SINGER VALVE
Result-Based Solutions. Globally.

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SINGER VALVE SIZING PROGRAM V.2.0 BETA

System Requirements:

- CPU with at least Pentium III or Higher
- RAM of at least 512MByte
- Windows XP Operating System or Higher
- Microsoft Excel 2000 or Higher

Opening the Program:

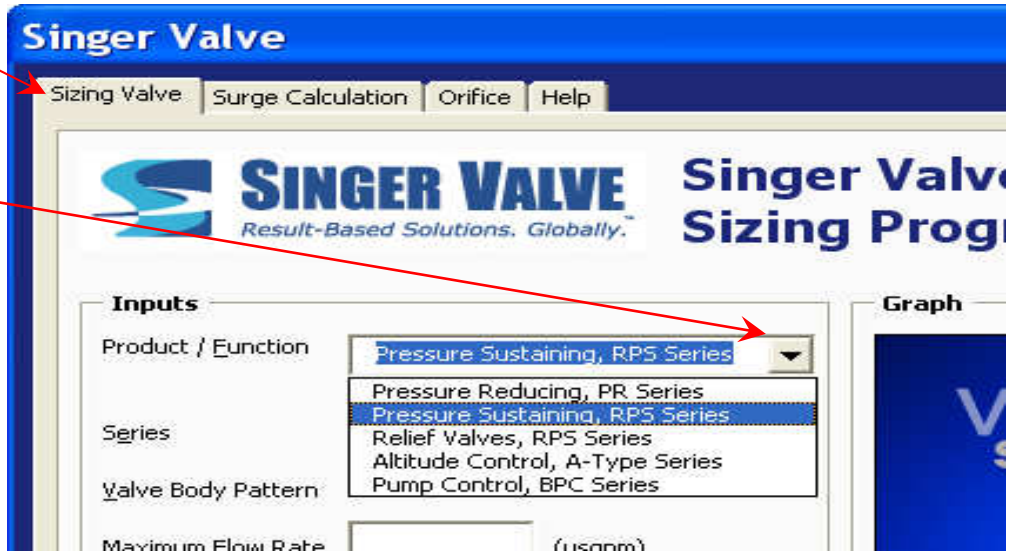
1. Upon clicking the filename "*SingerValveSizingProgramV2.0 Beta.xls*" you will prompted to enable macro if your macro security level is disable or set to **Medium** or **High**.
2. Excel displays a dialog box asking if you want to enable macros. Follow the instructions for enabling macro in the MS Excel version you are running.
3. Once your macro is enabled, the following screen will appear and is now ready for sizing.

Start-Up Screen:

Click on the tabs here to select between standard Sizing Valve, Surge Calculation, or Orifice Sizing

Click on this pull down menu to select valve sizing based on function. Available functions are:

- Pressure Reducing, PR Series
- Pressure Sustaining, RPS Series
- Relief Valves, RPS Series
- Altitude Control, A-Type Series
- Pump Control, BPC Series



Pressure Reducing, PR Series:

Step 1: Select “Pressure Reducing, PR Series”.

Step 2: Select preferred unit, “Imperial” or “Metric”.

Step 3: Select preferred series, “106” or “206”.

Step 4: Select valve body pattern, “Angle” or “Globe”.

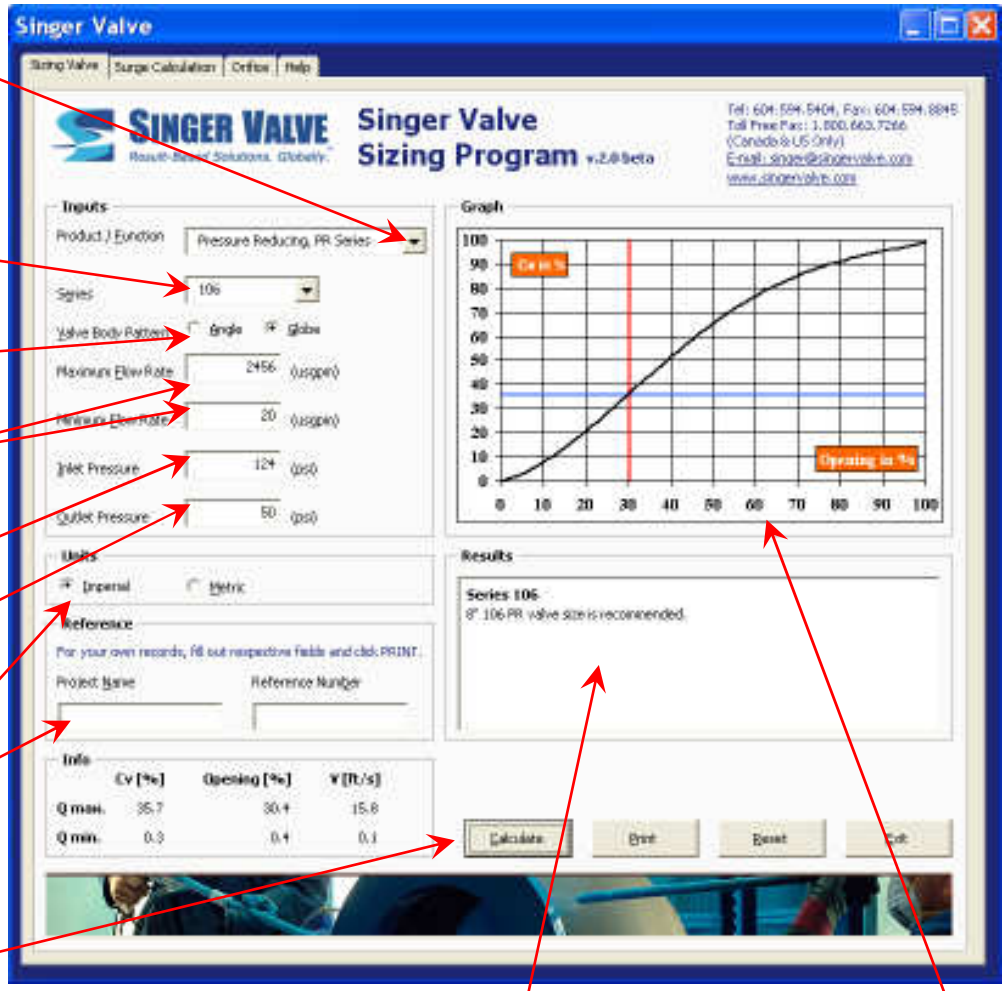
Step 5: Enter maximum and minimum flowrates.

Step 6: Enter system inlet pressure.

Step 7: Enter desired outlet pressure setpoint.

Step 8: Enter Optional Project Name and Reference Number for printing.

Step 9: Click “Calculate”.



RESULTS: Valve sizing result is shown here.

RESULTS: Graph shows equivalent valve position and % Cv at given max. flow and pressure differential.

Notes Regarding Pressure Reducing, PR Series:

- Inlet Pressure must be at least 10psi higher outlet pressure.
- If Inlet Pressure is more than three times higher than the desired outlet pressure, cavitation may occur. Please consult factory.
- Sizing is based on water at 15˚C with specific gravity of 1.0.
- Angle valves are available from 1-1/2” to 16” 106 Series, and 4” to 8” 206 Series only.
- Opening % and Cv % are approximates only.
- If inlet pressure is a range, size using minimum inlet pressure first to determine correct valve size, then size using maximum inlet pressure to determine if cavitation will occur.

Pressure Sustaining, RPS Series:

Step 1: Select “Pressure Sustaining, RPS Series”.

Step 2: Select preferred unit, “Imperial” or “Metric”.

Step 3: Select preferred series, “106” or “206”.

Step 4: Select valve body pattern, “Angle” or ‘Globe’.

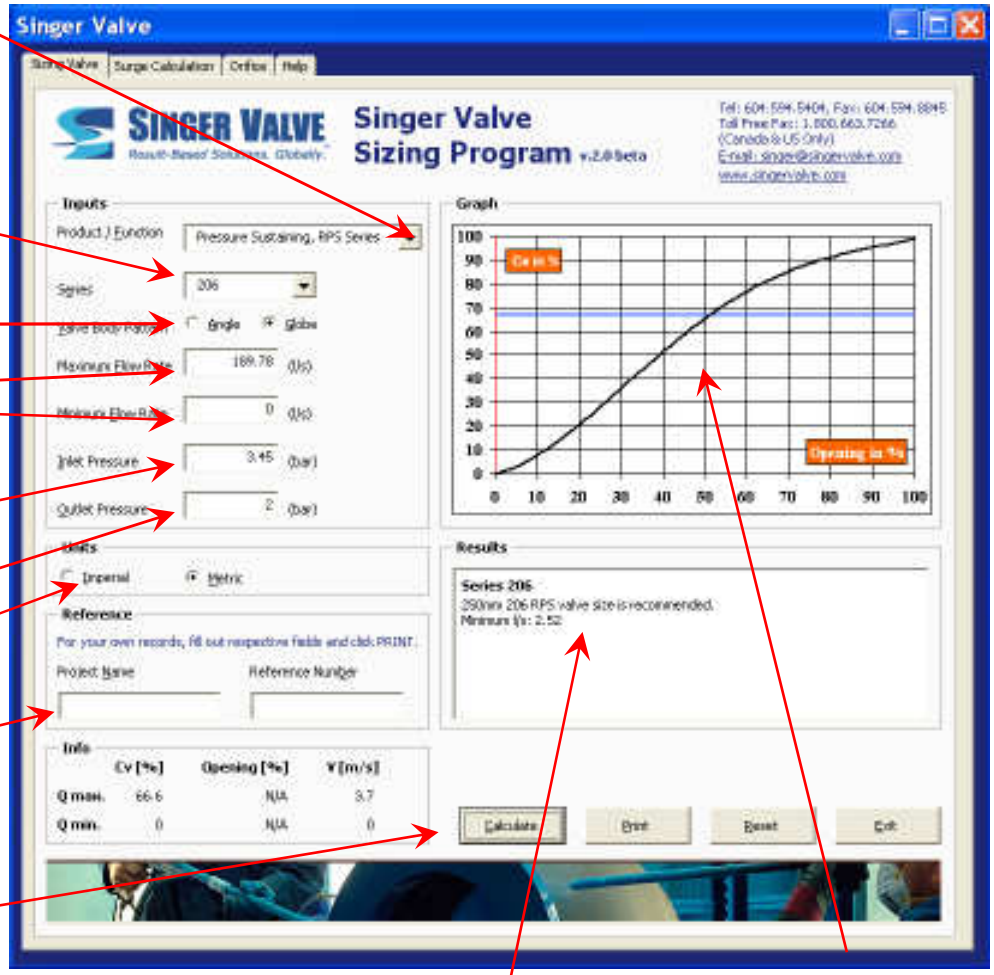
Step 5: Enter maximum and minimum flowrates.

Step 6: Enter desired minimum inlet pressure setpoint.

Step 7: Enter system outlet pressure.

Step 8: Enter Optional Project Name and Reference Number for printing.

Step 9: Click “Calculate”.



RESULTS: Valve sizing result is shown here.

RESULTS: Graph shows equivalent valve position and % Cv at given max. flow and pressure differential.

Notes Regarding Pressure Sustaining, RPS Series:

- Inlet Pressure must be at least 10psi higher outlet pressure.
- If Inlet Pressure is more than three times higher than the desired outlet pressure, cavitation may occur. Please consult factory.
- Sizing is based on water at 15˚C with specific gravity of 1.0.
- Angle valves are available from 1-1/2” to 16” 106 Series, and 4” to 8” 206 Series only.
- Opening % and Cv % are approximates only.
- If outlet pressure is a range, size using maximum outlet pressure first to determine correct valve size, then size using minimum outlet pressure to determine if cavitation will occur.

Pressure Relief, RPS Series:

Step 1: Select “Pressure Relief, RPS Series”.

Step 2: Select preferred unit, “Imperial” or “Metric”.

Step 3: Select preferred series, “106” or “206”.

Step 4: Select valve body pattern, “Angle” or “Globe”.

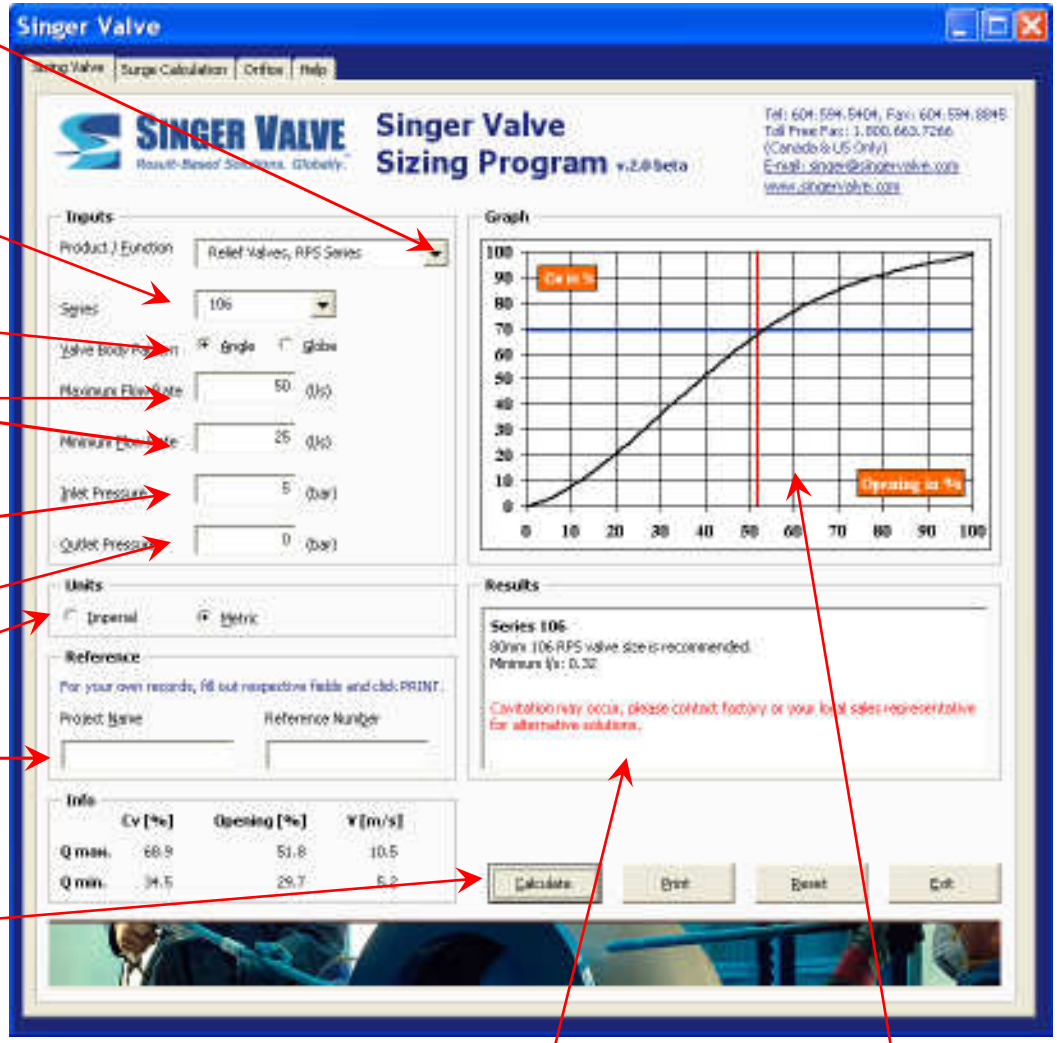
Step 5: Enter maximum and minimum flowrates.

Step 6: Enter relief setpoint inlet pressure.

Step 7: Enter system outlet pressure.

Step 8: Enter Optional Project Name and Reference Number for printing.

Step 9: Click “Calculate”.



RESULTS: Valve sizing result is shown here.

RESULTS: Graph shows equivalent valve position and % Cv at given max. flow and pressure differential.

Notes Regarding Pressure Relief, RPS Series:

- Inlet Pressure must be at least 10psi higher outlet pressure.
- If Inlet Pressure is more than three times higher than the desired outlet pressure, cavitation may occur. Please consult factory.
- Sizing is based on water at 15°C with specific gravity of 1.0.
- Angle valves are available from 1-1/2” to 16” 106 Series, and 4” to 8” 206 Series only.
- Opening % and Cv % are approximates only.
- Relief valves typically discharges to atmosphere. Cavitation damage may occur only if valve opens and flows continuously.

Altitude Control, A-Type Series:

Step 1: Select “Altitude Control, A-Type Series”.

Step 2: Select preferred unit, “Imperial” or “Metric”.

Step 3: Select preferred series, “106” or “206”.

Step 4: Select valve body pattern, “Angle” or “Globe”.

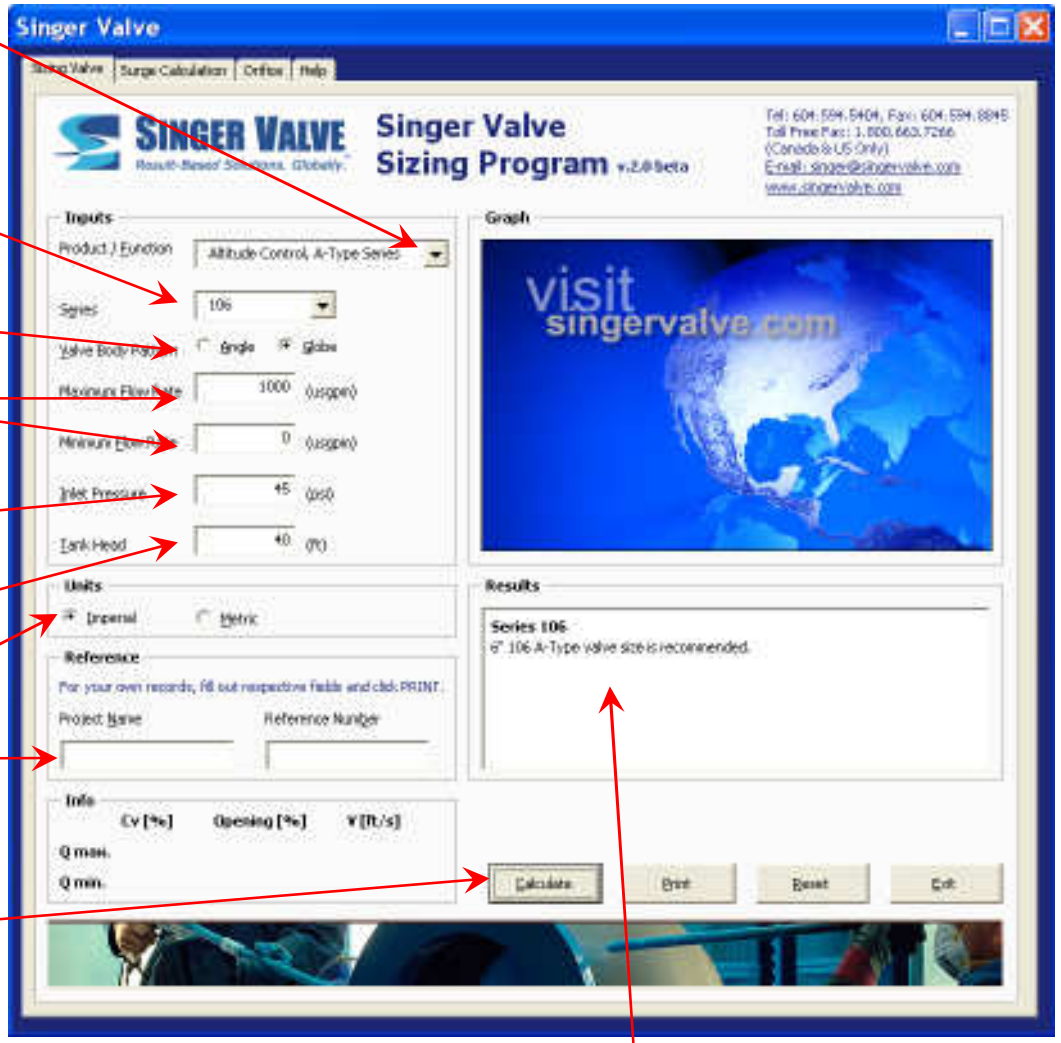
Step 5: Enter maximum and minimum flowrates.

Step 6: Enter system inlet/supply pressure.

Step 7: Enter desired tank head setpoint (NOTE THE UNITS).

Step 8: Enter Optional Project Name and Reference Number for printing.

Step 9: Click “Calculate”.



RESULTS: Valve sizing result is shown here. No graph is generated as this valve is non-modulating (fully open – fully closed only).

Notes Regarding Altitude Control, A-Type Series:

- Inlet Pressure must be at least 1 psi higher tank head (outlet pressure).
- If Inlet Pressure is more than 15psi higher than tank head (outlet pressure), valve will be sized using 15psid.
- If Inlet Pressure is more than three times higher than the desired tank head (outlet pressure), cavitation may occur. Please consult factory.
- Sizing is based on water at 15°C with specific gravity of 1.0.
- Angle valves are available from 1-1/2” to 16” 106 Series, and 4” to 8” 206 Series only.

Pump Control, BPC Series:

Step 1: Select “Pump Control, BPC Series”.

Step 2: Select preferred unit, “Imperial” or “Metric”.

Step 3: Select preferred series, “106” or “206”.

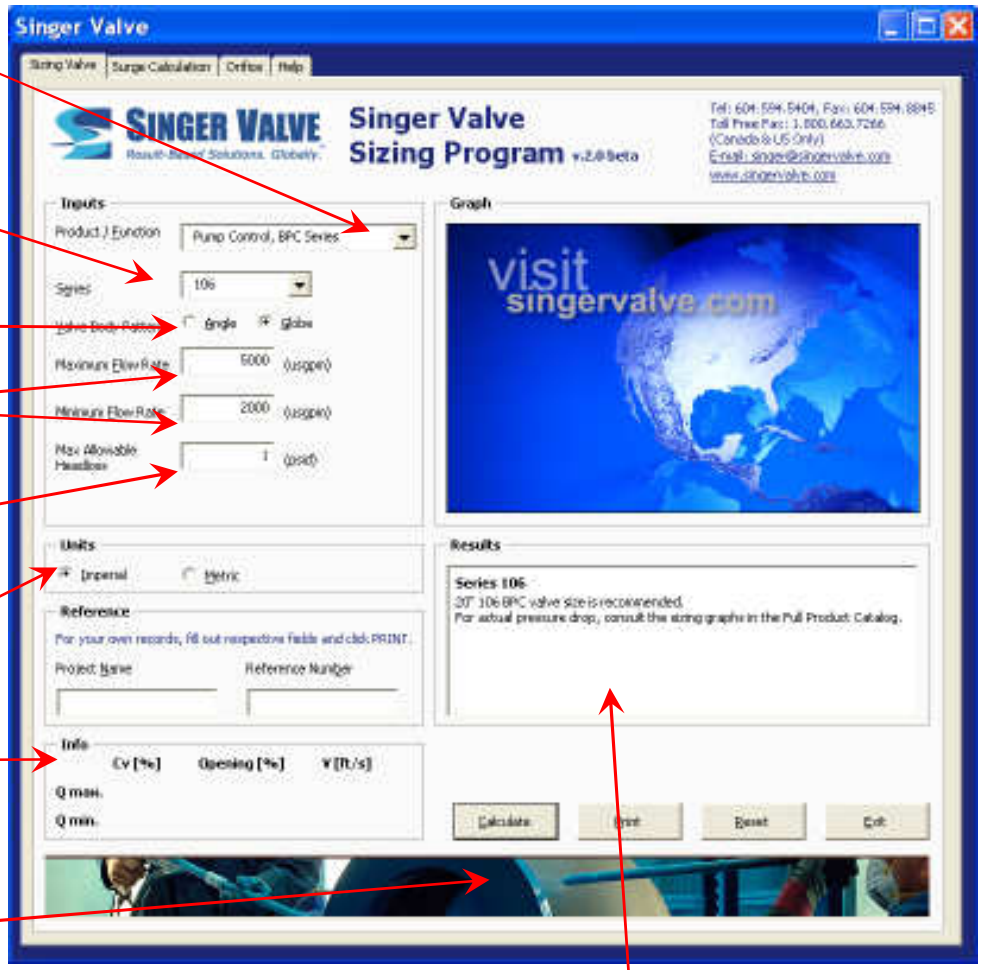
Step 4: Select valve body pattern, “Angle” or “Globe”.

Step 5: Enter maximum and minimum flowrates.

Step 6: Enter desired maximum headloss across the valve.

Step 7: Enter Optional Project Name and Reference Number for printing.

Step 8: Click “Calculate”.



RESULTS: Valve sizing result is shown here. No graph is generated as this valve is non-modulating (fully open – fully closed only).

Notes Regarding Pump Control, BPC Series:

- Minimum headloss is 1psid. For actual pressure drop at a given flowrate, consult the sizing graphs in the Full Product Catalog.
- Sizing is based on water at 15˚C with specific gravity of 1.0.
- Angle valves are available from 1-1/2” to 16” 106 Series, and 4” to 8” 206 Series only.

Surge Calculation:

Step 1: Select Surge Calculation.

Step 2: Select preferred unit, “Imperial or “Metric”.

Step 3: Enter main header flowrate

Step 4: Enter main head pipe size diameter (NOT VALVE SIZE).

Step 5: Enter system static pressure (no flow condition).

Step 6: Enter system dynamic pressure (header pressure at flowrate above).

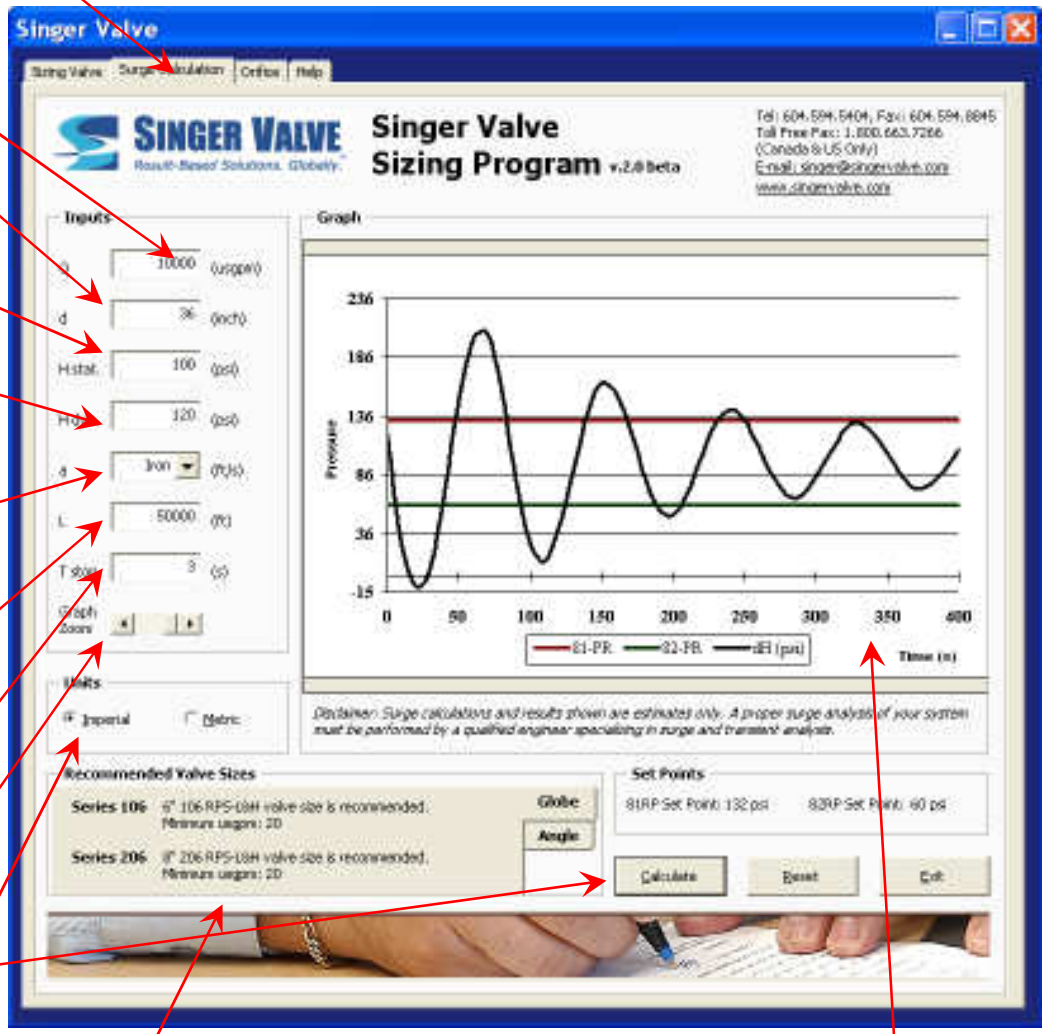
Step 7: Select pipe material of construction, “Steel”, “Iron”, “Concrete”, or “PVC”.

Step 8: Enter total length of header.

Step 9: Enter T stop time. This is an estimated time it will take to go from flow ***Q*** to zero flow. E.G. Power failure, Rapid valve closure, etc.

Use this to zoom in and out of graph.

Step 10: Click “Calculate”.



RESULTS: Valve sizing result is shown here. Select between “Globe” and “Angle” if desired.

RESULTS: Graph shows attenuating surge wave WITHOUT a relief valve installed. Red line is recommended 81RP High Pressure Relief pilot setpoint, Green line is recommended 82PR Low Pressure Anticipating pilot setpoint.

Notes Regarding Surge Calculation:

- Surge calculations and results are estimates only. A proper surge analysis of the system performed by a qualified engineer will give more accurate results and predictions.
- Discharge of Surge Anticipating Relief Valve is assumed atmospheric (0 psig).
- Valve sizing is based on 25% of flowrate ***Q***, at pressure drop of ***H dyn.*** to atmosphere, or 80psid, which ever is lower.
- 81RP High Pressure Relief Pilot setpoint is calculated based on 10% higher than ***H dyn.***
- 82PR Low Pressure Anticipating Pilot setpoint is calculated based on 60% of ***H stat.***
- If ***T stop*** is unknown, use different values to determine how the system will behave. Typical ***T stop*** time during power failure is 3 seconds. Maximum surge will result if ***T stop*** time is equal to or less than the calculated critical period. See formula below for equations used.

Equations Used:

$$H(\text{metres}) = Hstat + dH \times \frac{\sin(2\pi \times Cycle)}{Cycle}$$

Where:

Hstat = Static head in metres

$$dH(\text{metres}) = \frac{a}{g} \times \frac{dQ}{S}$$

Where:

a = Wave speed m/s

g = Acceleration due to gravity 9.81m/s^2

S = Internal header pipe area m^2

dQ = If Ts < Tc use Q flow

else $dQ = \frac{Q \times Tc}{Ts}$

Where:

Ts = Time Stop in seconds (time for flow to go from Q flow to 0)

$Tc\ (\text{Critical period in seconds}) = \frac{2 \times L}{a}$

Where:

L = Length of pipe in metres

$$Cycle = \frac{Te}{Tc}$$

Where:

Te = time elapsed in seconds

Tc = Critical Period

Orifice Sizing:

Step 1: Select “Orifice” tab.

Step 2: Select “Orifice” Tab to determine orifice bore diameter.

Select “Flow Rate/Differential Pressure” if bore diameter is known but flowrate and differential pressures are not.

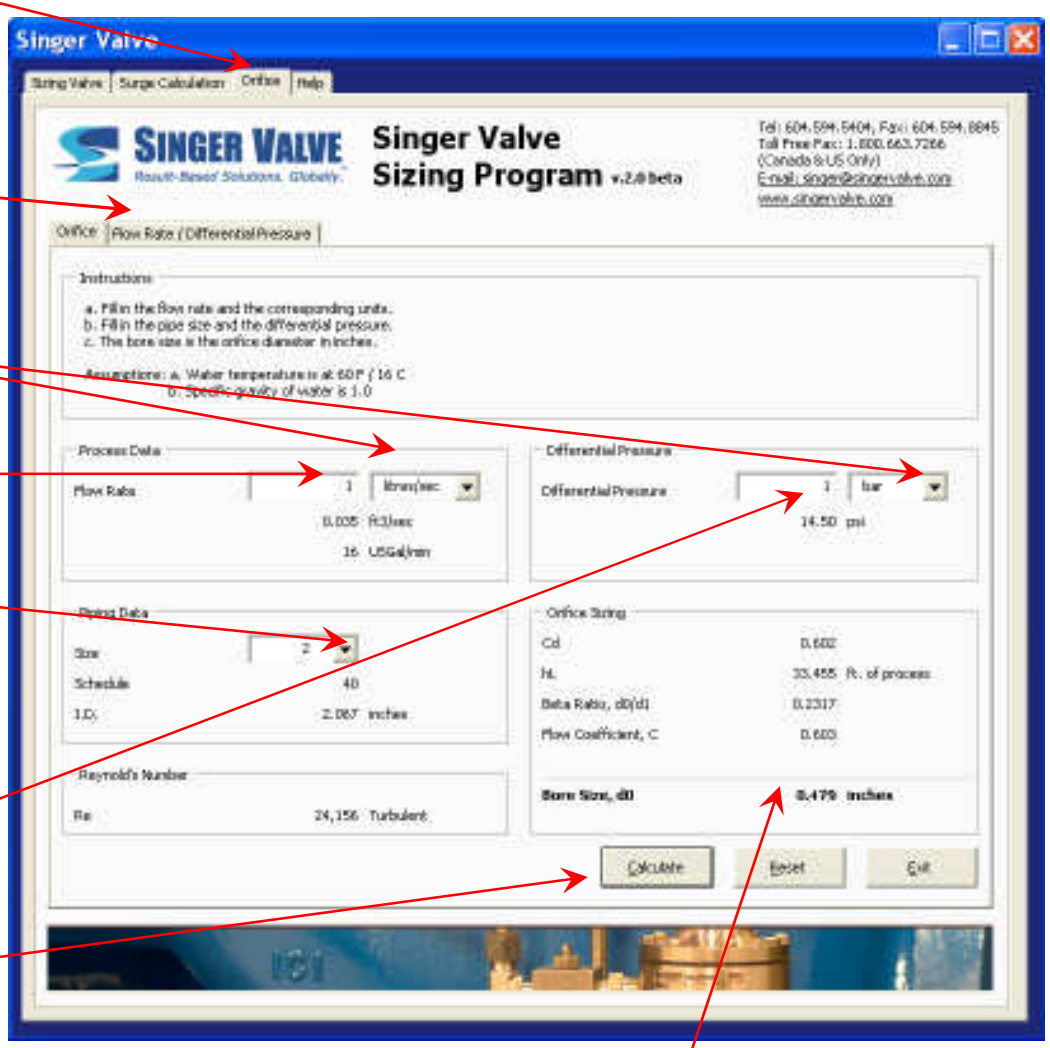
Step 3: Select preferred unit first.

Step 4: Enter flow rate for sizing.

Step 5: Select Pipe Size.

Step 6: Enter Differential Pressure for sizing.

Step 7: Click “Calculate”.



RESULTS: Recommended Bore Size of the orifice plate.

Orifice Sizing:

Step 2: Select “Orifice” Tab to determine orifice bore diameter.

Select “Flow Rate/Differential Pressure” if bore diameter is known but flowrate and differential pressures are not.

Step 3: Select calculator type, “Flow Rate” or “Differential Pressure”.

Step 4: Select preferred unit.

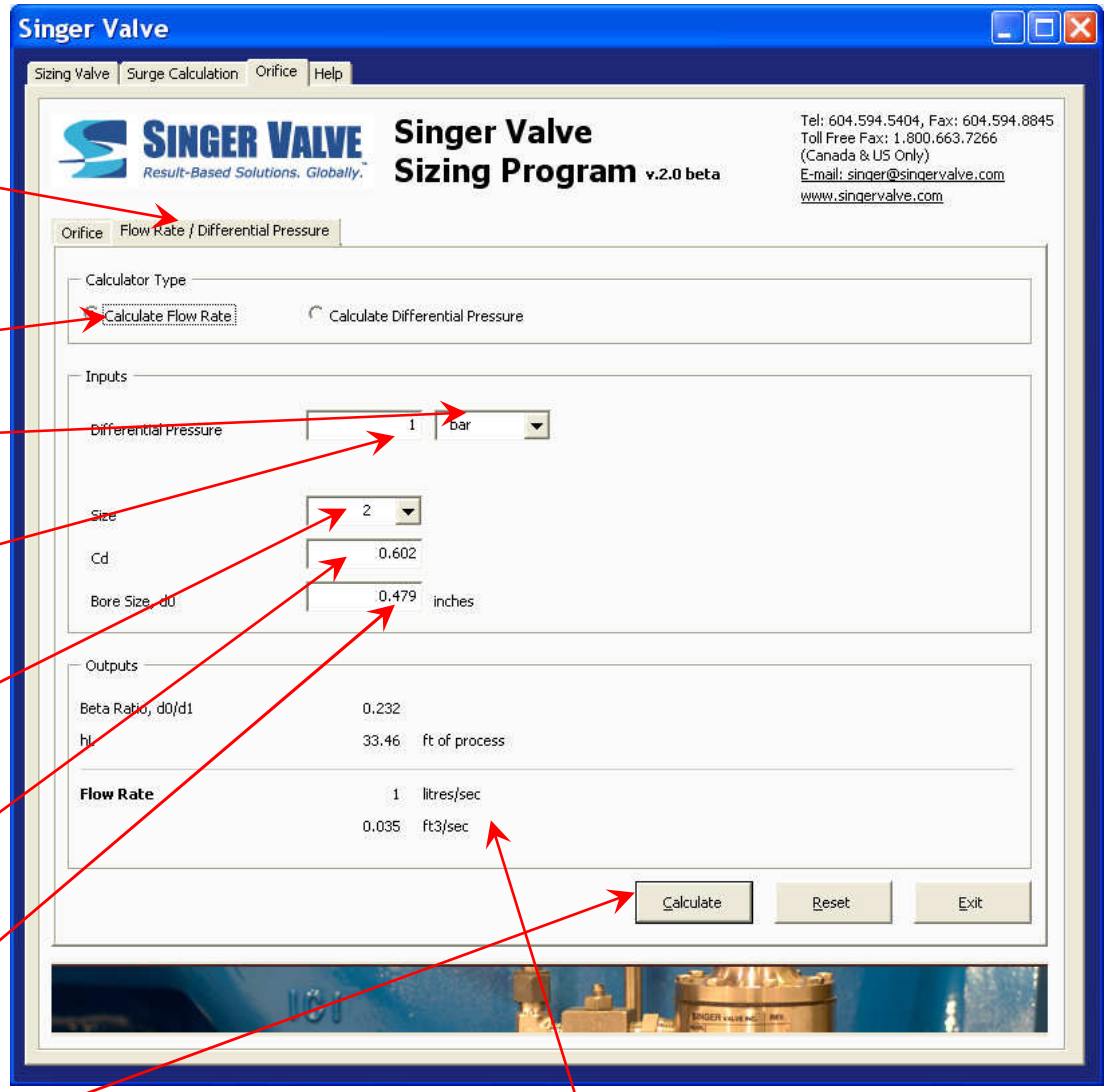
Step 3: Enter Differential Pressure if calculating for Flow Rate. Enter Flow Rate if calculating for Differential Pressure.

Step 6: Select Pipe Size.

Step 7: Enter Coefficient of Discharge **Cd** value if known. For sharp edge orifice, **Cd** value is 0.602. Singer orifice plates are always sharp edged.

Step 8: Enter Bore Size.

Step 7: Click “Calculate”.



RESULTS: Calculated Flow Rate or Differential Pressure.