CLA-VAL™

Cla-Tools
Software Solutions

VFD PUMP FLOW | PRV STATIONS | CHECK VALVES | CAVITATION ANALYSIS

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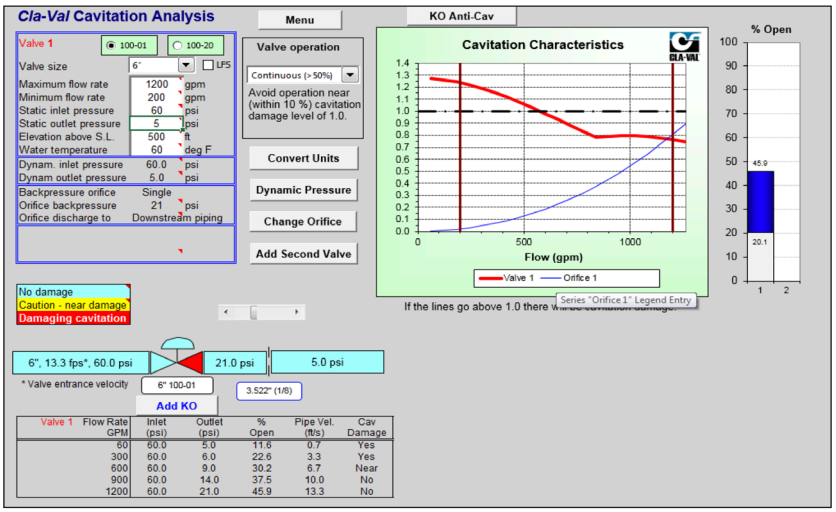
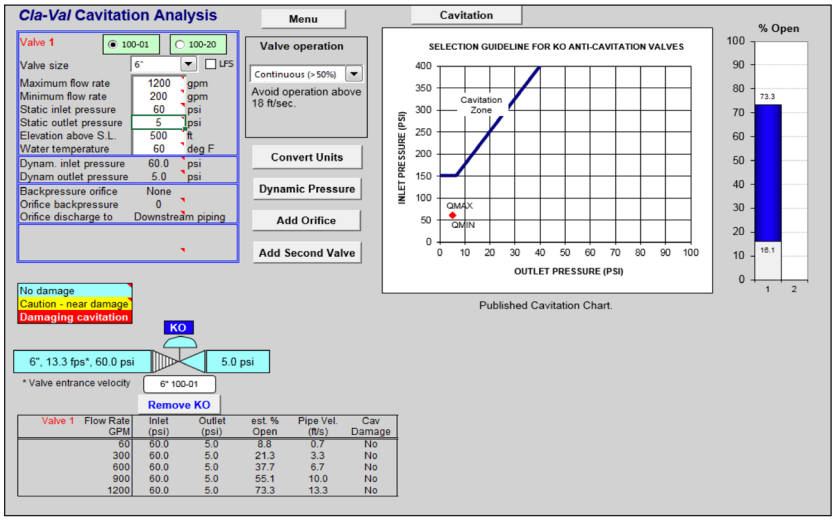
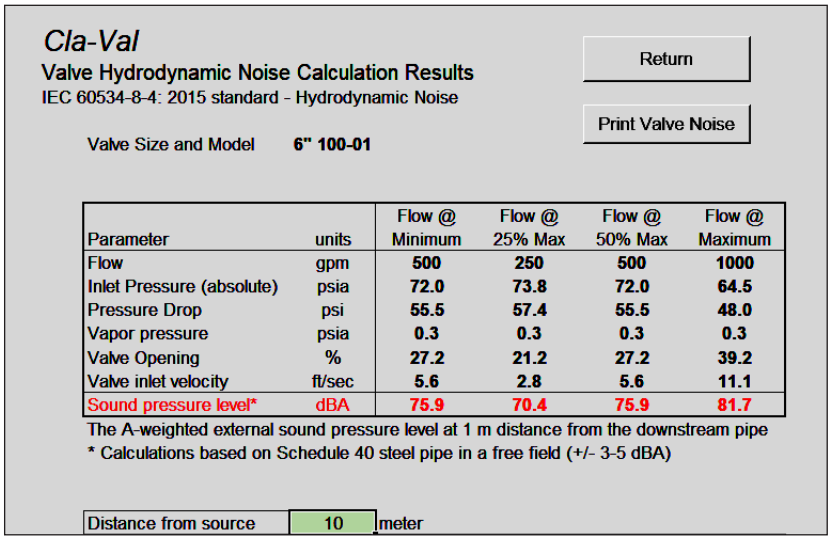
Cla-Cav

Cla-CAV is a tool for analyzing pilot operated control valves for the potential of cavitation and cavitation damage at the full range of flows and pressures, allowing the designer to see the benefits of adding KO anti-cavitation trim.







Cla-CAV 1

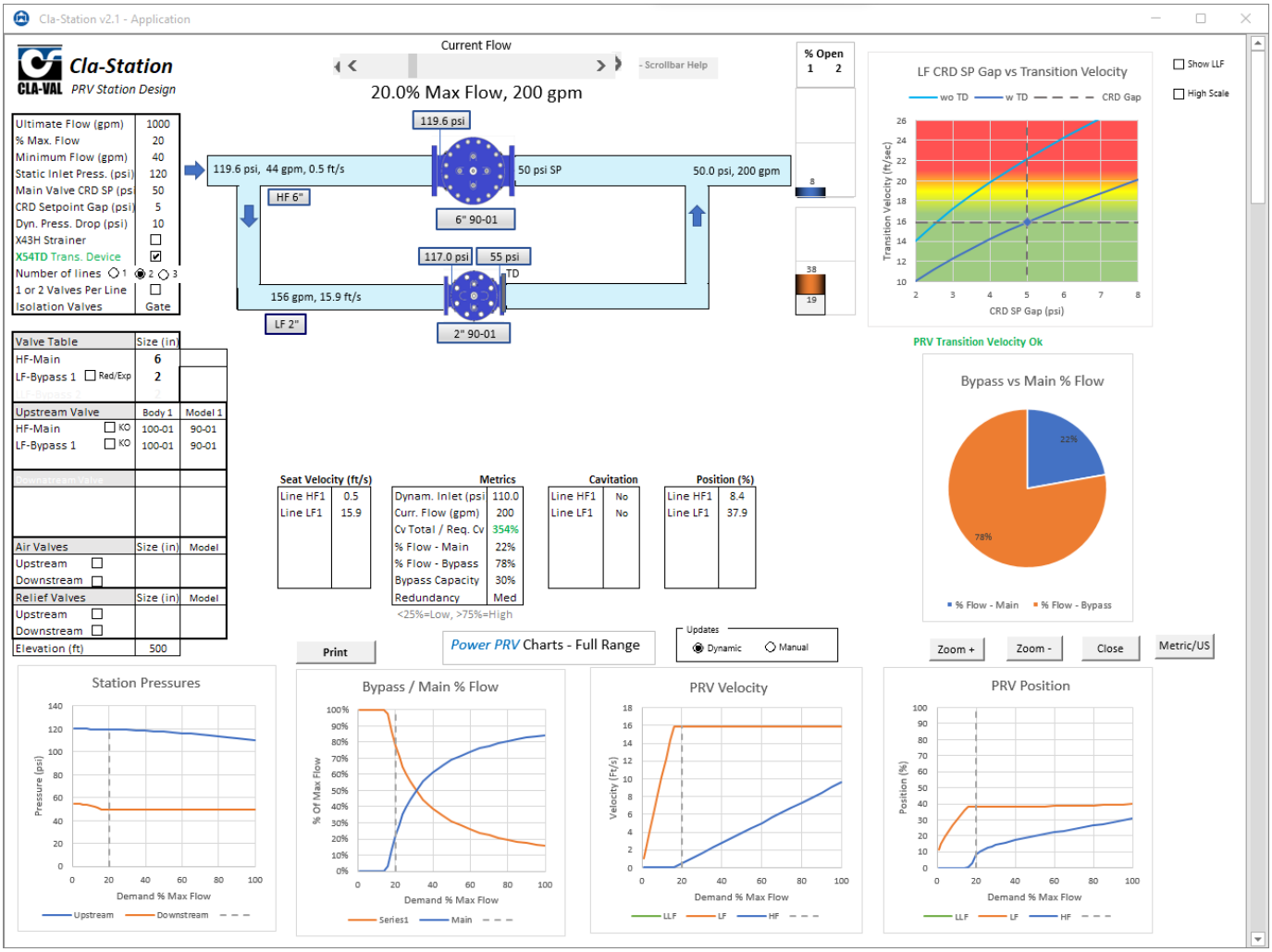
This screen illustrates that with a wide range of flows a back pressure orifice will not provide cavitation damage protection in the lower portion of the flow range. However when the range of flows is narrow, such as fixed flow control into a tank, this may be an economical alternative. Cla-CAV incorporates capabilities to analyze both backpressure and metering flow control orifices. Much of the results are based on independent lab tests at the Utah Water Research Laboratory.

Cla-CAV 2

In the case above the use of KO anti-cavitation trim provides cavitation damage protection over the entire range of flows. It also illustrates the increased portion of the valve stroke required and that in this case there is sufficient capacity with the same size valve.

Cla-CAV - Valve Noise

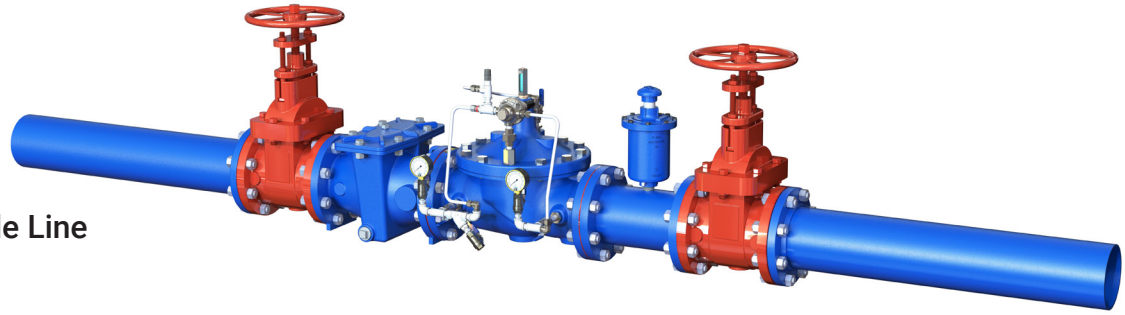
In some hydraulic conditions, especially operation with high pressure drop, valve noise can be an issue in residential areas or where people are near the valves. Cla-CAV includes a section where the IEC standards for Hydrodynamic Valve Noise are used to calculate the Sound Pressure Level (SPL) at 1 meter distance in decibels on a "A" weighting scale (dBA). Engineers and customers can then determine if corrective action may be needed. The analysis page provides noise levels between the minimum and maximum flows.



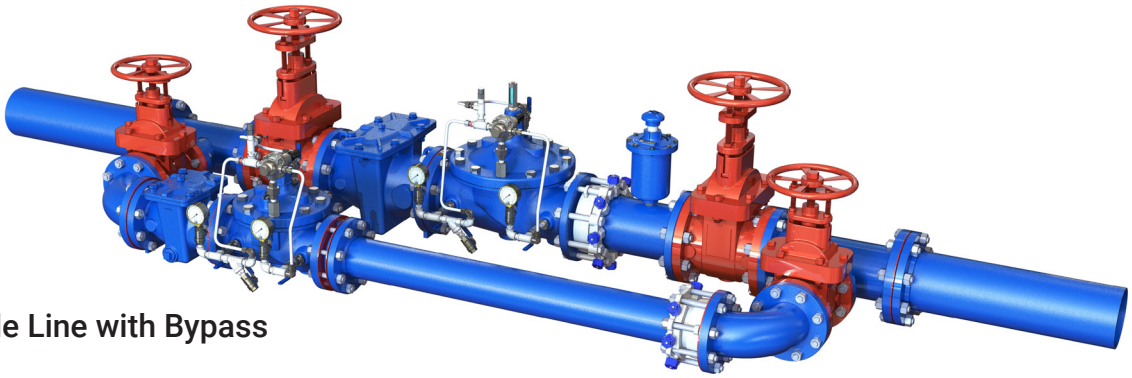
Cla-Station

Cla-Station is a full featured PRV Station Hydraulic Modeling tool. It models PRV Station performance based on flow and pressure parameter inputs. These include CRD pilot setpoints, dynamic upstream pressures, and complete flow range. Up to three parallel lines with one or two valves in series can be modeled. A current demand flow scroll bar makes it easy to view performance at any specific flow demand including fire flow. Add on features include X54TD Transition Device, X143H strainers, Air Valves, and Relief Valves. All devices are included in hydraulic modeling of the PRV Station, The X54TD Transition Device aids in transitioning to the next parallel PRV at a recommended safe velocity.

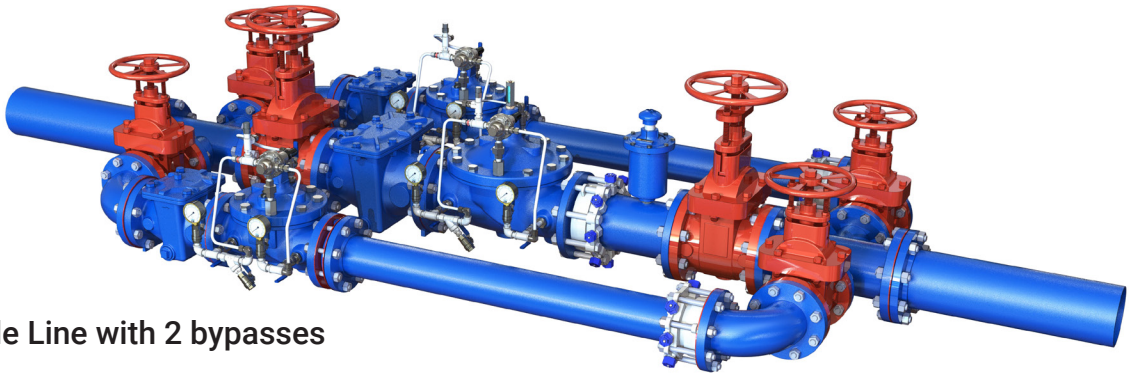
"Power PRV" charts provide performance from zero to ultimate flow of upstream and downstream pressures, relative % of total flow, velocities, and each valve position. Main Valve vs. Bypass Valves comparison chart provide a quick glance of relative performance an any specific flow demand. Multiple valve combinations can be quickly evaluated to optimize station performance. PRV Station Design can be completed by working with ESI Fab Systems for final CAD design and construction.



Single Line

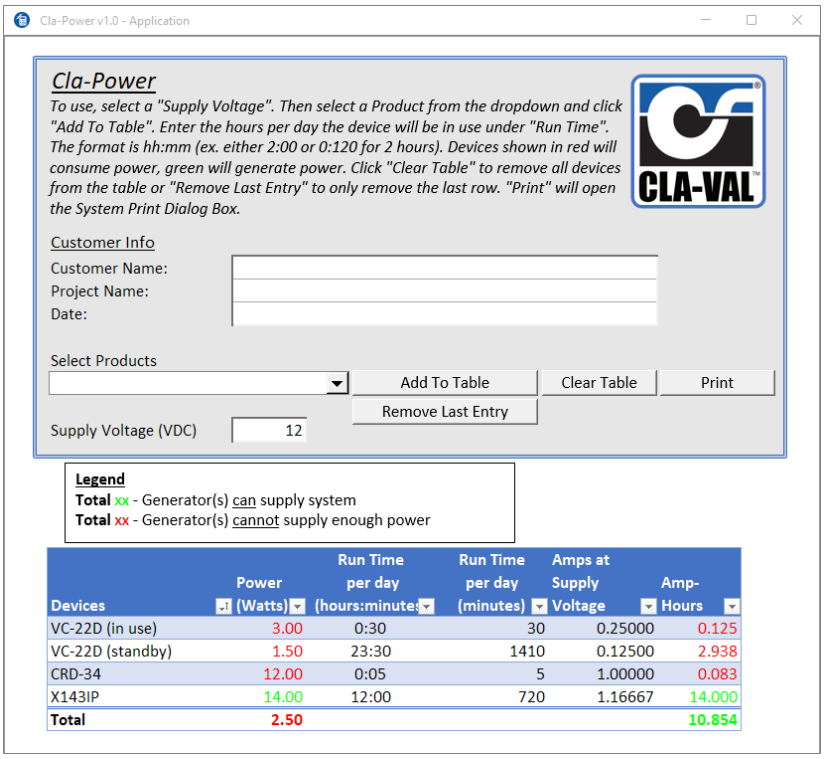


Single Line with Bypass



Single Line with 2 bypasses

Cla-Power

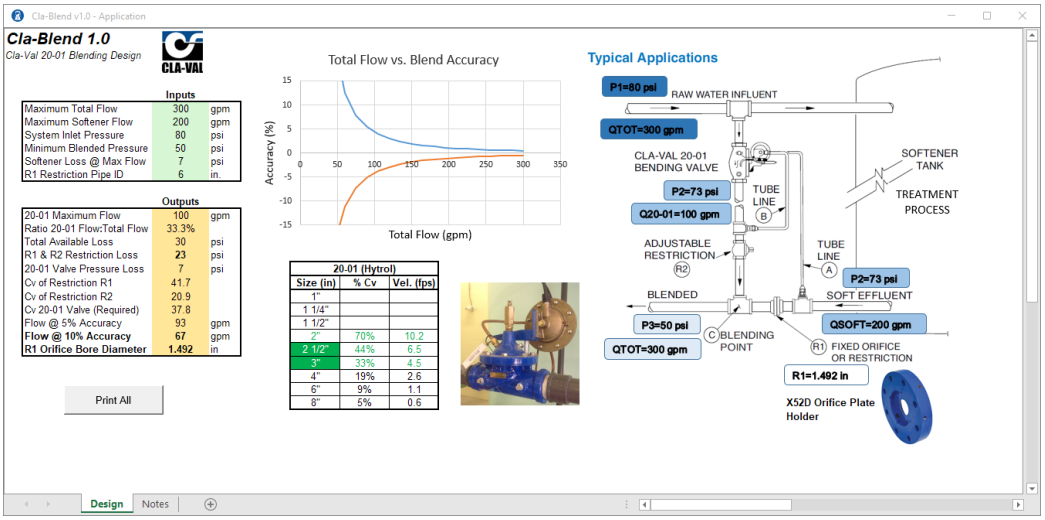


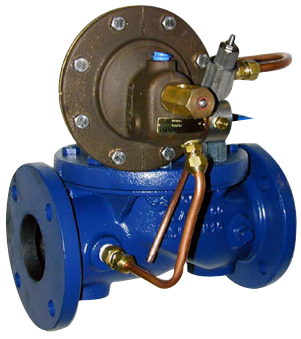
Devices	Power (Watts)	Run Time per day (hours:minutes)	Run Time per day (minutes)	Amps at Supply Voltage	Amp-Hours
VC-22D (in use)	3.00	0:30	30	0.25000	0.125
VC-22D (standby)	1.50	23:30	1410	0.12500	2.938
CRD-34	12.00	0:05	5	1.00000	0.083
X143IP	14.00	12:00	720	1.16667	14.000
Total	**2.50**				**10.854**

Cla-Power

Cla-Power is a basic power consumption calculator that can be used with any Cla-Val electrical products. This calculator allows for all electrical products at a site, or in a vault, to be added to a table with their daily usage and supply voltage. From this, the total power draw and amp-hours of that system can be found. Cla-Val generators, like the X143IP, can be added the table along with the suspected run time in order to see if it will be capable of supporting the desired system. This is extremely useful when trying to figure out run time and needed battery capacity. The calculator is also useful in determining external DC power supply and Solar panel requirements.

Cla-Blend



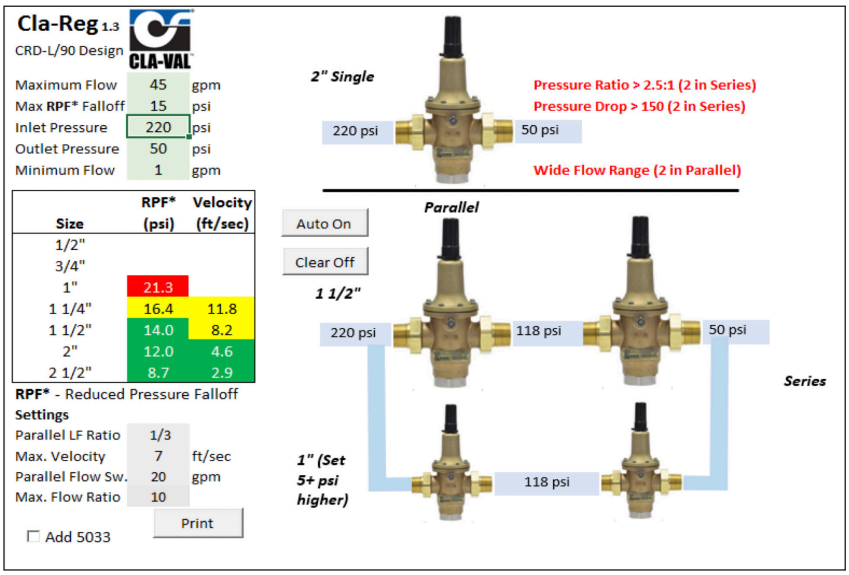


Cla-Blend

Cla-Blend is a modeling tool for soft water blending applications using the Model 20-01 Blending Valve. Results include sizes of 20-01 and restrictions given system parameters inputs. Accuracy chart illustrates the range of accurate blending performance. Diagrams show placement of the valve and restrictions in the system along with sizes.

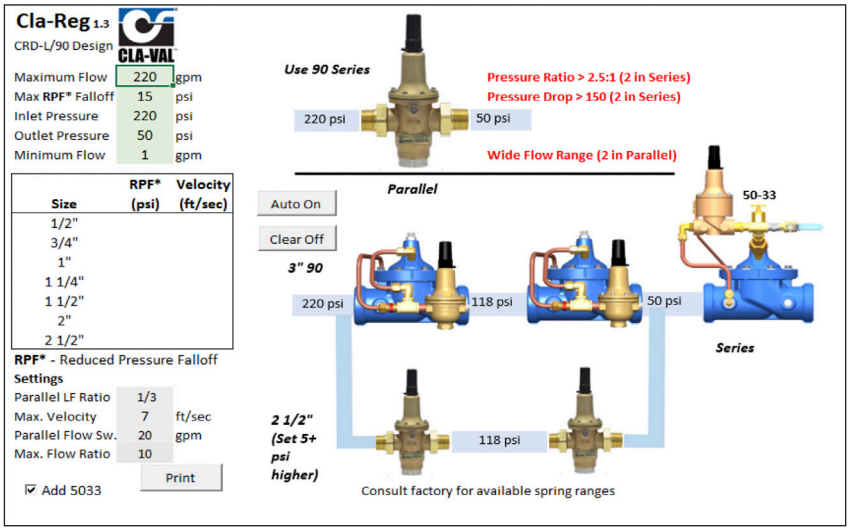
Cla-REG

Cla-Reg is a design tool for sizing both the CRD-L direct acting and 90 Series pilot operated pressure reducing valves for buildings. Well established rules are followed to prevent problems of cavitation damage and noise as well as excessive velocity. When pressure drop is too high or flow range is too wide the program automatically places valves in series and/or in parallel to perform over the entire design range.



Cla-Reg 1

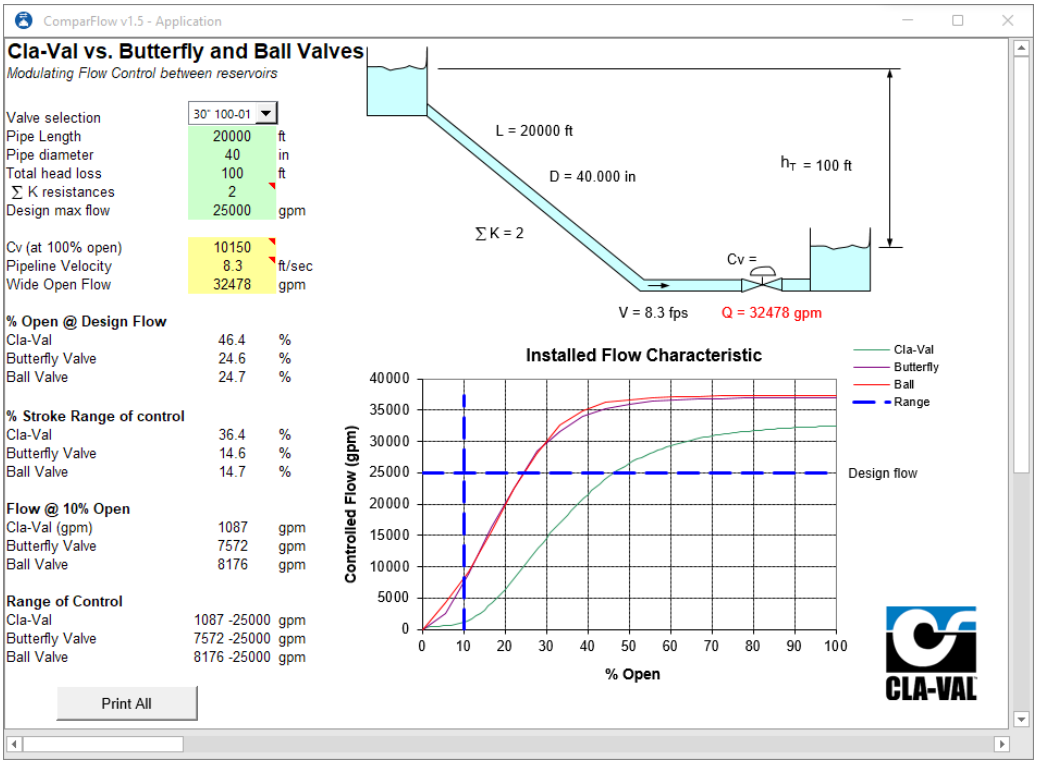
Cla-Reg 1 illustrates an example of high pressure drop and very low flow, particularly during low demand. Larger CRD-L pressure regulators are placed in parallel with smaller models to allow optimum performance over typical flow ranges. Because of the high pressure drop they are also placed in series.



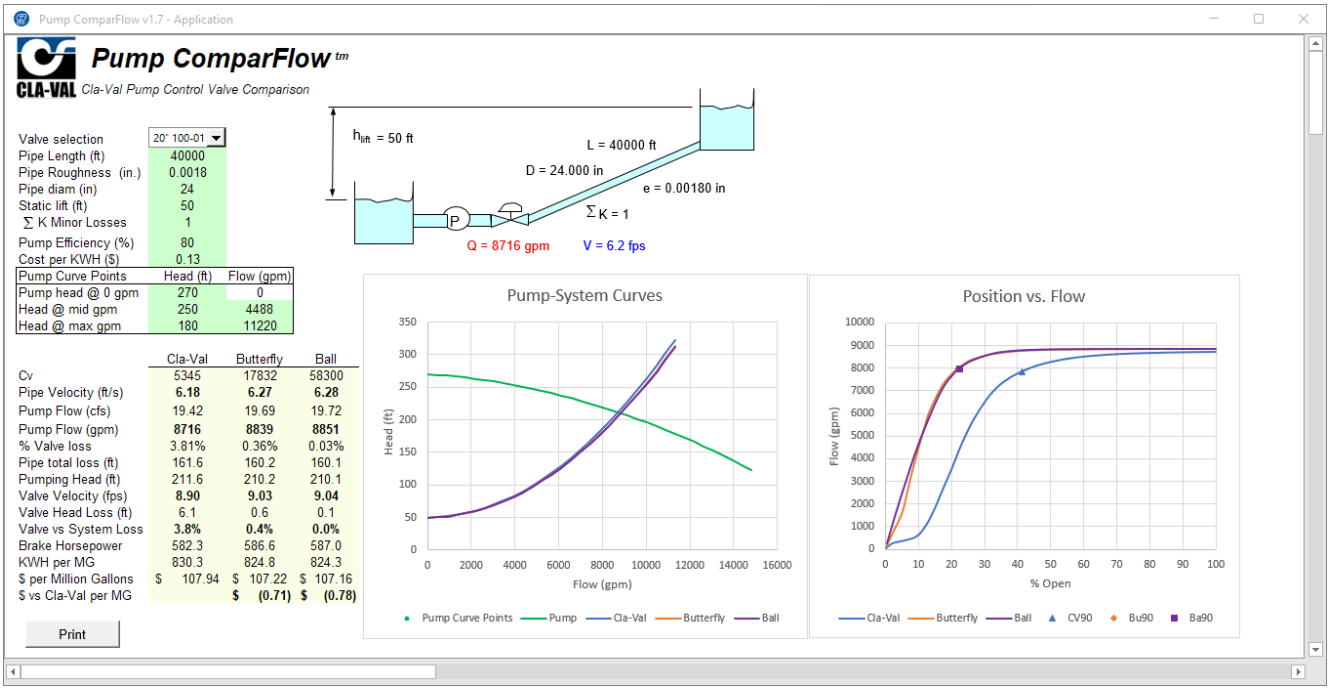
Cla-Reg 2

Cla-Reg 2 illustrates an even wider range of flows where the high flows are best handled with the 90 Series pilot operated pressure reducing valves. In addition, for protection In the event of malfunction, a safety model 50-33 Series valve is placed downstream which automatically closes on an over pressure condition to protect against damage to downstream plumbing.

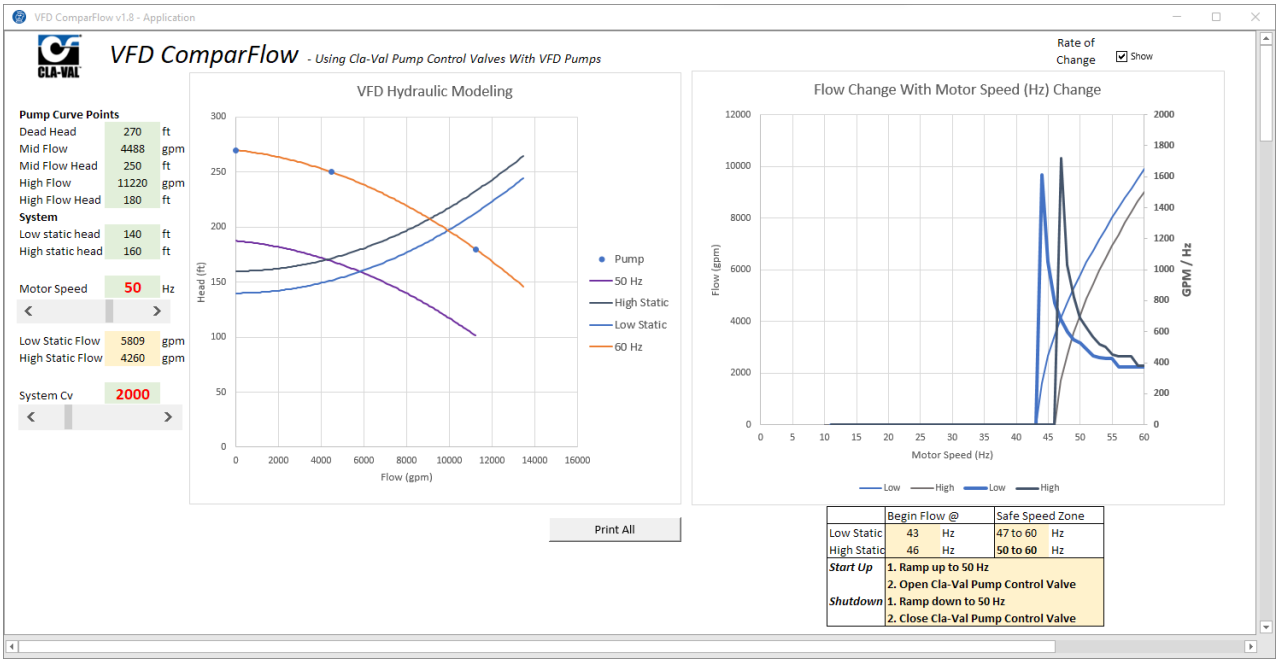
ComparFlow



Pump ComparFlow



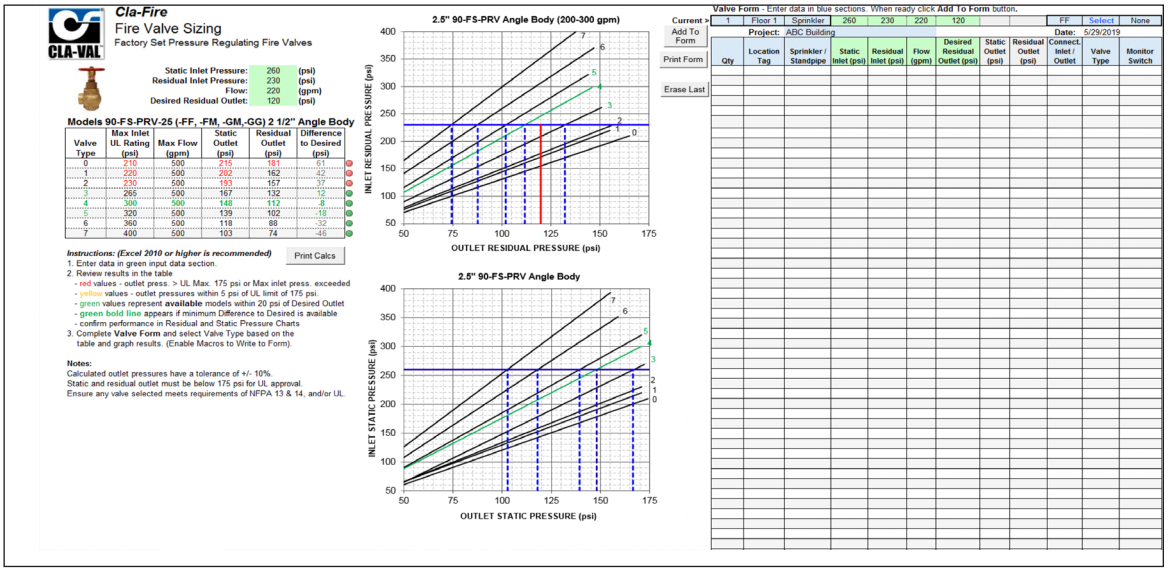
VFD ComparFlow



ComparFlow

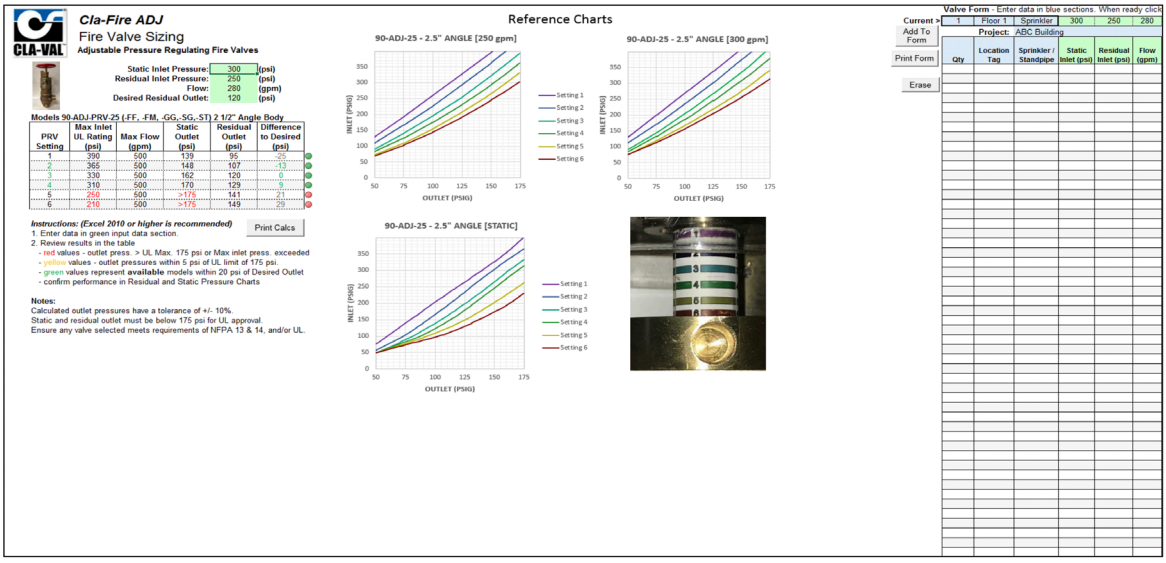
There are a trio of programs for gravity flow, pumping flow and pumping flow with VFDs focusing on valve installed "controllability" withing each system. Comparisons are made vs. other "lower loss" valves such as butterfly or ball valves illustrating the improved range of control with Cla-Val globe style valves. The improved range of control results in better stability of control and reduced hazard of causing surge, especially in longer pipelines. The Pump ComparFlow program illustrates that reducing surge can be equal to or greater in importance to small energy savings with low loss type valves.

In the case where VFDs are used there is also a hazard of surges because the relationship of motor speed with flow. The program illustrates the high rate of change of flow in the low flow region which can lead to surge problems. The program illustrates how utilizing Cla-Val Pump Control Valves can limit surge and transfer control to the VFDs for modulating control.



Cla-Fire

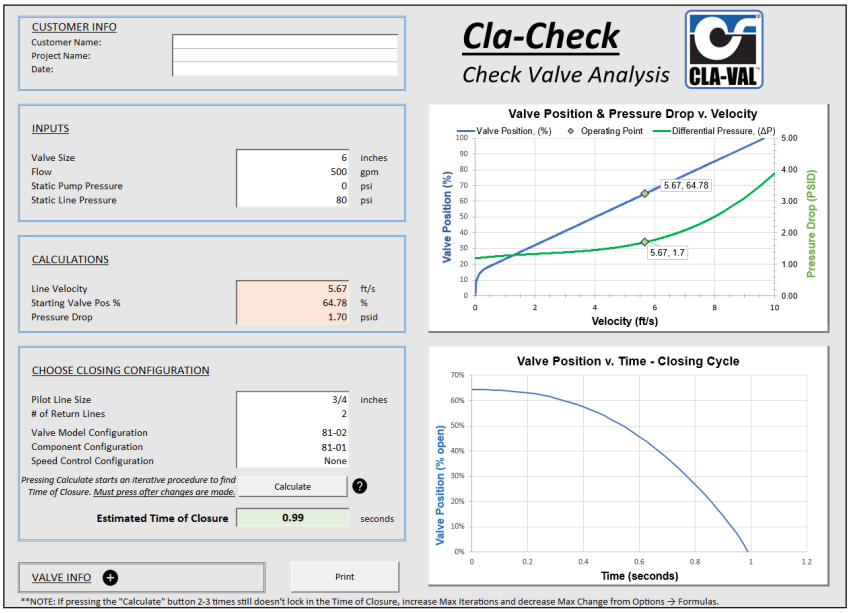
Allows quick sizing analysis of the direct acting Factory Set series of Pressure Regulating Valves.



Cla-Fire ADJ

This version is for the new Adjustable direct acting series PRVs. Both offer color coded tables to quickly evaluate the best options. A fill out table detailing each floor valve type or adjustment setting ensures correct design to meet NFPA 13 & 14 and/or UL requirements.

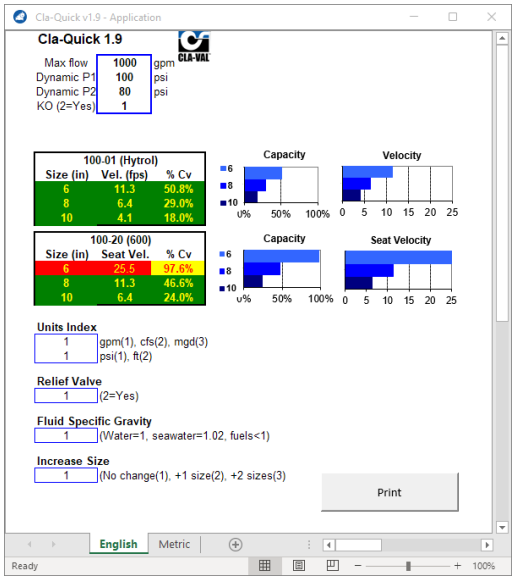
Cla-Check



Cla-Check

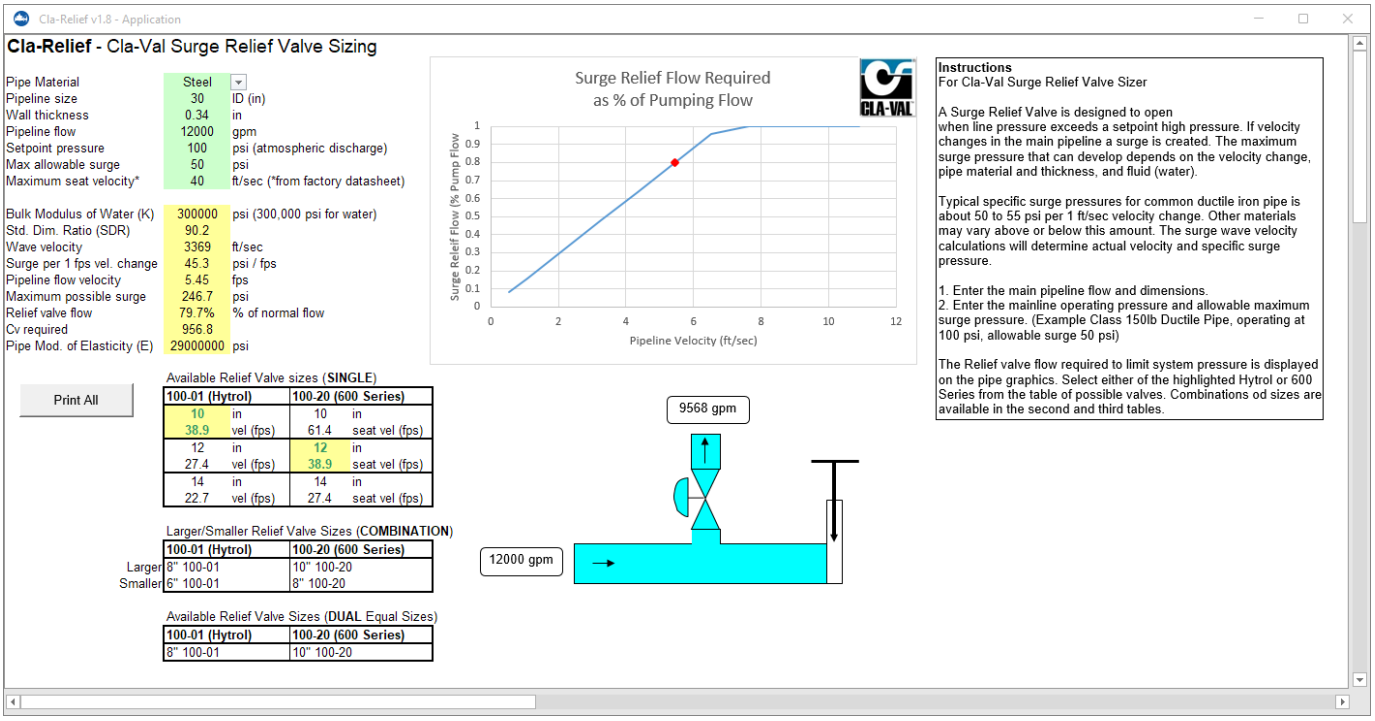
Cla-Check aids the user in selecting a Cla-Val Check Valve based on numerous parameters. The user can enter a Valve Size, Flow, Static Pump Pressure, and Static Line Pressure to determine Line Velocity, Valve Position, and Pressure drop through the valve. These values can be used to determine correct valve sizing for a desired flow. Once an appropriate valve has been selected, the pilot system can be configured. The number of return lines to the cover, the main valve configuration, the pilot component configuration, and speed control configuration can all be selected based on the desired closing time. These fields can all be modified in order to quickly and easily compare valves or configurations.

Cla-Quick



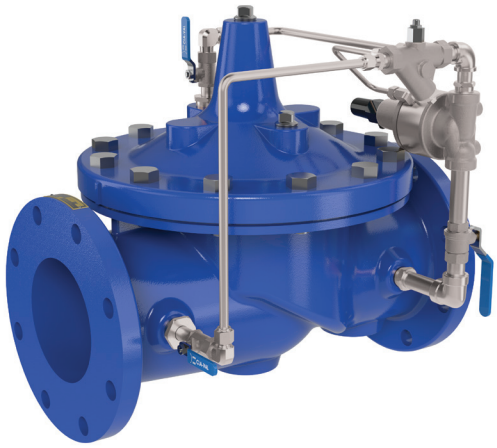
Cla-Quick

This software is intended to be a simple (and quick) valve sizing tool based on published information in the engineering datasheets. Suggested possible sizes are shown to meet the given flow and pressures in both full and reduced port valve models. The user can select the best option for the particular valve application. The program is compact enough to be used on both Apple and Android phones using downloadable Microsoft Excel.

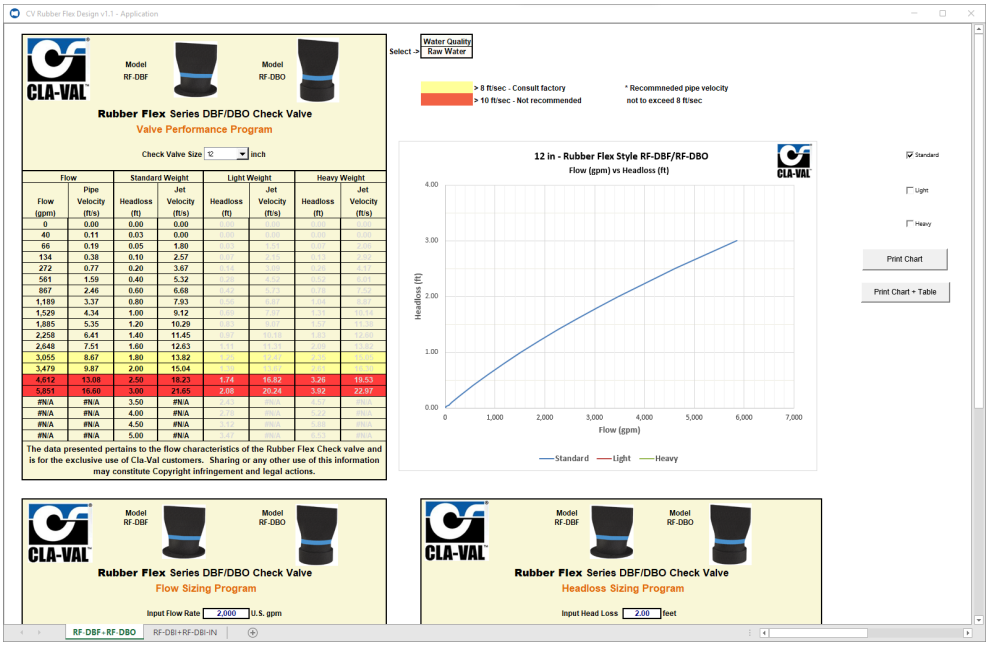


Cla-Relief

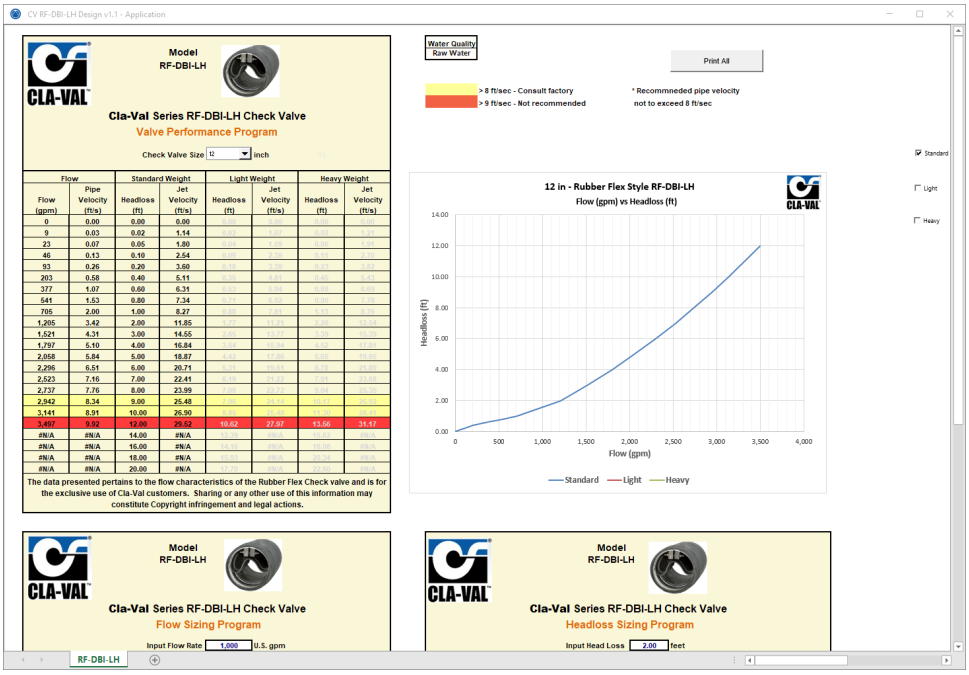
Cla-Relief is a tool for determining optimum relief valve sizes upstream of pumps and valves. Pipeline parameters, flows and pressures are inputs to establish adequate protection from potential surges caused by stopping pumps or closing valves. Recommended sizes to sufficiently protect the pipeline are provided for full or reduced port valves. Potential surge calculations illustrate the hazards without a relief valve and the level of protection provided.



CV Rubber Flex

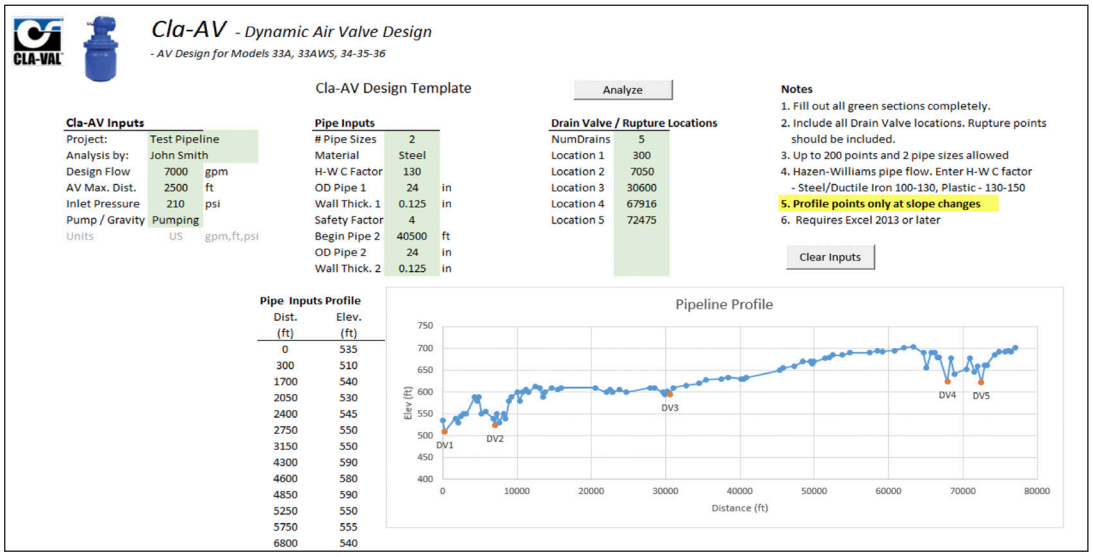


CV RF-DBI-LH



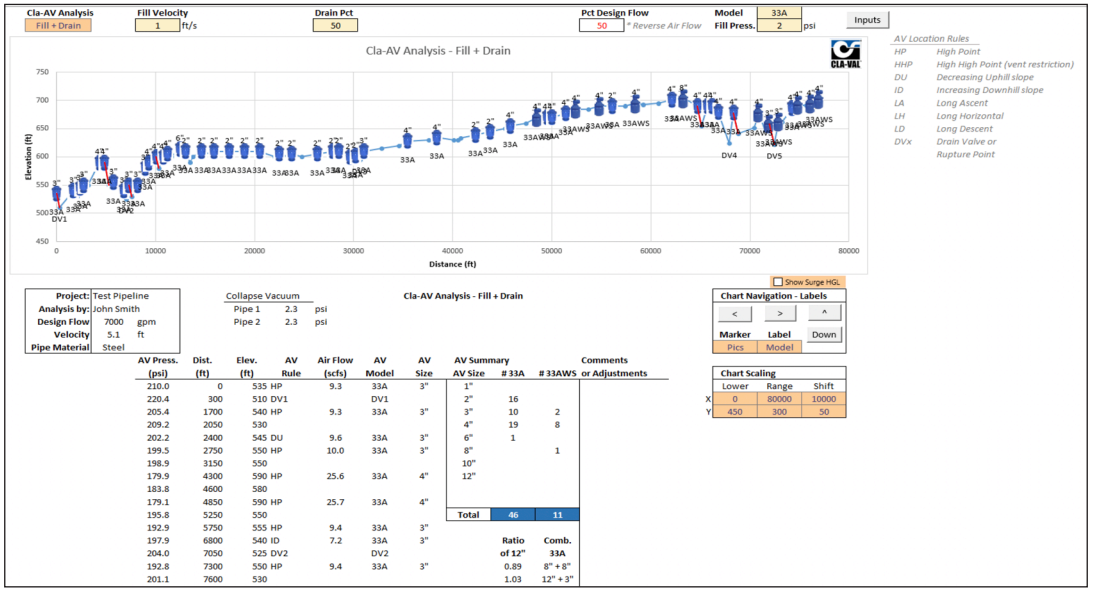
CV Rubber Flex Design & CV RF-DBI-LH Design

These programs provide sizing and performance information for the Rubber-Flex Duckbill Check Valves. Charts are provided for sizing based on headloss or for a given flow. With any given size charts are displayed which detail headloss at any flow rate. Velocity limits are given based on raw water or clean water. Each model has separate charts based on laboratory tests.



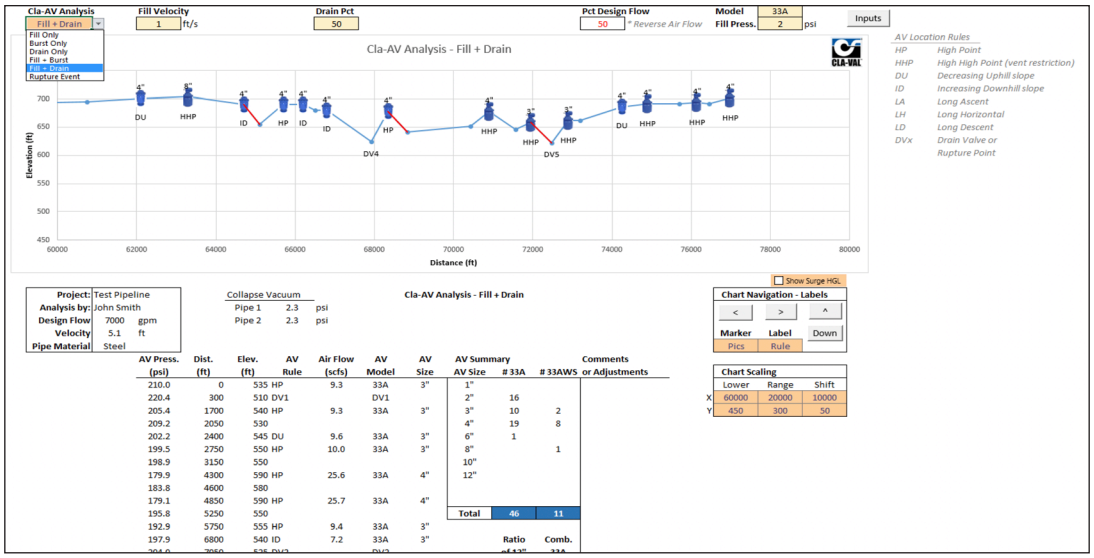
Cla-AV Inputs

New Cla-AV dynamic Air Valve design software provides visual design of air valve placement and sizing along pipelines following AWWA and international guidelines. The page of inputs allows quick entry of pipeline profile, piping characteristics, and Drain and/or Rupture locations. A pipeline profile graph shows convenient confirmation of correct entry of data.



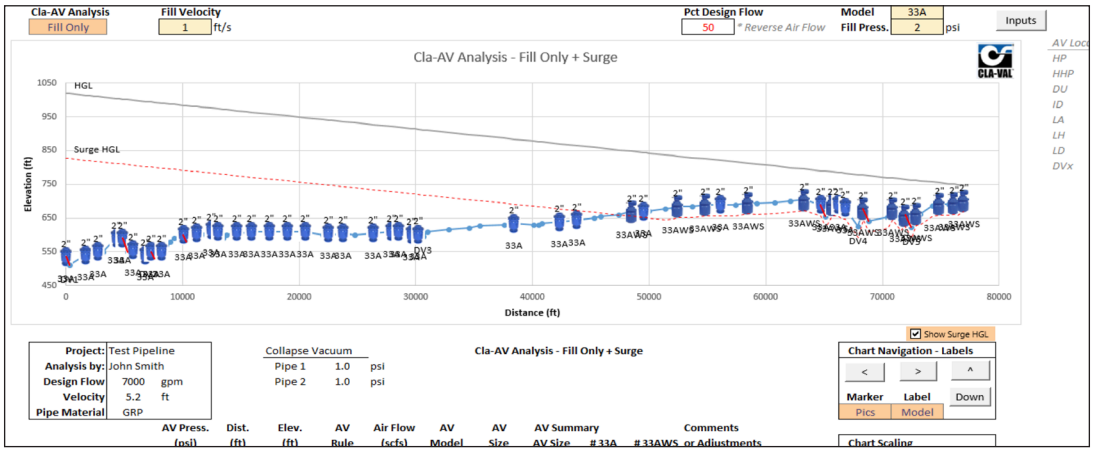
Cla-AV Design

The Analysis section first displays the entire pipeline with air valves located and sized for the default Filling scenario only. Above the graphic chart are settings for the type of air valve analysis, specific adjustment for each scenario, such as filling velocity, and air valve model. Both the 33A and traditional 34, 35, and 36 Series are supported. A percentage of Design Flow adjustment allows visual indication of potential "blowback" conditions and are indicated by red pipe sections and where damaging surges can occur.



Cla-AV Design 2

Multiple scenarios can be quickly reviewed for not only Burst (or gravity) Flow but also Drain Valve operation and Rupture events at designated susceptible locations. Air valve locations and sizing are automatically performed and graphically shown with each specific scenario. Combination scenarios are available for Filling and Burst (gravity flow) and Filling and Draining (pressurized flow). Zooming in on portions and navigation along the pipeline are possible with navigation controls. A table is available below detailing locations, air flow, and the rules for using the air valves, such as at High Points and at Increasing Downslopes. A summary table shows totals of each model and size used.



Cla-AV Design 3

Often overlooked in air valve design is potential surges caused during surge events such as power failure at a pump station. Cla-AV makes available both the steady state HGL and the resulting HGL during a sudden stoppage of flow. The Surge HGL, shown with a dotted red line, illustrates where vacuum conditions occur. Surges can caused by air valve slam effects when pressure recovers and all air is vented. Cla-AV predicts where this may occur and susceptible locations have 33AWS air valves with adjustable Throttling Devices to slow the exhaust to avoid surges caused by air valve slam.

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