been slightly improved, particularly when importing Excel spreadsheets.

BUG FIXES IN BUILD 12.3.2

DATA EXPORT

- Various improvements have been made to exporting calculations to PDF or Excel formats. The access method for the properties of the parameters to be exported, such as "Value" or "Messages," has been fundamentally revised.
- An error that occurred when exporting non-numeric parameters with the "Value" property has been fixed. In export templates, a "0" was exported instead of the text property.

USER INTERFACE

- When opening the control valve selection, the calculation mask moved to the background. In some cases, it was no longer visible behind the CONVAL start screen.

BUG FIXES IN BUILD 12.3.1

DATA EXPORT

- An error when exporting custom fields has been fixed. In export templates, references to user-defined data via “AddParam” were usually replaced by an empty string instead of the actual content of the parameter.

CHANGES IN BUILD 12.3

GENERAL

- The installation process has been updated with minor improvements and bug fixes, particularly for the silent setup.
- Enhanced update check: In addition to templates, material, and device data, units of measurement are now checked and updated as needed.
- The units for standard volume flow, volume flow, and volume have been extended.
- Improved calculation of fluid mixtures whose components are not included in the thermodynamics package.
- NEW: For fluid mixtures, both the dew point and the boiling point data are displayed in the selection dialogs for the phase boundary.
- Option to enter the nominal pressure rating/class for ANSI pipes without selecting the pipe material
- Various improvements have been made when exporting calculations to PDF or Excel format.
- Problems with printing calculations containing a large number of user-defined fields have been resolved.
- Revised help system.
- Minor improvements and fixes for stability issues

USER INTERFACE

- The management of templates has been revised and standardized. Templates include those for calculations, export schemes, user-defined fields, and measurement units.
- Improved consistency and error checking in program options
- The dialog for print options has been revised
- Minor improvements related to dependence graphs

CONTROL VALVE

- NEW: Input option for different nominal pressure classes at the valve inlet and outlet

- NEW: Adding seat tightness/leakage class according to IEC 60534-4 to the dialog and printout
- Calculation of additional operating points even with two-phase flow if the flow in the first operating point is gaseous.
- Improved calculation of fluid mixtures with manually overwritten fluid parameters
- NEW: For multi-stage downstream resistance structures (silencers), different bore diameters and plate thicknesses can be specified for each plate.
- Addressed stability issues in calculations with downstream resistance structures
- Notification for valve openings in the operating points that are too small or too large
- An issue with exporting operating characteristics to the Excel template has been addressed.
- Minor improvements related to compatibility with older calculations

ACTUATED VALVE

- NEW: The torques of any actuator not included in the database can be entered manually for documentation purposes.
- A notification will be displayed if the valve or actuator used in a calculation is no longer available in the current database.

DIFFERENTIAL PRESSURE FLOW ELEMENT

- Interpretation of the ISO 5167:2022 calculation standard in accordance with the ISO/TR 9464:2023 guideline.
- Minor improvements in checking compliance with the specified limits of the standards.
- The velocity in the flow meter was incorrectly calculated for venturi tubes in wet gas applications.
- Minor improvements related to compatibility with older calculations.

RESTRICTION ORIFICE

- NEW: For multi-stage configurations, different bore diameters and plate thicknesses can be specified for each plate.
- Improved calculation for flows with low Reynolds numbers, especially for high differential pressures within the potential choked flow range.
- NEW: Noise prediction for orifice plates with sound insulation according to ISO 15665.
- Minor improvements and fixes for stability issues

PRESSURE RELIEF VALVE

- NEW: In the fire case, non-insulated pipelines can also be considered for wetted vessels.
- For fluid mixtures, the dew point temperature is recommended as the worst-case scenario release temperature instead of the boiling point temperature.
- Some minor enhancements have been made, such as improvements in valve selection and the selection of nominal pressure classes.

THERMOWELL

- Minor improvements related to calculating fluid mixtures.

PIPE WALL THICKNESS

- Strength calculation according to EN 13480 has been updated to the 2024 edition

TANK DEPRESSURIZATION

- Free input option for the size of the valve inlet and outlet

CONTROL VALVE DATABASE

- Minor improvements have been made, including those related to importing Excel spreadsheets.

PRESSURE RELIEF VALVE DATABASE

- Minor improvements have been made, including those related to importing Excel spreadsheets.

COM SERVER

- The COM server supports loading and saving profiles and configuration backup files.

CHANGES IN BUILD 12.2

NEW USER INTERFACE

- The open calculations are displayed as tabs in the title bar of the calculations window.
- Visualization of modified calculations that require to be saved
- The management of templates, such as user-defined fields or units of measurement, has been revised. You can either change the data only for the current calculation or create a template for all calculations.
- Various settings (e.g. program settings, printing settings, etc.) can be saved in profiles. These profiles can also be used as a backup or to transfer settings to a different computer.
- It is now possible to change the unit of measurement of a single parameter without changing the unit of the linked parameters.
- The keyboard shortcuts have been revised to make it easier to use CONVAL without a mouse.
- Problems with incorrectly positioned dialog windows when using multiple monitors have been fixed.

GENERAL

- NEW: Ability to print schematic drawings of devices, such as for dimensioning
- Easier adding graphics to headers and footers
- Revised help system
- Minor improvements and fixes for stability issues

NEW CALCULATION MODULE: ANALYZER

- Calculation of analyzer frequencies and stresses according to IEC/TR 61831 and ASME PTC 19.3
- Calculation of probe lag time from sampling point to the analyzer for gases and liquids

CONTROL VALVE

- NEW: Noise Prediction for valves with acoustic insulation according to ISO 15665
- Corrections to cavitation and noise prediction for overcritical fluids
- Improved reliability analysis for abrasive media
- Improved support for butterfly valves and ball valves
  - Optional visualization of valve load as angle of rotation
  - Improved support for characteristics whose maximum is not at full valve opening
- Minor improvements in the calculation of multi-stage resistance structures
- Revised valve coefficients for generic multi-stage valves
- NEW: The seat sealing type can be specified as leakage class in the valve configuration.
- In addition to the seat diameter, the valve stroke is also displayed for linear valves.
- Minor improvements

CONTROL VALVE DATABASE

- Improved support for butterfly valves and ball valves
  - Import and export of characteristics and valve coefficient curves as a function of the angle of rotation
  - Improved support for curves whose maximum is not at full valve opening
- Minor improvements and fixes

ACTUATED VALVE

- Easy-to-read comparison of required torques with the actuator torques
- Minor improvements

DIFFERENTIAL PRESSURE FLOW ELEMENT

- Improved support for wedge flow meter and segmental orifices
- Minor improvements

RESTRICTION ORIFICE

- Corrected calculation of the bore spacing of multi-hole orifices with outlet bevel
- Minor improvements in the calculation of multi-stage designs
  - Separate option to enter the upstream pipe
  - Correction of temperature calculation for gas mixtures

PRESSURE RELIEF VALVE

- NEW: Update to the latest edition of ISO 4126-10:2024 for two phase flow sizing
- Improved calculation of pressure relief valves with two-phase flow
  - Correction in calculation of two-phase flow with highly viscous fluids
  - Improved calculation of the volumetric gas content in the valve throat of liquid-gas mixtures
- Corrections in the calculation of the mass flow rate at thermal expansion
- Reworked calculation of pressure loss in the downstream pipe considering the geodetic height
- Improved support for open discharge pressure relief valves
- Minor improvements and stability fixes

RUPTURE DISC

- NEW: Update to the latest edition of ISO 4126-10:2024 for two phase flow sizing
- Improved calculation of rupture discs with two-phase flow
- Calculation of mass flow rate to be discharged in fire case
- Minor improvements and fixes

THERMOWELL

- NEW: Support for straight helical thermowells
- Minor improvements

LEVEL CALIBRATION

- Minor improvements in the visualization of calculations with several units of measurement

COM SERVER

- Fixed issues with exporting characteristics graphics

BUG FIXES IN BUILD 12.1.1

PRESSURE RELIEF VALVES

- An error in the determinationof the mass flow to be discharged in the event of thermal expansion in blocked heat exchangers, pipelines, and vesselshas been fixed. The mass flow was calculated too large in older CONVAL versions, so that the safety valve was oversized.

STEAM CONDITIONING VALVE

- The values for the mass flow rate qm or the flow coefficient kv were not or not completely displayed in the calculation mask.

CHANGES IN BUILD 12.1

GENERAL

- Minor improvements and fixes for stability problems
- User-defined fields are indicated when they are linked to a calculation.
- Fixed issues printing multilingual user-defined fields.
- Fixed issues with printing graphics in headers or footers.
- Issues with the duplicatecheck when opening and copying calculations with gas or fluid mixtures have been fixed.
- Minor improvements when exporting calculations
- Improved functions for automatic saving of calculations
- NEW: Ability to repair databases via an Internet download function
- Improved compatibility when opening calculations created with older CONVAL versions
- Revised help system

CONTROL VALVE

- Display of a warning on the first dialog page if the valve does not cover the operating point
- Improved calculation of the mass vapor content at the valve outlet
- NEW: The mass flow rate for the heat exchanger feed can be calculated by entering the heat requirement of the heat exchanger.
- Display of viscosity for two-phase flow in standard view
- Corrections in calculation of cavitation index for two phase flow
- Minor improvements and fixes for stability issues

ACTUATOR FORCES OF CONTROL VALVE

- The stem diameter is now applied when importing a control valve calculation.

DIFFERENTIAL PRESSURE FLOW ELEMENT

- NEW: The flow meter calculation according to ISO/TR 15377 has been updated to the 2023 edition.
- NEW: The flow meter calculation according to ASME PTC 19.5 has been updated to the 2022 edition.
- The calculation of residual pressure loss $\Delta\varpi$ for venturi tubes and venturi nozzles has been revised.
- Fixed issues with opening calculations created with CONVAL 5 or 6.
- Inconsistencies in in the presentation of the required outlet lengths for 0.5% uncertainty have been fixed.
- Minor improvements

RESTRICTION ORIFICE

- The calculation of multistage designs has been revised:
  - -Correction of stability issues
  - -Table display with unit information
  - -Option for constant nominal diameter of each orifice plate

PRESSURE RELIEF VALVE

- Improved calculation of the mass vapor content in the valve outlet
- Corrections in the calculation of the mass flow in a fire case
- Corrections in calculation of pipe data (pressure losses, reaction forces, etc.) with the required mass flow rate

- Improved notification when valve dimensions are not in accordance with API 526
- Improved notification when the orifice size is too small for flashing valves
- Minor improvements and fixes for stability issues

RUPTURE DISC

- Improved calculation of rupture discs for two-phase flow with manual input of the mass flux

THERMOWELL

- The graph setting for the stress analysis of thermowells is saved with the calculation. A default value can be set in the program options.
- Minor improvements

SHELL-AND-TUBE HEAT EXCHANGER

- Minor improvements to the input of mass and volume flow rates

SUBSTANCE CALCULATION

- **NEW:** Calculation of melting temperature of pure substances and mixtures
- **NEW:** Calculation of the dew point temperature of humid gases
- **NEW:** Calculation of the Wobbe index to characterize the quality of fuel gases (e.g. natural gas, city gas)
- Searching the substance database in all languages supported

PRESSURE RELIEF VALVE DATABASE

- Minor improvements and fixes for stability issues

COM SERVER

- Fixed issues with releasing memory when the COM server is running for a while

THE NEW FEATURES OF CONVAL® 12

SOFTWARE LEASE OPTION - CONVAL 365

- Direct availability of new functions that would otherwise only be rolled out with a release upgrade
- Update of the supported calculation standards to the most recent version
- Guarantee of compatibility with the latest Windows versions
- Continuous updates for quality assurance and bug fixing

EXTENDED LICENSING MODELS

CONVAL supports different licensing variants:

- **Network licenses**, which are installed on any workstation or server in your company, and which manage the number of simultaneous users of CONVAL. The installation of the actual calculation software can be done locally on the client or on a network share.
- **Personal licenses**, which are provided by F.I.R.S.T. GmbH in the cloud and are bound to a named user. These licenses can be checked out temporarily so that work is still possible even without an Internet connection.

THE NEW USER INTERFACE

- Clear, contrast-optimized calculation forms based on popular Office programs
- Input pane with variable width for optimum use of the screen width

- Dynamic fading in and out of parameter names in multi-column input mask when width is changed
- Improved scaling support for high-resolution screens

ENHANCEMENTS AND IMPROVEMENTS AT RELEASE START

GENERAL

- Revised help system
- Setting option for the font of tables for the printout
- User-defined fields
  - -User-defined fields can be entered in multiple languages.
  - -Drop-down lists with or without the option of free input are supported.
  - -Notes can be added to all the user-defined fields.
- Templates
  - -Extended options for creating and managing calculation templates
  - -Improved support for export templates in Excel format

CONTROL VALVE

- Minor improvements and fixes for stability issues
- CONVAL now also supports valves of the "Dilating Disk" type (valves with an iris shutter-like mechanism).
- Improved calculation of fluid conditions in the Vena Contracta of multi-stage valves
- More accurate sound calculation for multi-stage valves if the data of the last stage is not known
- Improved recommendation for the optimum Cv100 value when several operating points are given
- Display of flow velocities in the upstream and downstream pipe for all operating points
- When printing out calculations with diaphragm valves, the valve stroke is not displayed

ACTUATED VALVE

- Adaptation to the recently issued version of ISO 5115 " Industrial valves - Part-turn valve actuation" (11/2023)

DIFFERENTIAL PRESSURE FLOW ELEMENT

- The calculation of differential pressure flow elements now supports the input of up to three operating points. The names of the operating points can be customized.
- For concentric orifices, in addition to the pressure tapping points defined in the standards, the distances between the pressure tapping points can optionally be entered freely.
- Improved design when using the calculation reference "C and ε with 2/3 sqm" by displaying both operating states
- Calculation of the permanent pressure loss $\Delta\varpi$ for Venturi tubes
- Improved support of the extended uncertainty calculation in tables and graphs
- Numerous other minor improvements

RESTRICTION ORIFICE

- Minor improvements and correction of stability issues in multi-hole orifice calculation
- Table view of individual orifices in multi-stage arrangements with more detailed information
- Display of inlet and outlet flow velocities

PRESSURE RELIEF VALVE

- Minor improvements and fixes for stability issues
- Calculation of the property data in the outlet of the safety valve, including the calculation of the mass vapor content for flashing liquids.

- Determination of the mass flow to be discharged in the event of thermal expansion in blocked heat exchangers, pipelines, and vessels (thermal relief valves)
- Determination of the maximum pressure of the blocked pipeline in the event of thermal expansion in pipelines
- Calculation of the banking-up pressure at the valve outlet with supercritical gas flow
- Calculation of the discharge function Ψ and discharge power Φ for compressible flow
- Graphic display of the corrections for the discharge coefficient for back pressure and lift stop
- Calculation of the steam pressure coefficient for steam according to ISO 4126-7
- Improved calculation of two-phase flow pressure relief valves
- Display of the maximum mass flow rate (maximum mass flow rate = certified mass flow rate / 0.9)
- Calculation of pipe data (pressure losses, reaction forces, etc.) optionally with the required mass flow rate instead of the maximum mass flow rate
- Improved support of temperature-dependent curves for the maximum set pressure
- Improved calculation of safety valves according to API 526 (08/2023)

THERMOWELL

- Thermowell calculation now supports input of up to three operating points. The names of the operating points can be customized.
- Pass/Fail analysis of dimensions, frequencies, and stress limits for up to three operating points
- Stress analysis can now show the dependence of stress limits on frequency ratio, flow velocity, and nowflow rate.

TANK DEPRESSURIZATION

- Minor improvements and fixes for stability issues
- Display of flow velocity at valve outlet

RUPTURE DISC

- Improved calculation of two-phase flow rupture discs

SUBSTANCE DATABASE

- Numerous viscous oils have been added to the substance database.
- Improved calculation of mixtures of liquids and gases
- Calculation of isothermal compressibility χ for media from the Thermodynamics module

LICENSE MANAGEMENT

- Temporary check-out and check-in of network and named user licenses so you can continue to work without a network connection.
- Optimized settings to make it easier to find available licenses

THE CONVAL® 11 SERVICE RELEASES

CHANGES IN BUILD 11.5

GENERAL

- Minor improvements and fixes for stability issues
- Improved appearance when scaling for high-resolution screens
- Extended update check: In addition to device and fluid data, export templates and templates for calculation information are also checked and updated if necessary.
- The function for sending calculations as e-mail attachments has been revised.

- Improvements to printing calculations with notes and comments

CONTROL VALVE

- Improved calculation of valve inlet pressure at operating conditions near the phase boundary
- Corrections in the calculation of the outlet conditions of valves with small pressure ratings
- Improved estimation of the valve characteristic value Fd and thus the sound prediction for low-noise valves for which no measured data are available
- When calculating the flow rate, the stroke position can now be specified as an alternative to the Cv/Kv value.
- The stroke in inch or mm can now be specified as an alternative when using lift stoppers for valves from the database.
- The dependence graphs of the parameters of the 2nd and 3rd working points partly gave no result.

STEAM COOLING VALVE

- Small improvements in the verification of input parameters

ACTUATOR FORCES OF CONTROL VALVE

- Support of leakage class IV-S1 according to IEC 60534-4

DIFFERENTIAL PRESSURE FLOW ELEMENT

- Minor improvements

RESTRICTION ORIFICES

- Minor improvements and fixes for stability issues in the calculation of multi-stage structures

PRESSURE RELIEF VALVE DATABASE

- Improvements in the import of valves with back pressure curve

PRESSURE RELIEF VALVE

- Revised calculation of outlet conditions and outlet pipe for gases and vapors
- Improvements in checking the limits of use for valves with threaded or clamped connections

FLUID DATABASE

- Correction of errors when editing solutions
- Minor improvements

MATERIAL DATABASE

- Improvements in entering new materials with clipboard support

COM SERVER

- The SI-unit of parameters could not be changed by the setting the name of the unit.

BUG FIXES IN BUILD 11.4.1

GENERAL

- Fixes for stability issues

CONTROL VALVE

- The selection of valves from the database with different inlet and outlet size caused the program to crash in some cases.

DIFFERENTIAL PRESSURE FLOW ELEMENT

- The selection of flow meters from Rosemount with special design caused the program to crash in rare cases.
- When calculating humid gases, in some cases the mass flow rate qm was not displayed.

CHANGES IN BUILD 11.4

GENERAL

- Minor improvements and fixes for stability issues
- Revised help system
- New: Graphics can be copied directly to the clipboard
- New: Navigation in tables with the Enter key optionally horizontally instead of vertically

ACTUATED VALVE

- Revised user interface and new data sheets according to ISO 5115 and WIB RP S 2812-X-19
- Support of electric actuators with torque brake
- Minor display issues in the selection dialog for electric actuators have been fixed.
- Revised check of the stall torque of electric actuators

CONTROL VALVE

- Minor improvements and fixes for stability issues
- Improved sound prediction for valves with two phase flow at inlet
- Improved sound prediction for low-noise valves not provided with all measured valve factors
- New: Calculation of the flange internal diameters as a function of the pressure rating

DIFFERENTIAL PRESSURE FLOW ELEMENT

- Minor improvements
- The flow meter calculation according to ISO 5167 has been updated to the 2022 edition.
- The flow meter calculation according to ISO 9300 has been updated to the 2022 edition.
- New: Calculation of wet gas in orifices, Venturi tubes and cone meters according to:
  - -ISO/TR 11583:2012 "Measurement of wet gas flow by means of pressure differential devices inserted in circular cross-section conduits".
  - -ISO/TR 12748:2015 "Natural gas - Wet gas flow measurement in natural gas operations".
- New: It is now possible to enter the diameter ratio ß as an alternative to entering the throttle orifice d.
- New: Sound prediction for all orifice type meters based on IEC 60534-8-3 or IEC 60534-8-4
- New: Input option for carrier rings for orifice plates with corner pressure tapping
- Revised calculation of Rosemount 1595 multi-hole orifice plates and 1195 integral orifice plates
- The calculation of the expansion coefficient ε of wedge flowmeters according to R. W. Miller was erroneously performed according to ISO 5167-6.

RESTRICTION ORIFICE

- Minor improvements and fixes for stability issues

PIPE WALL THICKNESS

- Minor improvements
- Strength calculation according to API 521 has been updated to the 2020 edition.
- New: Suggestion of the matching schedule for the calculated wall thickness of ANSI pipelines

PRESSURE RELIEF VALVE

- Minor improvements and fixes for stability issues
- Consideration of high viscosity media (small Reynolds numbers) with all calculation standards
- In addition to the sound power level, the sound pressure level is now calculated as well.
- New: Support of open discharge relief valves
- Revised pressure-temperature curves for cast iron according to EN 1092-2

RUPTURE DISC

- Minor improvements and fixes for stability issues
- Consideration of high viscosity media (small Reynolds numbers) with all calculation standards

LEVEL CALIBRATION

- The density of the media in the legs was not always calculated.

EXPORT FUNCTION

- An issue with exporting and sending calculations as PDF document has been fixed.

COM SERVER

- Improved support of formulas in user-defined fields

SUBSTANCE DATABASE

- A bug with copying solutions is fixed.

RELIEF VALVE DATABASE

- Improved import of data in Excel format with extended plausibility check

MATERIAL DATABASE

- Minor improvements and data maintenance

CHANGES IN BUILD 11.3

GENERAL

- Minor improvements and fixes for stability issues
- Revised management of formulas with access to parameters of calculation in user-defined fields
- Revised help system
- Improved window handling

ACTUATED VALVE

- Minor improvements and fixes
- Support of breakaway torques in open and closed position
- Revision and extension of the databases for valves and actuators

CONTROL VALVE

- Minor improvements and fixes for stability issues
- Option for safety-related application
- Revised user interface for valves with stroke or rotation angle limitation
- Improved handling of valves for liquids at flashing conditions or liquids with dissolved gases
- Improved support for rotary valves with low-noise trims

- Consideration of kinetic energy in the calculation of downstream resistances (only in combination with the thermodynamics module)

STEAM COOLING VALVE

- Revised user interface
- Consideration of the pressure drop at the injection nozzle

DIFFERENTIAL PRESSURE FLOW ELEMENT

- Minor improvements in the calculation of the flow coefficient C for Venturi tubes for small and large Reynolds numbers
- Revised calculation of limits for pipe roughness
- Calculation for drain holes according to ISO/TR 15377:2018 for all types of orifice plates
- Strength calculation for orifice plates according to ISO/TR 9464, ASME B31.3 etc.
- Inclusion of GOST 8.586 (ISO 5167 mod) in the list of available calculation standards

RESTRICTION ORIFICE

- Minor improvements and fixes for stability issues
- Consideration of kinetic energy in the calculation of multistage configurations (only in connection with the thermodynamics module)

PIPE WALL THICKNESS

- Strength calculation according to API 521:2014 - A.3.5.4.4

PRESSURE RELIEF VALVES AND RUPTURE DISC

- Minor improvements and fixes for stability issues.
- Inclusion of ASME BPVC-XIII:2021 in the list of available calculation standards
- Calculation of two-phase flow by direct integration according to API 520 or ISO 4126-10
  If CONVAL provides thermodynamic equations of state for the selected medium, the calculation of the mass flow can be derived by integration from the inlet to the narrowest flow cross-section of the nozzle.

SHELL-AND-TUBE HEAT EXCHANGER

- Corrected calculation of the minimum shell diameter for multiple pass heat exchangers

EXPORT FUNCTION

- Minor improvements and fixes for stability issues
- Improved user interface for creating export templates with error checking and hints on possible issues
- The unit of parameters can be predefined in the export templates

COM SERVER

- Selection of regional format for decimal separator, date, and time in CONVAL language settings
- Support of formulas in user-defined fields with access to parameters of the calculation

CHANGES IN BUILD 11.2

GENERAL

- Minor improvements and fixes for stability issues
- Minor adjustments for improved Windows 11 experience
- Improved appearance when scaling for high-resolution screens
- Revised help system

- NEW: Support of formulas in user-defined fields with access to parameters of the calculation
- Improved compatibility when loading old calculations from CONVAL versions 5 and 6
- Sporadic problems with the visualization of Chinese characters are solved
- Improved export of graphics to various image formats
- Selection of regional format for decimal separator, date, and time in CONVAL language settings
- Minor inconsistencies in the handling of mixtures are fixed.
- Import and export of mixtures according to AGA 8 and GERG 2008 standards
- Minor improvements in connection with export templates in Excel format
- Update of the licensing software. Problems with handling licenses for cloud licenses are fixed.

ACTUATED VALVE

- Many improvements and fixes of stability problems
- NEW: Design and selection of electric actuators
- Revised actuator database for pneumatic actuators
- Support of a second breakaway angle for open position for automated valves
- Improved import function for Scotch-Yoke actuators specifying the angle for the running torque
- Improved import function for valve torques that already include a safety margin
- Extended export templates

CONTROL VALVE

- Minor improvements and fixes to stability issues.
- Corrections in checking the maximum cavitation index recommended by the valve manufacturer
- Corrections in the evaluation of sound level corrections specified by the manufacturer
- Revised control valve database
- Revised export templates for calculations with two-phase flow

DIFFERENTIAL PRESSURE FLOW ELEMENT

- Minor improvements
- Corrections in the extended uncertainty calculation near the phase boundary
- Calculation of the position of the Vena Contracta for additional orifice types

RESTRICTION ORIFICE

- Minor improvements and fixing of issues in the calculation of multistage configurations
- Improved ability to detect potential pipe damage with compressible flow
- Extension of the valid input range for the hole diameter d

PRESSURE RELIEF VALVE

- Minor improvements and fixes of stability problems
- Correction of noise prediction according to ISO 4126-9 and API 521

MATERIAL DATABASE

- Minor improvements and fixes of stability problems

COM SERVER

- Timing issues when starting the COM server are fixed.
- General function "Module Func" for ICalculation to call the public functions without parameters

CHANGES IN BUILD 11.1

GENERAL

- Display issues with scaling for high-resolution screens have been fixed.
- Exporting graphics and Excel templates to PDF format is now possible in many cases.
- Problems with opening multiple calculations via the Open dialog have been fixed.
- Searching of Chinese substance and material names is now supported.
- Improved handling when individual device databases are not stored in the default folder
- Extended option to control the printout of calculations by sections
- In the database programs, Excel data sheets with formulas are supported during import.
- Improved client setup at network installation fixes problems with accessing the help function
- Revised controlling of license search for network and cloud licenses
- Occasional issues when opening calculations with gas or liquid mixtures have been fixed.
- Improved print preview via Microsoft WebView2 instead of Internet Explorer with PDF plugin

ACTUATED VALVE

- Minor improvements and fixes of stability problems
- Specifying multiple flanges for valves and actuators is supported by the database.
- When specifying valves in the database, an additional user-defined identifier can be assigned.
- The minimum air pressure required for the valve torques is displayed in the actuator selection.
- In addition to scotch yoke and rack and pinion actuators, diaphragm and vane actuators are supported.

CONTROL VALVE

- Minor improvements and fixes of stability problems
- Display issues in the piping selection dialog have been fixed.

DIFFERENTIAL PRESSURE FLOW ELEMENT

- Revised uncertainty calculation for pitot tubes. The Uncertainty of the pipe diameter was not sufficiently considered in the overall uncertainty calculation.

RESTRICTION ORIFICE

- Minor improvements and fixes of stability problems
- Revised calculation of multi-stage single-hole orifices at extremely high Mach numbers.

THE NEW FEATURES OF CONVAL® 11

ENHANCEMENTS AND IMPROVEMENTS AT RELEASE START

GENERAL

- Revised user interface
- Advanced import and export functions
- Improved support for Windows display scaling

SUBSTANCE DATABASE

- Measured values for enthalpy, entropy, surface tension
- Improved calculation of substance mixtures

  - Option to enter mass and molar percentage data
- Support of solutions, acids etc.
  - Concentration-dependent substance properties
- Support for substance names for additional languages besides German and English

NEW: ACTUATED VALVE

- Sizing and selection of actuators for part-turn on/off valves
  - WIB RP S 2812-X-19
  - ISO-TC153-SC
- Graphical analysis of valve and actuator torques
- Database for actuators
- Database for on/off valves
- Favorites lists for device manufacturers in the valve and actuator selection

CONTROL VALVE

- Improved calculation of downstream resistors
- Revised printout of characteristic curves
- Extended control valve database
- Improved valve selection with favorites list for valve manufacturers
- Calculation of steam cooling valves

DIFFERENTIAL PRESSURE FLOW ELEMENT

- Extended uncertainty calculation according to ISO 5168 with -Sensitivity coefficients
- Update of the calculation for nozzles according to ISO 5167-3
- Calculation of wedge flowmeters according to ISO 5167-6
- Support of GB/T 2624 standard
- Extended calculation of cone meters. Includes the calculation of the required straight inlet and outlet lengths
- Stress calculation for orifices (ASME B31.3, ISO/TR 9464, ISO 5167 etc.)

RESTRICTION ORIFICE

- Calculation of multi-stage expansion (automatic and manual)
- Improved stress calculation (ASME B31.3, AD 2000, ISO 5167 etc.), especially for multi-hole orifice plates

PRESSURE LOSS

- Pressure loss with NPSH calculation

PRESSURE RELIEF VALVE

- Calculation of two-phase flow
  - ISO 4126-10
- Revised user interface with recommendations for the valve design
- Favorites lists for valve manufacturers and enhanced filter options in the valve selection

RUPTURE DISC

- Calculation of two-phase flow
  - API 520
  - ISO 4126-10

THERMOWELL

- Calculation of the maximum allowable working stress in a wider temperature range

PIPE WALL THICKNESS

- Pipe wall thickness calculation according to ASME B31.3

LEVEL CALIBRATION

- Media in the legs from database
  - Consideration of temperature changes affecting the density
- Improved uncertainty calculation
  - For example, to check the influence of the ambient temperature with tanks with two liquids