

PetroSof

Chemical Engineering Softwares



Product Catalog 2022

Developed by
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Product of
Petrosof

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1- FRICTION FACTOR CALCULATIONS

Friction factor software calculates Moody and Fanning friction factors of the pipes. Users can select pipe material from a wide range of list of material that has been incorporated in the software.

Pipe size from 0.125 inch to 52 inch can be selected for various piping classes. Friction factor is calculated quickly based on the carefully selected equations to which the manual solution are laborious and time consuming. Software is very user friendly while errors and input limitations are cautioned in the message bar.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

Friction Factor Solution Sunday Jan-27-2013 11:46:43 pm

Input

Flow (gpm) 100

Specific Gravity 1

Viscosity (cp) 0.01

Pipe Size (in) 3

Pipe Schedule 10

Get Pipe ID 3

Pipe Material Carbon Steel

☐ Known ☒ Unknown

Absolute Roughness (ft) 0.00015

Friction Factor Equations

☐ Colebrook Equation - 1

☐ Colebrook Equation - 2

☐ Colebrook Equation - 3

☐ Serghide Equation

☒ Swamee and Jain Equation

☐ Altshul - Tsai Equation

☐ Churchill and Usagi Equation

☐ Round's Equation

☐ Schacham's Equation

☐ Karman's Equation

Results

Relative Roughness (e/D) 0.000600000

Reynold Number 10537378

Swamee and Jain Equation

Moody Friction Factor (f) 0.017464915

Fanning Friction Factor (ff) 0.004366229

Calculate **Exit**

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Ok

2- NATURAL GAS COMPRESSIBILITY

Natural Gas - [Compressibility]

File | Applications | About | <http://PetroSof.com>

Natural Gas Compressibility

Inputs

Pressure, P (Psig) 650

Temperature, T (deg F) 70

Specific gravity, Sp.G 0.65

H2S Mol% 2

CO2 Mol% 4

N2 Mol% 6

Critical Properties Model

☒ Brown et al (1948) and Standing (1977) Natural Gas System

☐ Brown et al (1948) and Standing (1977) Gas Condensate System

☐ Boyun Guo and Ali Ghalmor Simple Equation

☐ Ahmed (1989) Natural Gas System

Compressibility Model

☒ Beggs and Brill

☐ Papay

☐ Hall-Yarborough

☐ Dranchuk-Abu-Kassem

☐ Dranchuk-Purvis-Robinson

Critical Properties Correction Methods

☒ Wichart-Aziz Correction Method

☐ Carr-Kobayashi-Burrows Correction Method

Viscosity Model

☒ Carr-Kobayashi-Burrows-Method

☐ Lee-Gonzalez-Eakin Method

☐ Dean and Stiel Method

Results

Compressibility, Z 0.8952

Viscosity, Mu (CP) 0.0199

Molecular Weight Mw 18.850

Critical Pressure Pc (Psia) 670.906

Critical Temperature Tc (Deg F) 373.969

Ok

Calculate Exit

<http://PetroSof.com>

Natural Gas Compressibility software is developed to calculate:

- Gas compressibility
- Gas viscosity
- Critical parameters

Five (05) empirical procedures are included in application to calculate gas compressibility. Four (04) models are given for critical properties determination. Three (03) models are given for gas viscosity calculation and two (02) methods are provided for correction methods. Engineers may find manual solution to these equations very tedious and time consuming. Having this software on your computer can really make a difference. Users are cautioned about the limitations of inputs for each set of calculations to obtain the correct results.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

3- EQUIVALENT LENGTH CALCULATIONS

Equivalent length calculation program is developed to estimate the total equivalent length of complete piping system including all the pipe fittings, manual block valves etc. Standard methods of calculation are adopted by using proven equations to help Engineers and Piping Designers to swiftly obtain the results. Manual calculations of various fittings in entire piping system may very cumbersome. Having this software on your computer can be handy tool.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

Equivalent Length - [Equivalent Length Calculator]

File About


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Equivalent Length Table

Fittings	Angle	Size [in] d1 ≤ d2			K1	K2	FT	L/D	L
		Id1	x Id2	no					
Elbow Std 90 degree (Welded)	0	2	2	1	0.57	0.57	0.019	30	5
select	0	0	1	0	0	0	0	0	0
select	0	0	1	0	0	0	0	0	0
select	0	0	1	0	0	0	0	0	0
select	0	0	1	0	0	0	0	0	0
select	0	0	1	0	0	0	0	0	0
select	0	0	1	0	0	0	0	0	0
select	0	0	1	0	0	0	0	0	0
select	0	0	1	0	0	0	0	0	0
select	0	0	1	0	0	0	0	0	0
select	0	0	1	0	0	0	0	0	0
Total									5

Calculate Reset Exit

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Sunday Feb-03-2013 10:29:19 pm

Ok

4- CONTROL VALVE SIZING [LIQUID SERVICE]

A comprehensive and detailed valve sizing software has been developed with great care and efforts to help out Design Engineers to appropriately size the valve.

A wide range of fluids are included in the program to promptly solve for the physical properties. Together with valve sizing, program helps to select the valve and determines the suitability for the service by developing the valve characteristics and generates the complete valve travel and opening profile over the complete range of flow rate.

A very important aspect of this software is the valve's pressure drop determination which is often assumed or completely neglected leading to the incorrect valve size. To determine the correct pressure drop profile for the valve, a comprehensive valve pressure drop

Valve Sizing For Liquid Service

Inputs

Parameter	Minimum	Normal	Maximum
Flow Rate Q (gpm)	75	150	150
Valve D/S P1 (Psi)	70	70	70
Valve D/S P2 (Psi)	50.452	57.295	63.057
Inlet Temperature T1 (deg F)	70	70	70
Specific Gravity (Sp G)	1	1	1
Vapour Pressure @ T1 Pvl (Psi)	1.982	1.982	1.982
Critical Pressure Pc (Psi)	1174.53	1174.53	1174.53
Viscosity V (cP)	0.795	0.795	0.795

Valve Selection

Service: ☒ Flow ☐ Pressure ☐ Level ☐ Temperature

Load Valve: ☐ ☒ Equal Percentage Valve

Controller Action: ☐ Reverse Acting ☒ Forward Acting

Valve Type: ☒ ATC ☐ AFD ☐ U/S at Valve ☐ U/S at Inlet

Valve Selection Criteria

- Select Valve with:
- Valve has Creq at 60-85% opening = 58.327
- Valve has Creq at 60-70% opening = 30.975
- Valve has Creq at 20-40% opening = 5.891
- Valve has FL Value = 0.406

Results

Parameter	Minimum	Normal	Maximum
Pressure Cv	5.654	30.752	58.327
Required Recovery Factor FL	0.406	0.393	0.29
Critical Pressure Ratio FP	1	0.993	0.976
Piping Geometric Factor GP	5.329	11.231	131.72
Reynolds Number	0.406	0.393	0.289
Piping Geometric Factor FLP	5.891	30.975	58.327
Required Cv	13.549	12.795	5.943
Actual DP	0.159	0.701	0.956
Velocity in Pipe Vp (F/sec)	1.133	4.987	6.8

Warnings

- <<Note-1>>
- <<Note-2>>
- <<Note-3>>

Selected Valve

Parameter	Value	Unit
Valve Cv @ 100% Open	66	
Valve Cv @ 10% Open	1	
Valve FL @ 100% Open	0.34	
Valve FL @ 100% Open	0.34	
Valve DP @ Min Flow	28	
Valve DP @ Max Flow	6.943	
Valve Authority (N)	0.34715	

Results

Parameter	Value	Unit
Allowable DP (Psi)	58.131	
Cv (eq. valve cv)	21.252	
Flow Resistance (R)	0.001	
Rangeability	66	
Cv (eq. valve cv)	106.26	
Valve Opening @ Min	42.33	
Valve Open @ Max	57.05	

Warnings

- <<Note-1>>
- <<Note-2>>
- <<Note-3>>

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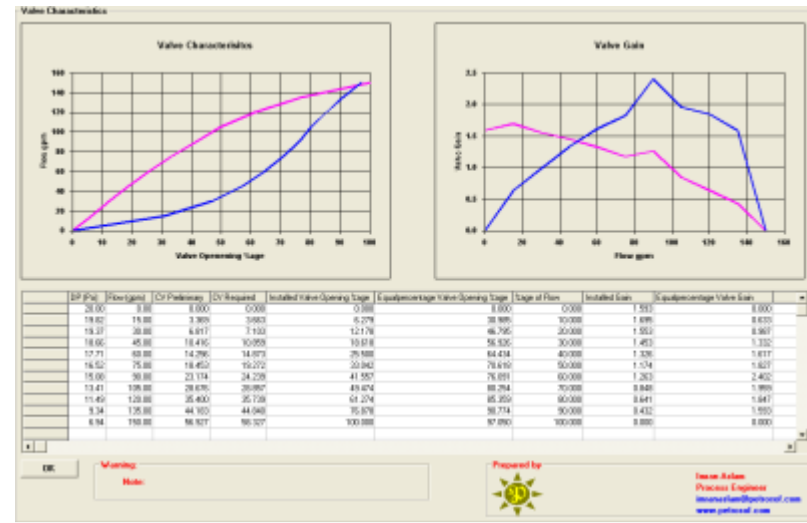
Sunday Feb-03-2013 11:14:54 pm

calculation program is included in the software.

Users are cautioned about incorrect inputs and limitations during valve sizing and guide them to achieve the correct results.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.



5- CONTROL VALVE SIZING [GAS SERVICE]

A comprehensive and detailed valve sizing software has been developed with great care and efforts to help out Design Engineers to appropriately size the valve.

A wide range of fluids are included in the program to promptly solve for the physical properties. Together with valve sizing, program helps to select the valve and determines the suitability for the service by developing the valve characteristics and generates the complete valve travel and opening profile over the complete range of flow rate.

A very important aspect of this software is the valve's pressure drop determination which is often assumed or completely neglected leading to the incorrect valve size. To determine the correct pressure drop profile for the valve, a comprehensive valve pressure drop

Valve Sizing For Gas Service

Inputs

Select Fluid	Valve Size	Normal	Minimum
Nitrogen	246	446	546
Flow Rate Q (cc/s)	196.205	153.725	196.205
Valve Inlet Pressure P1 (Psg)	104.539	105.562	111.729
Valve Outlet Pressure P2 (Psg)	50	50	50
Inlet Temperature T1 (deg F)	0.67	0.67	0.67
Specific Gravity (Sp G)	7337.404	7337.404	7337.404
Vapor Pressure PV @ T1 (Psg)	452.45	452.45	452.45
Critical Pressure PC (Psg)	1.27	1.27	1.27
Heat Capacity Ratio (K)	0.358006	0.358006	0.358006
Molecular Weight (M)	28.013	28.013	28.013
Viscosity (CP)	0.195	0.195	0.195

Valve Selection

Service: ☒ Flow ☐ Pressure ☐ Level ☐ Temperature

Load Valve: ☒ Equal Percentage Valve ☐ Reverse Acting

Valve Type: ☒ AFC ☐ AFD ☐ U/S of Valve ☐ U/S of Valve

Valve Selection Criteria

- Select Valve with:
- Valve has Cvsq at 80-95% opening = 63.736
- Valve has Cvsq at 60-75% opening = 522.123
- Valve has Cvsq at 30-45% opening = 251.334
- Valve has Cvsq at 10-20% opening = 6.609

Results

Minimum	Normal	Maximum
Pressure Drop	253.319	521.99
Piping Geometric Factor FP	1	1
Required Cv	253.334	522.123
Actual Cv	96.77	98.193
Max Number in Valve	0.019	0.038
Max Number in Pipe	0.011	0.032
Pressure Ratio (P)	0.494	0.427
Minimum Pressure Drop Ratio (PT)	0.591	0.466
Velocity in Pipe Vp (FV/sec)	11.573	23.146
Velocity in Valve Vv (FV/sec)	28.414	49.828

Get Required CV ☒ OK

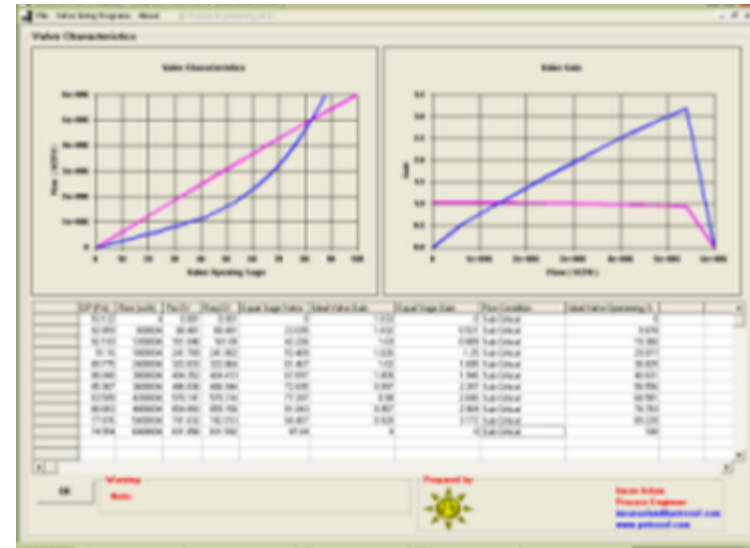
Prepared by **Iman Arslan**
Process Engineer
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calculation program is included in the software.

Users are cautioned about incorrect inputs and limitations during valve sizing and guide them to achieve the correct results.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.



6- CONTROL VALVE [STEAM SERVICE]

A comprehensive and detailed valve sizing software has been developed with great care and efforts to help out Design Engineers to appropriately size the valve.

A wide range of fluids are included in the program to promptly solve for the physical properties. Together with valve sizing, program helps to select the valve and determines the suitability for the service by developing the valve characteristics and generates the complete valve travel and opening profile over the complete range of flow rate.

A very important aspect of this software is the valve's pressure drop determination which is often assumed or completely neglected leading to the incorrect valve size. To determine the correct pressure drop profile for the valve, a comprehensive valve pressure drop calculation program is included in the software.

Users are cautioned about incorrect inputs and limitations during valve sizing and guide them to achieve the correct results.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.



7- CONTROL VALVE SIZING [TWO PHASE]

A comprehensive and detailed valve sizing software has been developed with great care and efforts to help out Design Engineers to appropriately size the valve.

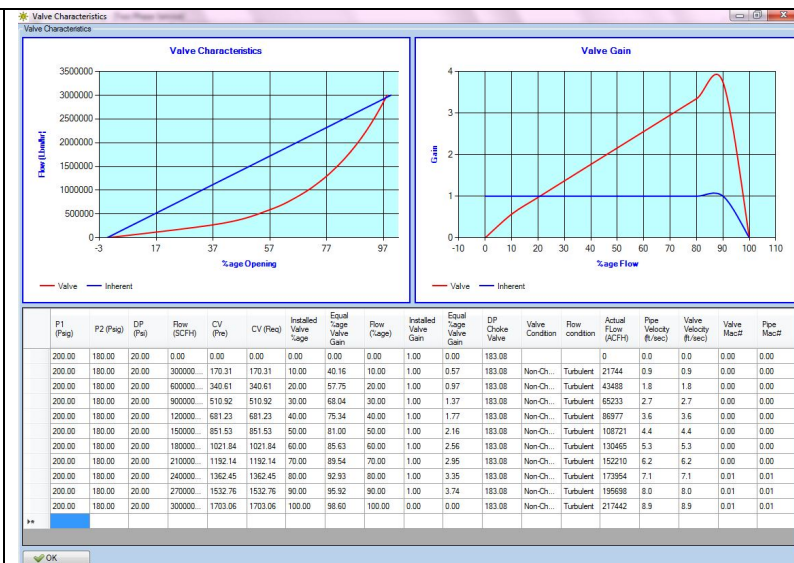
A wide range of fluids are included in the program to promptly solve for the physical properties. Together with valve sizing, program helps to select the valve and determines the suitability for the service by developing the valve characteristics and generates the complete valve travel and opening profile over the complete range of flow rate.

A very important aspect of this software is the valve's pressure drop determination which is often assumed or completely neglected leading to the incorrect valve size. To determine the correct pressure drop profile for the valve, a comprehensive valve pressure drop calculation program is included in the software.

Users are cautioned about incorrect inputs and limitations during valve sizing and guide them to achieve the correct results.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.



8- CONTROL VALVE VAPOR BREAK THROUGH CALCULATION

Many times a situation arises in operation where high pressure equipment are connected to low pressure system like flare headers and level control valves on high pressure separators. Engineers have to make repetitive and laborious manual calculations to predict the situation.

This software is developed with high precision to step by step evaluate all of the above scenarios and size the restriction orifice, determine mass flow rate and calculate rise in downstream piping pressure.

A list of ANSI piping class is incorporated in the program to assist the users and minimize the inputs required. Having this smart tool on computers can be of time saving and efficient.

Users are prompted about the limitations and given direction on how to apply correct inputs in the message bar on the screen.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

Control Valve Sizing - [Vapor Break Through Valve]

File Valve Sizing Programs About © Process Engineering 2011

Vapor Break Through Calculation Sunday Feb-10-2013 11:45:14 pm

Inputs

Vessel Pressure P1 (Psig)	501.3345
Downstream Vessel Pressure P3 (Psig)	0
Pipe Material	Carbon Steel
Pipe Pressure Rating ANSI Class	150
Drain Line Design Pressure P2 (Psig) @ 100 F	295
Length of Pipe L (Ft)	164
Liquid Drain Pipe Size OD (in)	2
Liquid Drain Pipe Schedule SCH	10
Get Pipe ID	2
Molecular Weight of Vapors M	20
Operating Temperature of Vapors T (deg F)	77
Density of Vapors @ P1 (lbm/ft3)	2.065
Density of Vapors @ P2 (lbm/ft3)	0.051045
Orifice Material	316 S/S

Calculations

System Analysis

Actual DP Ratio	0.975
Limiting DP Ratio	0.832
Limiting Differential Pressure (Psig)	496.186
Actual Differential Pressure (Psig)	501.334
D/S Pipe Pressure (Psig)	469.194

Choked Flow, Restriction Orifice Required

Results

Calculated Differential Pressure (Psig)	471.396
Calculated DP Ratio	0.791
Calculated D/S Line Pressure (Psig)	109.939
Assumed Expansion Factor (Yassume)	0.75
Calculated Expansion Factor (Ycalc)	0.75
Expansion Factor Difference (% age)	0.050 %
Recommended Orifice Size (in)	12 mm
Beta Ratio (d/D)	0.229
Coefficient of Discharge (CD)	0.6516
Resistance Coefficient (K)	20.401
Gas Flow Rate Through Orifice (Lbm/hr)	4501.939
Gas Flow Rate Through Orifice (Ft ³ /hr)	24.499

Calculate **Exit** **Reset**

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Ok

9- TANK BLANKET GAS CALCULATION

Many times a situation arises in operation where high pressure equipment are connected to low pressure system like flare headers and level control valves on high pressure separators. Engineers have to make repetitive and laborious manual calculations to predict the situation.

This software is developed with high precision to step by step evaluate all of the above scenarios and size the orifice, vapors mass flow rate, downstream piping pressure. A list of ANSI piping class is incorporated in the program to assist the users and minimize the inputs required. Having this smart tool on computers can be of time saving and efficient.

Users are prompted about the limitations and gives direction on how to make correction in the message bar on the screen.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

Control Valve Sizing - [Vapor Break Through Valve]
File Valve Sizing Programs About © Process Engineering 2011

Vapor Break Through Calculation Sunday Feb-10-2013 11:45:14 pm

Inputs

Vessel Pressure P1 (Psig)	501.3345
Downstream Vessel Pressure P3 (Psig)	0
Pipe Material	Carbon Steel
Pipe Pressure Rating ANSI Class	150
Drain Line Design Pressure P2 (Psig) @ 100 F	295
Length of Pipe L (Ft)	164
Liquid Drain Pipe Size OD (in)	2
Liquid Drain Pipe Schedule SCH	10
Get Pipe ID	2
Molecular Weight of Vapors M	20
Operating Temperature of Vapors T (deg F)	77
Density of Vapors @ P1 (lbm/ft3)	2.065
Density of Vapors @ P2 (lbm/ft3)	0.051045
Orifice Material	316 S/S

Calculations

System Analysis

Actual DP Ratio	0.975
Limiting DP Ratio	0.832
Limiting Differential Pressure (Psig)	496.186
Actual Differential Pressure (Psig)	501.334
D/S Pipe Pressure (Psig)	469.194

Choked Flow. Restriction Orifice Required

Results:

Calculated Differential Pressure (Psig)	471.396
Calculated DP Ratio	0.791
Calculated D/S Line Pressure (Psig)	109.939
Assumed Expansion Factor (Yassume)	0.75
Calculated Expansion Factor (Ycalc)	0.75
Expansion Factor Difference (% age)	0.050 %
Recommended Orifice Size (in)	12 mm
Beta Ratio (d/D)	0.228
Coefficient of Discharge (CD)	0.6516
Resistance Coefficient (K)	201.401
Gas Flow Rate Through Orifice (Lbm/hr)	4501.939
Gas Flow Rate Through Orifice (Ft ³ /hr)	24.499

Calculate **Exit** **Reset**

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Ok

10- SQUARE EDGE FLANGE TAP ORIFICE SIZING [ISO 5167-1, ASME & API]

Flow measurement is one of the essential elements of process design and most important part in plant operation for controlling and optimizing the process.

Engineers often required sizing the orifice and specifying correct range of flow transmitter for display and control on the DCS. Sizing the orifice based on assumptions often leads to incorrect design and poorly specified transmitter which gives erratic measurement and cause poor process control.

This software is developed based on widely accepted oil and gas flow measurement standard using correct orifice sizing equation and recommended method of calculating the Reynold number. Added advantage of this software is to size the correct range of transmitter and evaluate the calibration constants. This software can also be used to validate the existing transmitter for its adequacy.

Flow Measurement - [Square Edge Flange Tap Orifice ISO 5167-1]

Monday Feb-11-2013 12:34:22 am

Tag #

Site Conditions

Base Temperature T_B (deg F) 50

Base Pressure P_B (Psis) 14.65

Latitude L (degrees) 3

Elevation EL (FT) 76

Avg Inlet Temperature T_W (F) 95

Avg Ambient Temperature T_a (F) 100

Transmitter Data

Transmitter ☒ Water Manometer ☐ Mercury Manometer

Pressure Range P_T (Paig) 370

Differential Pressure Range h_W (in) 50

Temperature Range T_T (F) 65

Evaluate Transmitter Calibration Constants ☒

Input Meter Reading

Pressure Tap ☒ Up Stream ☐ Down Stream

Differential Pressure (Sg h_W) 10

Temperature (Sg T) 10

Pressure (Sg P) 10

Pipe and Orifice Dimensions

Pipe Diameter OD (in) 8

Pipe Schedule 40

Pipe Material Carbon Steel

Get ID (in) 7.981

Orifice Diameter d (in) 4

Orifice Material 316 SS

Fluid Properties

☐ Liquid ☒ Gas

Specific Gravity @ P_T, T_T 0.57

Viscosity @ P_T, T_T (CP) 0.0102067

Heat Capacity Ratio (CP/CV) 1.3

Fluid Compressibility @ P_T, T_T (Z_T) 0.997971

Fluid Compressibility @ P_B, T_B (Z_B) 0.997839

Fluid Compressibility @ STP (Z_s) 0.991308

Results

Results	Units	
Static Pressure	P _T (Psis)	384.730000
Pressure Loss P _{Loss}	P _{Loss} (Psis)	1.316233
Temperature	T _T (deg R)	524.670000
Expansion Factor	Y	0.990441
Velocity Approach Factor	EV	1.032123
Super Compressibility Factor	FP _Y	0.999334
Coefficient of Discharge	CD	0.603011
Reynold Number in Pipe	Re-D	2046781.484360
Reynold Number in Orifice	Re-d	4083878.124849
Velocity in Pipe	V _{pl} (ft/sec)	18.526221
Velocity in Throat	V _o (ft/sec)	73.754653
Beta Ratio	b (d/D)	0.501186
Orifice Plate Thickness	in	0.250000
Differential Pressure Ratio	dp/P	0.00469
Water Manometer Leg Correction Factor	F _{wm}	0.989389
Water Manometer Temp. Correction Factor	F _{wt}	0.995013
Local Gravitational Correction Factor	F _{gl}	0.998668
Local Gravitational Dead Weight Correction Factor	F _{gd}	0.997329
Mercury Manometer Factor Leg Correction Factor	F _{hgm}	1.000000
Mercury Manometer Temp. Correction Factor	F _{hgt}	1.000000
Flow Rate @ Flowing Cond.	Q _v (MMCFD)	0.570900
Flow Rate @ Standard Cond.	Q _s (MMSCFD)	14.877800
Flow Rate @ Base Cond.	Q _b (MMCFD)	14.561400
Mass Flow Rate	Q _m (Lbm/hr)	25960.307300

Calculate Reset Exit

Prepared by Incan Aslan Process Engineer incan.aslan@petrosol.com www.petrosol.com

OK

Users are prompted about the limitations of the programs in the message bar on the screen.

An introductory demonstration of this software is available online at www.petrosol.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

11- SQUARE EDGE CORNER TAP ORIFICE SIZING [ISO 5167-1, ASME & BS 1042]

Another orifice sizing software as per ISO 5167-1 standard.

Main features are as follows:

- Site condition section to define base temperature, pressure, base latitude and site elevation.
- A section to define the pipe size, schedule and material. Orifice size and material.
- A section to define fluid properties and type of fluid (liquid or gas).
- A section to define the transmitter range.
- A section to define the pipe tapping location and transmitter readings.
- A result section to display the calculated orifice sizing factor, coefficient of discharge and flow rate along with other useful parameters.
- A message bar to display the warnings and program orifice sizing limitations.

Users are prompted about the limitations of the programs in the message bar on the screen.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

12- SQUARE EDGE RADIUS TAP ORIFICE SIZING [ISO 5167-1 & ASME]

Another orifice sizing software as per ISO 5167-1 standard.

Main features are as follows:

- Site condition section to define base temperature, pressure, base latitude and site elevation.
- A section to define the pipe size, schedule and material. Orifice size and material.
- A section to define fluid properties and type of fluid (liquid or gas).
- A section to define the transmitter range.
- A section to define the pipe tapping location and transmitter readings.
- A result section to display the calculated orifice sizing factor, coefficient of discharge and flow rate along with other useful parameters.
- A message bar to display the warnings and program orifice sizing limitations.

Users are prompted about the limitations of the programs in the message bar on the screen.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

13- SQUARE EDGE PIPE TAP ORIFICE SIZING [API 14.3 & API 2530]

Another orifice sizing software as per API 14.3 and API 2530 standard.

Main features are as follows:

- Site condition section to define base temperature, pressure, base latitude and site elevation.
- A section to define the pipe size, schedule and material. Orifice size and material.
- A section to define fluid properties and type of fluid (liquid or gas).
- A section to define the transmitter range.
- A section to define the pipe tapping location and transmitter readings.
- A result section to display the calculated orifice sizing factor, coefficient of discharge and flow rate along with other useful parameters.
- A message bar to display the warnings and program orifice sizing limitations.

Users are prompted about the limitations of the programs in the message bar on the screen.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

14- CONICAL CORNER TAP ORIFICE SIZING [BS1042]

Orifice sizing program for Conical Style Corner tap orifice according to British Standard BS 1042.

Main features are as follows:

- Site condition section to define base temperature, pressure, base latitude and site elevation.
- A section to define the pipe size, schedule and material. Orifice size and material.
- A section to define fluid properties and type of fluid (liquid or gas).
- A section to define the transmitter range.
- A section to define the pipe tapping location and transmitter readings.
- A result section to display the calculated orifice sizing factor, coefficient of discharge and flow rate along with other useful parameters.
- A message bar to display the warnings and program orifice sizing limitations.

Conical Corner Tap Orifice BS 1042

Tag #

Site Conditions

Base Temperature T_B (deg F) 50

Base Pressure P_b (Psia) 14.65

Latitude L (degrees) 3

Elevation EL (FT) 76

Avg Water Temperature T_w (F) 95

Avg Ambient Temperature T_a (F) 100

Pipe and Orifice Dimensions

Pipe Diameter OD (in) 2

Pipe Schedule 40

Pipe Material Carbon Steel

Get ID (in) 2.067

Orifice Diameter d (in) 0.5

Orifice Material 316 SS

Fluid Properties

☐ Liquid ☒ Gas

Specific Gravity @ P, T 0.57

Viscosity @ P, T (CP) 0.0162057

Heat Capacity Ratio (C_P/C_V) 1.3

Fluid Compressibility @ P, T (Z₁) 0.997971

Fluid Compressibility @ P_b, T_b (Z₂) 0.997039

Fluid Compressibility @ STP (Z₃) 0.951300

Transmitter Data

Transmitter ☒ Water Manometer ☐ Mercury Manometer

Pressure Range P_R (Paig) 50

Differential Pressure Range hw (in) 5

Temperature Range T_R (F) 65

Evaluate Transmitter Calibration Constants ☒

Input Meter Reading

Pressure Tap ☐ Up Stream ☒ Down Stream

Differential Pressure (Sq hw) 10

Temperature (Sq T) 10

Pressure (Sq P) 10

Results

Results	Units	Value
Static Pressure	P (Psia)	64.730000
Pressure Loss P_{Loss}	P_{Loss} (Psia)	0.165651
Temperature	T (deg R)	524.670000
Expansion Factor	Y	0.999118
Velocity Approach Factor	EV	1.001716
Super Compressibility Factor	FP_v	0.999934
Coefficient of Discharge	CD	0.730000
Reynold Number in Pipe	Re_D	10323.939096
Reynold Number in Orifice	Re_d	63349.743717
Velocity in Pipe	V_p (Ft/sec)	3.907964
Velocity in Orifice	V_o (Ft/sec)	66.700162
Beta Ratio	β (b/D)	0.241894
Orifice Plate Thickness	t	0.125000
Differential Pressure Ratio	dp/P	0.00279
Water Manometer Leg Correction Factor	F_{wm}	0.999377
Water Manometer Temp. Correction Factor	F_{wt}	0.999013
Local Gravitational Correction Factor	F_{gl}	0.999668
Local Gravitational Dead Weight Correction Factor	F_{gdl}	0.999339
Mercury Manometer Factor Leg Correction Factor	F_{hgm}	1.000000
Mercury Manometer Temp. Correction Factor	F_{hgt}	1.000000
Flow Rate @ Flowing Cond.	Q_v (MMSCFD)	0.060100
Flow Rate @ Standard Cond.	Q_s (MMSCFD)	0.033500
Flow Rate @ Base Cond.	Q_b (MMSCFD)	0.034700
Mass Flow Rate	G_m (Lbm/hr)	61.804400

Prepared by In an Aslam
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Ok

Users are prompted about the limitations of the programs in the message bar on the screen.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

15- QUARTER CORNER TAP ORIFICE SIZING [BS1042]

Orifice sizing program for Quarter type Corner tap orifice according to British Standard BS 1042.

Main features are as follows:

- Site condition section to define base temperature, pressure, base latitude and site elevation.
- A section to define the pipe size, schedule and material. Orifice size and material.
- A section to define fluid properties and type of fluid (liquid or gas).
- A section to define the transmitter range.
- A section to define the pipe tapping location and transmitter readings.
- A result section to display the calculated orifice sizing factor, coefficient of discharge and flow rate along with other useful parameters.
- A message bar to display the warnings and program orifice sizing limitations.

Quarter Corner Tap Orifice BS 1042

Tag #

Site Conditions

Base Temperature T_B (deg F) 50

Base Pressure P_B (Psia) 14.65

Latitude L (degrees) 3

Elevation EL (FT) 76

Avg Water Temperature T_w (F) 95

Avg Ambient Temperature T_a (F) 100

Pipe and Orifice Dimensions

Pipe Diameter OD (in) 2

Pipe Schedule 40

Pipe Material Carbon Steel

Get ID (in) 2.067

Orifice Diameter d (in) 1

Orifice Material 316 SS

Fluid Properties

Liquid Gas

Specific Gravity @ P_B, T_B 0.57

Viscosity @ P_B, T_B (CP) 0.0102067

Heat Capacity Ratio (CP/CV) 1.3

Fluid Compressibility @ P_B, T_B (Z_B) 0.997571

Fluid Compressibility @ P_B, T_B (Z_B) 0.997571

Fluid Compressibility @ STP (Z_{STP}) 0.951308

Transmitter Data

Transmitter Water Manometer Mercury Manometer

Pressure Range P₁ (Psi) 25

Differential Pressure Range h_w (in) 0.001

Temperature Range T₁ (F) 65

Evaluate Transmitter Calibration Constants

Input Meter Reading

Pressure Tap Up Stream Down Stream

Differential Pressure (Sq P₁) 10

Temperature (Sq T₁) 10

Pressure (Sq P₁) 10

Results

Results	Units	
Static Pressure	P ₁ (Psia)	39.730000
Pressure Loss P _{Loss}	P _{Loss} (Psia)	0.000024
Temperature	T ₁ (deg R)	524.670000
Expansion Factor	Y	1.000000
Velocity Approach Factor	EV	1.028569
Super Compressibility Factor	FP _r	0.999934
Coefficient of Discharge	CD	0.797263
Reynold Number in Pipe	Re _D	12689.344982
Reynold Number in Orifice	Re _d	26227.049080
Velocity in Pipe	V _p (ft/sec)	0.316716
Velocity in Throat	V _t (ft/sec)	1.353190
Beta Ratio	b (b/D)	0.483789
Orifice Plate Thickness	in	0.125000
Differential Pressure Ratio	dp/P	0.000000
Water Manometer Leg Correction Factor	F _{WM}	1.000000
Water Manometer Temp. Correction Factor	F _{WT}	1.000000
Local Gravitational Dead Weight Correction Factor	F _g	1.000000
Mercury Manometer Factor Leg Correction Factor	F _{HM}	1.000000
Mercury Manometer Temp. Correction Factor	F _{HT}	1.000000
Flow Rate @ Flowing Cond.	Q _v (MMSCFD)	0.000700
Flow Rate @ Standard Cond.	Q _s (MMSCFD)	0.001700
Flow Rate @ Base Cond.	Q _b (MMSCFD)	0.001700
Mass Flow Rate	Q _m (Lbm/Hr)	3.104100

Calculate Reset Exit

Prepared by

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OK

Users are prompted about the limitations of the programs in the message bar on the screen.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

16- ECCENTRIC CORNER TAP ORIFICE SIZING [BS1042]

Orifice sizing program for Eccentric Corner tap orifice according to British Standard BS 1042.

Main features are as follows:

- Site condition section to define base temperature, pressure, base latitude and site elevation.
- A section to define the pipe size, schedule and material. Orifice size and material.
- A section to define fluid properties and type of fluid (liquid or gas).
- A section to define the transmitter range.
- A section to define the pipe tapping location and transmitter readings.
- A result section to display the calculated orifice sizing factor, coefficient of discharge and flow rate along with other useful parameters.
- A message bar to display the warnings and program orifice sizing limitations.

Eccentric Corner Tap Orifice BS 1042

Wednesday Feb-13-2013 12:10:01 am

Site Conditions

Tag # []

Base Temperature T_B (deg F) [50]

Base Pressure P_B (Psia) [14.65]

Latitude L (degrees) [3]

Elevation EL (FT) [76]

Avg Water Temperature T_w (F) [95]

Avg Ambient Temperature T_a (F) [100]

Pipe and Orifice Dimensions

Pipe Diameter OD (in) [14]

Pipe Schedule [40]

Pipe Material [Carbon Steel]

Get ID (in) [13.124]

Orifice Diameter d (in) [2]

Orifice Material [304 SS]

Fluid Properties

☐ Liquid ☒ Gas

Specific Gravity @ P_B, T_B [0.57]

Viscosity @ P_B, T_B (CP) [0.0102067]

Heat Capacity Ratio (CP/CV) [1.3]

Fluid Compressibility @ P_B, T_B (Z_B) [0.937971]

Fluid Compressibility @ P_B, T_B (Z_B) [0.997839]

Fluid Compressibility @ STP (Z_s) [0.951388]

Transmitter Data

Transmitter ☒ Water Manometer ☐ Mercury Manometer

Pressure Range P_T (Psig) [370]

Differential Pressure Range h_w (in) [50]

Temperature Range T_T (F) [65]

Evaluate Transmitter Calibration Constants ☒

Input Meter Reading

Pressure Tap ☒ Up Stream ☐ Down Stream

Differential Pressure (Sq h_w) [10]

Temperature (Sq T) [10]

Pressure (Sq P) [10]

Results

Results	Units	
Static Pressure	P _T (Psia)	384.730000
Pressure Loss P _{Loss}	P _{Loss} (Psia)	1.743443
Temperature	T _T (deg R)	524.670000
Expansion Factor	Y	0.998920
Velocity Approach Factor	EV	1.000270
Super Compressibility Factor	FP _v	0.999934
Coefficient of Discharge	CD	0.742005
Reynold Number in Pipe	Re _D	1704450.463338
Reynold Number in Orifice	Re _d	11184706.282391
Velocity in Pipe	V _p (ft/sec)	2.040753
Velocity in Throat	V _o (ft/sec)	87.876102
Beta Ratio	b (b/D)	0.152391
Orifice Plate Thickness	in	0.250000
Differential Pressure Ratio	dp/P	0.00469
Water Manometer Leg Correction Factor	F _{am}	0.999309
Water Manometer Temp. Correction Factor	F _{wt}	0.995013
Local Gravitational Correction Factor	F _{gl}	0.990660
Local Gravitational Dead Weight Correction Factor	F _{gd}	0.997339
Mercury Manometer Factor Leg Correction Factor	F _{hgm}	1.000000
Mercury Manometer Temp. Correction Factor	F _{hgt}	1.000000
Flow Rate @ Flowing Cond.	Q _v (MMSCFD)	0.170000
Flow Rate @ Standard Cond.	Q _s (MMSCFD)	4.193300
Flow Rate @ Base Cond.	Q _b (MMSCFD)	4.337300
Mass Flow Rate	Q _m (Lbm/Hr)	7732.700700

Calculate Reset Exit

Prepared by **Isaac Aslan**
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Ok

Users are prompted about the limitations of the programs in the message bar on the screen.

An introductory demonstration of this software is available online at www.petrosol.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

17- ECCENTRIC FLANGE TAP ORIFICE SIZING [BS1042]

Orifice sizing program for Eccentric Flange tap orifice according to British Standard BS 1042.

Main features are as follows:

- Site condition section to define base temperature, pressure, base latitude and site elevation.
- A section to define the pipe size, schedule and material. Orifice size and material.
- A section to define fluid properties and type of fluid (liquid or gas).
- A section to define the transmitter range.
- A section to define the pipe tapping location and transmitter readings.
- A result section to display the calculated orifice sizing factor, coefficient of discharge and flow rate along with other useful parameters.
- A message bar to display the warnings and program orifice sizing limitations.

Eccentric Flange Tap Orifice BS 1042

Wednesday Feb-13-2013 12:13:43 am

Site Conditions

Base Temperature T_B (deg F) : 50
 Base Pressure P_B (Psia) : 14.65
 Latitude L (degrees) : 3
 Elevation EL (FT) : 76
 Avg Water Temperature T_w (F) : 95
 Avg Ambient Temperature T_a (F) : 100

Pipe and Orifice Dimensions

Pipe Diameter OD (in) : 8
 Pipe Schedule : 40
 Pipe Material : Carbon Steel
 Get ID (in) : 7.981
 Orifice Diameter d (in) : 2
 Orifice Material : 316 SS

Fluid Properties

Specific Gravity @ P_B, T_B : 0.57
 Viscosity @ P_B, T_B (CP) : 0.0182867
 Heat Capacity Ratio (CP/CV) : 1.3
 Fluid Compressibility @ P_B, T_B (Z_B) : 0.997971
 Fluid Compressibility @ P_B, T_B (Z_B) : 0.997839
 Fluid Compressibility @ STP (Z_s) : 0.951300

Transmitter Data

Transmitter : ☒ Water Manometer ☐ Mercury Manometer
 Pressure Range P₁ (Psi) : 370
 Differential Pressure Range P₂ (in) : 50
 Temperature Range T₁ (F) : 65
 Evaluate Transmitter Calibration Constants : ☒

Input Meter Reading

Pressure Tap : ☒ Up Stream ☐ Down Stream
 Differential Pressure (Sq In) : 10
 Temperature (Sq T) : 10
 Pressure (Sq P) : 10

Results

Results	Units	
Static Pressure	P ₁ (Psia)	384.730000
Pressure Loss P _{Loss}	P _{Loss} (Psia)	1.657782
Temperature	T ₁ (deg R)	524.670000
Expansion Factor	Y	0.998516
Velocity Approach Factor	EV	1.001978
Super Compressibility Factor	FP _v	0.999934
Coefficient of Discharge	CD	0.673913
Reynold Number in Pipe	Re _D	2821658.780543
Reynold Number in Orifice	Re _d	1125932.394056
Velocity in Pipe	V _p (ft/sec)	5.020466
Velocity in Throat	V _t (ft/sec)	78.947824
Beta Ratio	b (b/D)	0.250000
Orifice Plate Thickness	in	0.250000
Differential Pressure Ratio	dp/P	0.00469
Water Manometer Leg Correction Factor	F _{am}	0.993389
Water Manometer Temp. Correction Factor	F _{wt}	0.995013
Local Gravitational Correction Factor	F _{gl}	0.998688
Local Gravitational Dead Weight Correction Factor	F _{gd}	0.997339
Mercury Manometer Factor Leg Correction Factor	F _{hm}	1.000000
Mercury Manometer Temp. Correction Factor	F _{ht}	1.000000
Flow Rate @ Flowing Cond.	Q _v (MMSCFD)	0.154700
Flow Rate @ Standard Cond.	Q _s (MMSCFD)	3.015000
Flow Rate @ Base Cond.	Q _b (MMSCFD)	3.946000
Mass Flow Rate	Q _m (Lbm/hr)	7035.047900

Calculate Reset Exit

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Ok

Users are prompted about the limitations of the programs in the message bar on the screen.

An introductory demonstration of this software is available online at www.petrosol.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

18- RESTRICTION ORIFICE SIZING [ISO 5167-1]

A restriction orifice software is exclusively developed to determine the correct size the orifice required to restrict the high pressure flow downstream of a blow down valve on flare headers, pump's minimum circulations lines and downstream of a level control valve to mitigate the vapor breakthrough and many other similar operations requirements. Sizing method selected is based on ISO 5167-1 flow measurement standard for its wide applicability and accuracy.

Program is design such that it completes the calculation steps while highlighting the choked flow condition, correct range of pipe and orifice size and pressure drop limitations.

Flow transmitters are not commonly installed on restriction orifices although, program have the flexibility to size the flow transmitter which is sometimes required in critical operation. Having this software on computer can really make the calculations just a click away.

Restriction Orifice ISO 5167-1

Wednesday Feb-13-2013 12:32:35 am

Tag #

Site Conditions

Base Temperature TB (deg F) 50
Base Pressure Pb (Psia) 14.65
Latitude L (degrees) 3
Elevation EL (FT) 76
Avg Water Temperature Tw (F) 95
Avg Ambient Temperature Ta (F) 100

Pipe and Orifice Dimensions

Pipe Diameter OD (in) 2
Pipe Schedule 40
Pipe Material Carbon Steel
Get ID (in) 2.067
Orifice Diameter d (in) 0.5
Orifice Material 304 SS

Fluid Properties

Liquid Gas
Specific Gravity @ Pt, T1 0.57
Viscosity @ Pt, T1 (CP) 0.0102067
Heat Capacity Ratio (CP/CV) 1.3
Fluid Compressibility @ Pt, T1 (Z1) 0.997971
Fluid Compressibility @ Pb, T1 (Zb) 0.997839
Fluid Compressibility @ STP (Zs) 0.951308

Transmitter Data

Transmitter Water Manometer Mercury Manometer
Pressure Range Pt (Paig) 370
Differential Pressure Range hwp (in) 50
Temperature Range Tt (F) 65
Evaluate Transmitter Calibration Constants

Input Meter Reading

Pressure Tap Up Stream Down Stream
Differential Pressure (Sq hwp) 10
Temperature (Sq T) 10
Pressure (Sq P) 10

Results

	Units	
Static Pressure	Pt (Psia)	304.730000
Pressure Loss PLoss	Ploss (Psia)	1.678457
Temperature	Tt (deg R)	524.670000
Expansion Factor	Y	0.998516
Velocity Approach Factor	EV	1.001716
Super Compressibility Factor	FPv	0.999334
Coefficient of Discharge	CD	0.617875
Reynold Number in Pipe	ReD	687916.341845
Reynold Number in Orifice	ReD	2843872.179101
Velocity in Pipe	Vp (Ft/sec)	4.287866
Velocity in Throat	Vt (Ft/sec)	73.280778
Beta Ratio	b (b/D)	0.241894
Orifice Plate Thickness	in	0.125000
Differential Pressure Ratio	dp/P	0.00469
Water Manometer Leg Correction Factor	Fwc	0.999309
Water Manometer Temp. Correction Factor	Fwt	0.995013
Local Gravitational Correction Factor	Fwl	0.998668
Local Gravitational Dead Weight Correction Factor	Fpwl	0.997339
Mercury Manometer Factor Leg Correction Factor	Fhps	1.000000
Mercury Manometer Temp. Correction Factor	Fhgt	1.000000
Flow Rate @ Flowing Cond.	Qv (MMCFD)	0.008900
Flow Rate @ Standard Cond.	Qs (MMSCFD)	0.218600
Flow Rate @ Base Cond.	Qb (MMSCFD)	0.226100
Mass Flow Rate	Qm (Lbm/Hr)	403.823600

Calculate Reset Exit

Prepared by
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Ok

Users are prompted about the limitations of the programs in the message bar on the screen.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

19- ISA 1932 NOZZLE SIZING [ISO 5167-1]

ISA 1932 Nozzles is a differential pressure flow measuring devices. Nozzle sizing software is developed with great precision according to ISO standard recommended procedure. Program is very users friendly and main interface is kept same as of the orifice sizing software. Program calculates mass flow rate and volumetric flow at standard conditions, flowing conditions and local base conditions. Nozzle dimensions are also displayed on the screen for ready reference.

Users are prompted about the limitations of the programs in the message bar on the screen.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

ISA 1932 Nozzle ISO 5167-1

Wednesday Feb-13-2013 01:02:43 am

Tag #

Site Conditions

Base Temperature TB (deg F) 50

Base Pressure Pb (Psia) 14.65

Latitude L (degrees) 3

Elevation EL (FT) 76

Avg Water Temperature Tw (F) 95

Avg Ambient Temperature Ta (F) 100

Pipe and Orifice Dimensions

Pipe Diameter OD (in) 8

Pipe Schedule 40

Pipe Material Carbon Steel

Get ID (in) 7.981

Orifice Diameter d (in) 4

Orifice Material 316 SS

Fluid Properties

Liquid Gas

Specific Gravity @ Pt, T1 0.57

Viscosity @ Pt, T1 (CP) 0.0162067

Heat Capacity Ratio (CP/CV) 1.3

Fluid Compressibility @ Pt, T1 (Z1) 0.997971

Fluid Compressibility @ Pb, Tb (Zb) 0.997839

Fluid Compressibility @ STP (Zs) 0.951308

Transmitter Data

Transmitter Water Manometer Mercury Manometer

Pressure Range PI (PsiG) 370

Differential Pressure Range tw (in) 50

Temperature Range TI (F) 65

Evaluate Transmitter Calibration Constants

Input Meter Reading

Differential Pressure (Sg hw) 10

Temperature (Sg T) 10

Pressure (Sg P) 10

Results

Results	Units	
Static Pressure	PI (Psia)	384.730000
Pressure Loss Ploss	Ploss (Psia)	1.074826
Temperature	TI (deg R)	524.670000
Expansion Factor	Y	0.997049
Velocity Approach Factor	EV	1.033125
Super Compressibility Factor	FPv	0.999934
Coefficient of Discharge	CD	0.976616
Reynold Number in Pipe	ReD	3287462.957190
Reynold Number in Orifice	ReD	6559310.465334
Velocity in Pipe	Vp (Ft/sec)	29.963190
Velocity in Throat	Vt (Ft/sec)	119.284168
Beta Ratio	b (b/D)	0.501190
Differential Pressure Ratio	dp/P	0.99531
Water Manometer Leg Correction Factor	Fwm	0.999309
Water Manometer Temp. Correction Factor	Fwt	0.995013
Local Gravitational Correction Factor	Fwl	0.998668
Local Gravitational Dead Weight Correction Factor	Fpwl	0.997339
Mercury Manometer Factor Leg Correction Factor	Fpwm	1.000000
Mercury Manometer Temp. Correction Factor	Fpwt	1.000000
Flow Rate @ Flowing Cond.	Qv (MMSCFD)	0.923300
Flow Rate @ Standard Cond.	Qs (MMSCFD)	22.769500
Flow Rate @ Base Cond.	Qb (MMSCFD)	23.551500
Max Flow Rate	Qm (Lbm/Hr)	41988.205500

Calculate Reset Exit

Prepared by

Iran Aslan
Process Engineer
iran.aslan@petrosol.com
www.petrosol.com

Ok

Nozzle Profile

R1 0.80 in

R2 1.33 in

an 1.22 in

bn 1.20 in

L 2.42 in

20- LONG RADIUS HIGH BETA RATIO NOZZLE SIZING [ASME & ISO 5167-1]

Software is developed with great accuracy according to ASME & ISO 5167-1 standard procedure for liquid and gas measurement. Program is very users friendly and main interface is kept same as of the other nozzle sizing software. Program calculates mass flow rate and volumetric flow at standard conditions, flowing conditions and local base conditions. Nozzle dimensions are also displayed on the screen for ready reference. Users are prompted about the limitations of the programs in the message bar on the screen.

An introductory demonstration of this software is available online at www.petrosol.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

<http://www.petrosol.com/>

Long Radius High Beta Ratio Nozzle ASME

Wednesday Feb-13-2013 11:41:02 pm

Tag #

Site Conditions

Base Temperature TB (deg F) 50

Base Pressure Pb (Psia) 14.65

Latitude L (degrees) 3

Elevation EL (FT) 76

Avg Water Temperature Tw (F) 95

Avg Ambient Temperature Ta (F) 100

Pipe and Orifice Dimensions

Pipe Diameter DD (in) 4

Pipe Schedule 40

Pipe Material 316 SS

Get ID (in) 4.026

Orifice Diameter d (in) 3

Orifice Material 316 SS

Fluid Properties

Liquid Gas

Specific Gravity @ Pt, Tf 0.57

Viscosity @ Pt, Tf (CP) 0.0102067

Heat Capacity Ratio (CP/CV) 1.3

Fluid Compressibility @ Pt, Tf (Zt) 0.997971

Fluid Compressibility @ Pb, Tb (Zb) 0.997839

Fluid Compressibility @ STP (Zs) 0.951308

Transmitter Data

Transmitter Water Manometer Mercury Manometer

Pressure Range Pt (Psi) 370

Differential Pressure Range hw (in) 50

Temperature Range Tf (F) 65

Evaluate Transmitter Calibration Constants

Input Meter Reading

Differential Pressure (Sq hw) 10

Temperature (Sq T) 10

Pressure (Sq P) 10

Results

Results	Units	
Static Pressure	Pt (Psia)	384.730000
Pressure Loss Ploss	Ploss (Psia)	2.490067
Temperature	Tf (deg R)	524.670000
Expansion Factor	Y	0.995693
Velocity Approach Factor	EV	1.202388
Super Compressibility Factor	FPv	0.999934
Coefficient of Discharge	CD	0.994048
Reynold Number in Pipe	ReD	4351394.523830
Reynold Number in Orifice	ReD	5839571.450980
Velocity in Pipe	Vp (ft/sec)	78.354176
Velocity in Throat	Vs (ft/sec)	141.113050
Beta Ratio	b (b/D)	0.745156
Nozzle Thickness	mm	3.000000
Differential Pressure Ratio	dp/P	0.99531
Water Manometer Leg Correction Factor	Fam	0.998309
Water Manometer Temp. Correction Factor	Fwt	0.995013
Local Gravitational Correction Factor	Fwl	0.998668
Local Gravitational Dead Weight Correction Factor	Fpwl	0.997339
Mercury Manometer Factor Leg Correction Factor	Fhgm	1.000000
Mercury Manometer Temp. Correction Factor	Fhgt	1.000000
Flow Rate @ Flowing Cond.	Qv (MMCFD)	0.614400
Flow Rate @ Standard Cond.	Qs (MMSCFD)	15.151700
Flow Rate @ Base Cond.	Qb (MMCFD)	15.672100
Mass Flow Rate	Qm (Lbs/Hr)	27940.502600

Calculate Reset Exit

Prepared by

Iran Aslan

Process Engineer

iran.aslan@petrosof.com

www.petrosol.com

Nozzle Profile

21- LONG RADIUS LOW BETA RATIO NOZZLE SIZING [ISO 5167-1]

Software is developed with great accuracy according to ISO standard recommended procedure. Program is very users friendly and main interface is kept same as of the other nozzle sizing software. Program calculates mass flow rate and volumetric flow at standard conditions, flowing conditions and local base conditions. Nozzle dimensions are also displayed on the screen for ready reference.

Users are prompted about the limitations of the programs in the message bar on the screen.

An introductory demonstration of this software is available online at www.petrosol.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

NOIForm1 - [Long Radius Low Beta Ratio Nozzle]

File Settings Programs About Help © Process Engineering 2011

Long Radius Low Beta Ratio Nozzle ISO 5167-1 Wednesday Feb-13-2013 11:45:35 pm

Tag #

Site Conditions

Base Temperature TB (deg F) 50

Base Pressure Pb (Psia) 14.5

Latitude L (degrees) 3

Elevation EL (FT) 76

Avg Water Temperature Tw (F) 95

Avg Ambient Temperature Ta (F) 100

Pipe and Orifice Dimensions

Pipe Diameter OD (in) 3

Pipe Schedule 40

Pipe Material 316 SS

Get ID (in) 3.068

Orifice Diameter d (in) 1

Orifice Material 316 SS

Fluid Properties

☐ Liquid ☒ Gas

Specific Gravity @ Pt, Tf 0.57

Viscosity @ Pt, Tf (CP) 0.0102067

Heat Capacity Ratio (CP/ CV) 1.3

Fluid Compressibility @ Pt, Tf (Z) 0.997971

Fluid Compressibility @ Pb, Tb (Zb) 0.997839

Fluid Compressibility @ STP (Zs) 0.951308

Calculate Reset Exit

Prepared by

Iranian Aslan
Process Engineer
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Transmitter Data

Transmitter ☒ Water Manometer ☐ Mercury Manometer

Pressure Range Pt (Psig) 370

Differential Pressure Range hwh (in) 50

Temperature Range Tt (F) 65

Evaluate Transmitter Calibration Constants ☒

Input Meter Reading

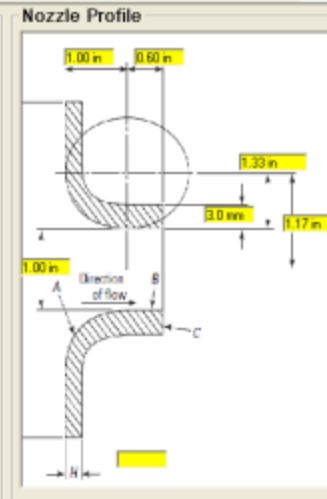
Differential Pressure (Sq hwh) 10

Temperature (Sq T) 10

Pressure (Sq P) 10

Results	Units	
Static Pressure	Pt (Psia)	384.730000
Pressure Loss PLOSS	PLOSS (Psia)	1.458913
Temperature	Tt (deg R)	524.670000
Expansion Factor	Y	0.997250
Velocity Approach Factor	EV	1.005632
Super Compressibility Factor	FPw	0.999934
Coefficient of Discharge	CD	0.991384
Reynold Number in Pipe	ReD	530940.359941
Reynold Number in Orifice	ReD	1628925.024239
Velocity in Pipe	Vp (Ft/sec)	12.525971
Velocity in Throat	Vs (Ft/sec)	117.902253
Beta Ratio	b (b/D)	0.325945
Nozzle Thickness	mm	3.000000
Differential Pressure Ratio	dp/P	0.99531
Water Manometer Leg Correction Factor	Fam	0.999309
Water Manometer Temp. Correction Factor	Fwt	0.995013
Local Gravitational Correction Factor	Fwl	0.998668
Local Gravitational Dead Weight Correction Factor	Fpwl	0.997339
Mercury Manometer Factor Leg Correction Factor	Fhgm	1.000000
Mercury Manometer Temp. Correction Factor	Fhgt	1.000000
Flow Rate @ Flowing Cond.	Qv (MMCFD)	0.057600
Flow Rate @ Standard Cond.	Qs (MMSCFD)	1.421200
Flow Rate @ Base Cond.	Qb (MMCFD)	1.485200
Mass Flow Rate	Qm (Lbms/Hr)	2593.601000

Ok



22- LONG RADIUS LOW BETA RATIO NOZZLE SIZING [ASME]

Software is developed with great accuracy according to ASME standard recommended procedure. Program is very users friendly and main interface is kept same as of the other nozzle sizing software. Program calculates mass flow rate and volumetric flow at standard conditions, flowing conditions and local base conditions. Nozzle dimensions are also displayed on the screen for ready reference.

Users are prompted about the limitations of the programs in the message bar on the screen.

An introductory demonstration of this software is available online at www.petrosol.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

<http://www.petrosol.com/>

NOIForm1 - [Long Radius Low Beta Ratio Nozzle]

File Settings Programs About Help © Process Engineering 2011

Long Radius Low Beta Ratio Nozzle ASME Wednesday Feb-13-2013 11:47:47 pm

Tag #

Site Conditions

Base Temperature TB (deg F) 50

Base Pressure Pb (Psia) 14.696

Latitude L (degrees) 3

Elevation EL (FT) 76

Avg Water Temperature Tw (F) 95

Avg Ambient Temperature Ta (F) 100

Pipe and Orifice Dimensions

Pipe Diameter OD (in) 4

Pipe Schedule 40

Pipe Material 316 SS

Get ID (in) 4.026

Orifice Diameter d (in) 1

Orifice Material 316 SS

Fluid Properties

☐ Liquid ☒ Gas

Specific Gravity @ Pt, Tf 0.57

Viscosity @ Pt, Tf (CP) 0.0102067

Heat Capacity Ratio (CP/ CV) 1.3

Fluid Compressibility @ Pt, Tf (Z) 0.997971

Fluid Compressibility @ Pb, Tb (Zb) 0.997839

Fluid Compressibility @ STP (Zs) 0.951308

Calculate Reset Exit

Prepared by

Iranian Aslan
Process Engineer
iraniaslan@petrosol.com
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Transmitter Data

Transmitter ☒ Water Manometer ☐ Mercury Manometer

Pressure Range Pt (Psig) 370

Differential Pressure Range hwh (in) 50

Temperature Range Tf (F) 65

Evaluate Transmitter Calibration Constants ☒

Input Meter Reading

Differential Pressure (Sq hwh) 10

Temperature (Sq T) 10

Pressure (Sq P) 10

Results

Results	Units	
Static Pressure	Pt (Psia)	384.730000
Pressure Loss PLOSS	Ploss (Psia)	1.820570
Temperature	Tf (deg R)	524.670000
Expansion Factor	Y	0.997277
Velocity Approach Factor	EV	1.001909
Super Compressibility Factor	FPw	0.999934
Coefficient of Discharge	CD	0.991374
Reynold Number in Pipe	ReD	403110.558425
Reynold Number in Orifice	Red	1622923.108217
Velocity in Pipe	Vp (Ft/sec)	7.246425
Velocity in Throat	Vs (Ft/sec)	117.454956
Beta Ratio	b (b/D)	0.248385
Nozzle Thickness	mm	3.000000
Differential Pressure Ratio	dp/P	0.99531
Water Manometer Leg Correction Factor	Fam	0.999309
Water Manometer Temp. Correction Factor	Fwt	0.995013
Local Gravitational Correction Factor	Fwl	0.998668
Local Gravitational Dead Weight Correction Factor	Fpwl	0.997339
Mercury Manometer Factor Leg Correction Factor	Fhgm	1.000000
Mercury Manometer Temp. Correction Factor	Fhgt	1.000000
Flow Rate @ Flowing Cond.	Qv (MMCFD)	0.056600
Flow Rate @ Standard Cond.	Qs (MMSCFD)	1.356900
Flow Rate @ Base Cond.	Qb (MMCFD)	1.440300
Mass Flow Rate	Qm (Lbss/Hr)	2584.020000

Nozzle Profile

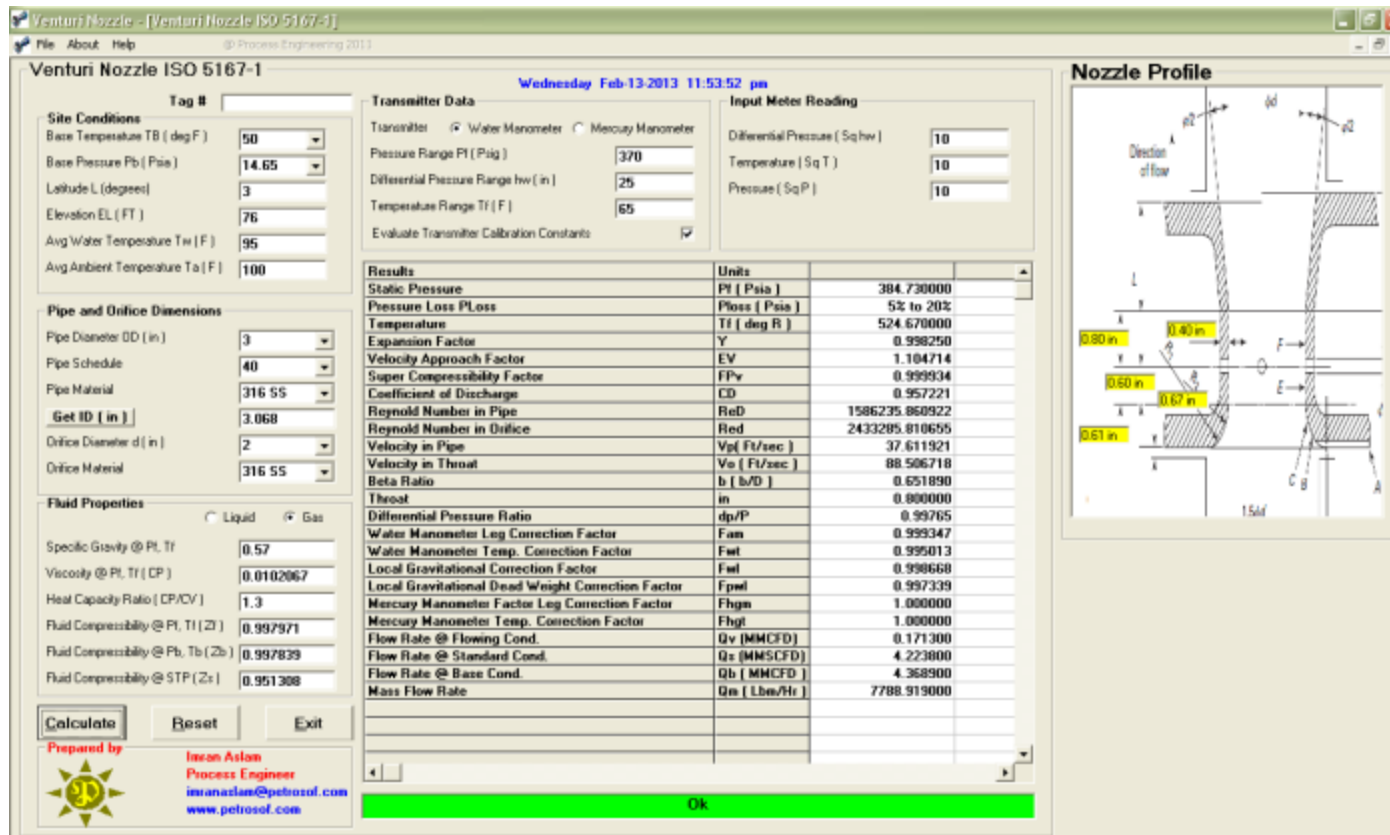
23- VENTURI NOZZLE SIZING [ISO 5167-1]

Software is developed with great accuracy according to ISO standard procedure for liquid and gas measurement. Program is very users friendly and main interface is kept same as of the other nozzle sizing software. Program calculates mass flow rate and volumetric flow at standard conditions, flowing conditions and local base conditions. Nozzle dimensions are also displayed on the screen for ready reference. Users are prompted about the limitations of the programs in the message bar on the screen.

An introductory demonstration of this software is available online at www.petrosol.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

<http://www.petrosol.com/>



24- ROUGH CAST CONVERGENT VENTURI SIZING [ASME & ISO 51671-1]

Software is developed with great accuracy according to ISO 5167-1 and ASME standard procedure. Application contains two sub-applications for ISO-5167-1 and ASME. Program is very user's friendly containing two main section a) The input section to provide site conditions and b) result section where a detailed calculation of flow measuring device displayed. Program calculates mass flow rate and volumetric flow at standard conditions, flowing/site conditions and local site base conditions. Nozzle dimensions are also displayed on the screen for ready reference.

Users are prompted about the limitations of the programs in the message bar on the screen.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

Rough Cast Convergent Venturi ASME

Thursday Feb 14 2013 12:03:22 am

Tag #

Site Conditions

Base Temperature TB (deg F) 50

Base Pressure Pb (Psia) 14.65

Latitude L (degrees) 3

Elevation EL (FT) 76

Avg Water Temperature Tw (F) 95

Avg Ambient Temperature Ta (F) 100

Transmitter Data

Transmitter ☒ Water Manometer ☐ Mercury Manometer

Pressure Range P1 (Psig) 370

Differential Pressure Range hwp (in) 50

Temperature Range Tf (F) 65

Evaluate Transmitter Calibration Constants ☐

Input Meter Reading

☒ 15 degree divergent ☐ 7 degree divergent

Differential Pressure (Sq hwp) 10

Temperature (Sq T) 10

Pressure (Sq P) 10

Results

Results	Units	
Static Pressure	PT (Psia)	384.730000
Pressure Loss Ploss	Ploss (Psia)	0.125443
Temperature	Tf (deg F)	524.670000
Expansion Factor	Y	0.996453
Velocity Approach Factor	EV	1.110562
Super Compressibility Factor	FPv	0.999934
Coefficient of Discharge	CD	0.984000
Reynold Number in Pipe	ReD	4682313.883495
Reynold Number in Orifice	Reo	7699568.425851
Velocity in Pipe	Vp (Ft/sec)	56.162034
Velocity in Throat	Vo (Ft/sec)	129.117305
Beta Ratio	b (b/D)	0.659522
Conical Convergent B	in	5.575500
Differential Pressure Ratio	dp/P	0.99531
Water Manometer Leg Correction Factor	Fam	1.000000
Water Manometer Temp. Correction Factor	Fwt	1.000000
Local Gravitational Correction Factor	Fwl	1.000000
Local Gravitational Dead Weight Correction Factor	Fpwd	1.000000
Mercury Manometer Factor Leg Correction Factor	Fhgm	1.000000
Mercury Manometer Temp. Correction Factor	Fhgt	1.000000
Flow Rate @ Flowing Cond.	Qv (MMCFD)	1.069200
Flow Rate @ Standard Cond.	Qs (MMSCFD)	24.886400
Flow Rate @ Base Cond.	Qb (MMCFD)	25.741200
Mass Flow Rate	Qm (Lbm/Hr)	45891.943400

Pipe and Orifice Dimensions

Pipe Diameter OD (in) 6

Pipe Schedule 40

Pipe Material 316 SS

Get ID (in) 5.065

Orifice Diameter d (in) 4

Orifice Material 316 SS

Fluid Properties

☐ Liquid ☒ Gas

Specific Gravity @ Pt, Tf 0.57

Viscosity @ Pt, Tf (CP) 0.0102067


Heat Capacity Ratio (CP/CV) 1.3

Fluid Compressibility @ Pt, Tf (Zi) 0.997971

Fluid Compressibility @ Pb, Tb (Zb) 0.997839

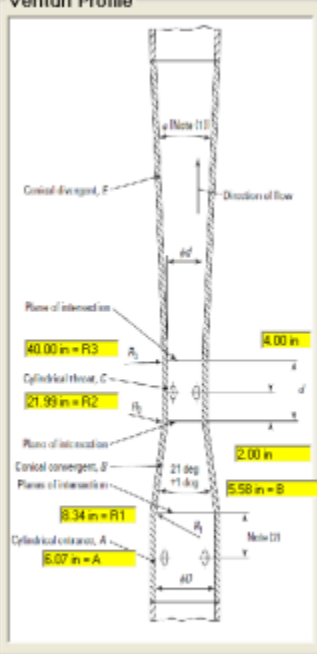
Fluid Compressibility @ STP (Zs) 0.951398

Calculate **Reset** **Exit**

Prepared by  **Iman Aslan**
Process Engineer
imanaslan@petrosol.com
www.petrosol.com

Ok

Venturi Profile



25- MECHANICAL CONVERGENT VENTURI SIZING [ASME & ISO 5167-1]

Software is developed with great accuracy according to ISO 5167-1 and ASME standard procedure. Application contains two sub-applications for ISO-5167-1 and ASME. Program is very user's friendly containing two main section a) The input section to provide site conditions and b) result section where a detailed calculation of flow measuring device displayed. Program calculates mass flow rate and volumetric flow at standard conditions, flowing/site conditions and local site base conditions. Nozzle dimensions are also displayed on the screen for ready reference.

Users are prompted about the limitations of the programs in the message bar on the screen.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

Mechanical Covergent Venturi ASME

Thursday Feb-14-2013 12:09:32 am

Tag #

Site Conditions

Base Temperature T_B (deg F) 60

Base Pressure P_B (Psia) 14.65

Latitude L (degrees) 3

Elevation EL (FT) 76

Avg Water Temperature T_w (F) 95

Avg Ambient Temperature T_a (F) 100

Transmitter Data

Transmitter ☒ Water Manometer ☐ Mercury Manometer

Pressure Range P_I (Psig) 370

Differential Pressure Range h_w (in) 50

Temperature Range T_I (F) 65

Evaluate Transmitter Calibration Constants ☒

Input Meter Reading

☒ 15 degree divergent ☐ 7 degree divergent

Differential Pressure (Sq h_w) 10

Temperature (Sq T) 10

Pressure (Sq P) 10

Pipe and Orifice Dimensions

Pipe Diameter OD (in) 2

Pipe Schedule 40

Pipe Material 316 SS

Get ID (in) 2.067

Orifice Diameter d (in) 0.75

Orifice Material 316 SS

Fluid Properties

☐ Liquid ☒ Gas

Specific Gravity @ P_I , T_I 0.57

Viscosity @ P_I , T_I (CP) 0.0102067

Heat Capacity Ratio (CP/CV) 1.3

Fluid Compressibility @ P_I , T_I (Z) 0.997971

Fluid Compressibility @ P_B , T_B (Zb) 0.997839

Fluid Compressibility @ STP (Zs) 0.951308

Results

Results	Units	
Static Pressure	P_I (Psia)	384.730000
Pressure Loss P_{Loss}	P_{Loss} (Psia)	0.201631
Temperature	T_I (deg R)	524.670000
Expansion Factor	Y	0.997227
Velocity Approach Factor	EV	1.008781
Super Compressibility Factor	FPv	0.999934
Coefficient of Discharge	CD	0.995000
Reynold Number in Pipe	ReD	443967.524803
Reynold Number in Orifice	ReD	1223574.498357
Velocity in Pipe	V_p (ft/sec)	15.626701
Velocity in Throat	V_o (ft/sec)	118.693169
Beta Ratio	b (b/D)	0.362845
Conical Convergent B	in	3.555900
Differential Pressure Ratio	dp/P	0.99531
Water Manometer Leg Correction Factor	Fam	0.999309
Water Manometer Temp. Correction Factor	Fwt	0.995013
Local Gravitational Correction Factor	Fwl	0.998668
Local Gravitational Dead Weight Correction Factor	Fpwl	0.997339
Mercury Manometer Factor Leg Correction Factor	Fhgm	1.000000
Mercury Manometer Temp. Correction Factor	Fhgt	1.000000
Flow Rate @ Flowing Cond.	Q_v (MMCFD)	0.032900
Flow Rate @ Standard Cond.	Q_s (MMSCFD)	0.012200
Flow Rate @ Base Cond.	Q_b (MMCFD)	0.056500
Mass Flow Rate	Q_m (Lbm/Hr)	1468.687200

Venturi Profile

Diagram showing the Venturi profile with dimensions and labels. Key dimensions include: 0.38 in = R3, 0.38 in, 0.52 in = R2, 0.52 in = R1, 2.07 in = A, 3.56 in = B, 21 deg ±1 (deg), and 0.75 in = d. Labels include: Conical divergent, F; Direction of flow; Plane of intersection; Cylindrical throat, C; Plane of intersection; Conical convergent, B; Plane of intersection; Cylindrical orifice, A; and Valve (D).

Calculate Reset Exit

Prepared by Incan Aslan Process Engineer incanaslan@petrosol.com www.petrosol.com

Ok

26- FABRICATED CONVERGENT VENTURI SIZING [ASME & ISO 51671-1]

Software is developed with great accuracy according to ISO 5167-1 and ASME standard procedure. Application contains two sub-applications for ISO-5167-1 and ASME. Program is very user's friendly containing two main section a) The input section to provide site conditions and b) result section where a detailed calculation of flow measuring device displayed. Program calculates mass flow rate and volumetric flow at standard conditions, flowing/site conditions and local site base conditions. Nozzle dimensions are also displayed on the screen for ready reference.

Users are prompted about the limitations of the programs in the message bar on the screen.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

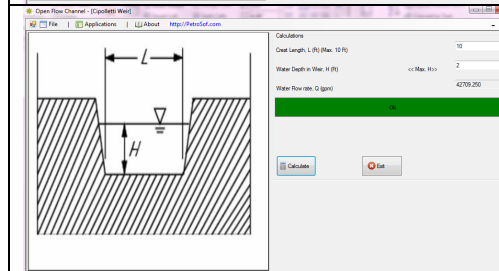
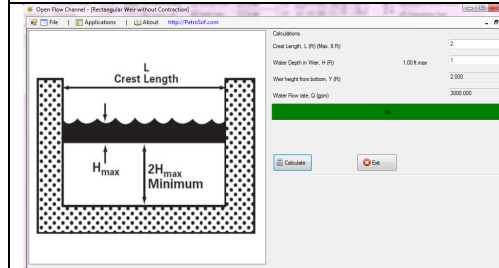
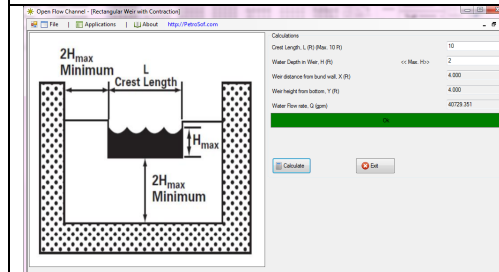
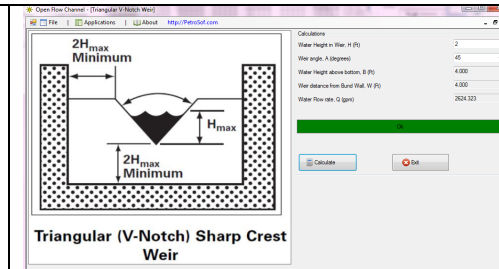
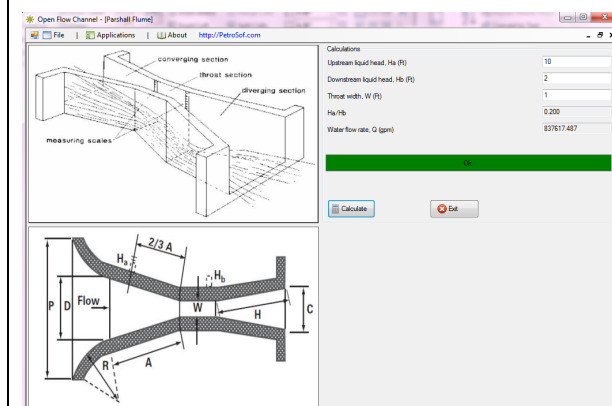
27- OPEN CHANNEL FLOW MEASUREMENT

Open channel flow measurement software is developed with great accuracy to calculate open channel water flow through various types of measurement devices. Following five types of devices are normally used in open channels to calculate the flow of water/drains or water channels in rivers canals and gutters. Software is very user's friendly allowing users to provide simple inputs and determine the flow. Software covers all possible errors and define limits on the screen for user's to provide accurate details for calculation.

- Triangular V-Notch Sharp Crest weir type device
- Rectangular weir with contraction
- Rectangular weir without contraction
- Cippolletti weir
- Parshall flume

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

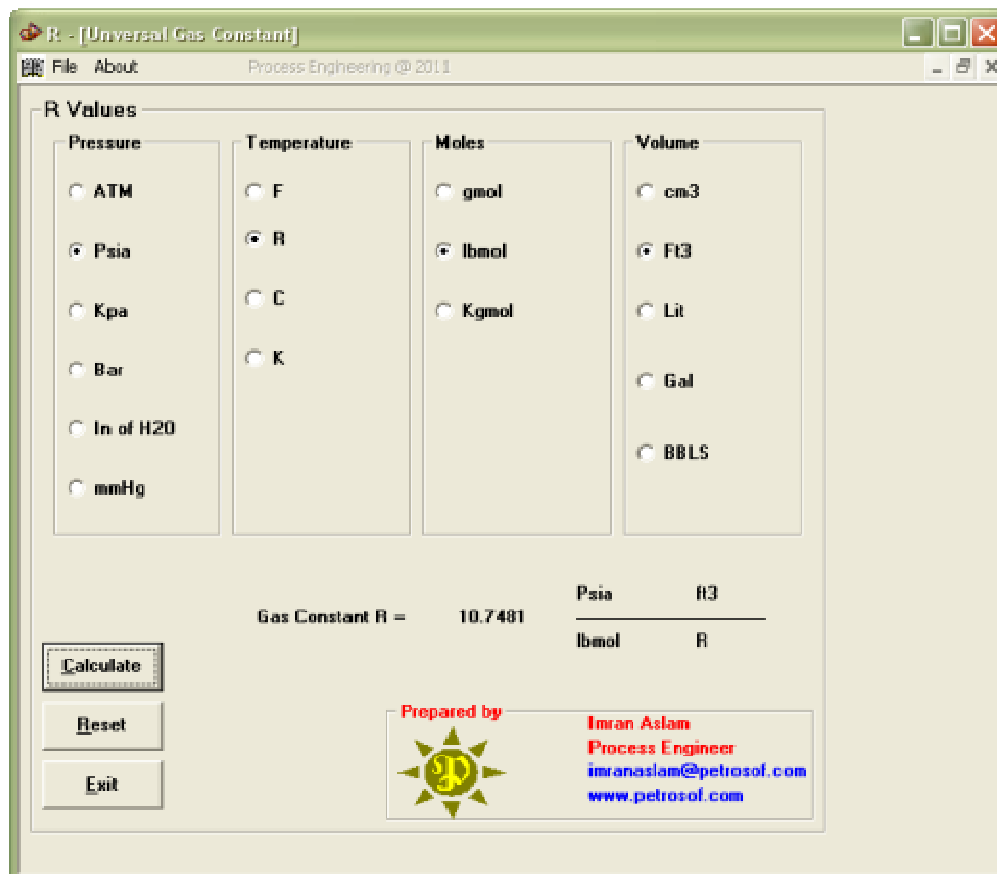


28- UNIVERSAL GAS CONSTANT

Universal gas constant is used in a variety of calculations with different set of units. A simple program is developed to calculate the R values with most commonly set of units. A simple tool to be used on desk calculations.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.



29- GAS TO LIQUID CONVERSION

A most common practice is the gas plant purging with an inert gas before and after the plant shutdown. Nitrogen is an inert gas and mostly used for this specific purpose. Engineers are required to determine the volume of liquid nitrogen used during the purging process based on the volume of piping and vessels at various pressures. A simple and robust software is developed to calculate the exact volume of liquid nitrogen at different pressures based on the piping and vessel volumes.

Also a list of selective components are incorporated in the software for which the equivalent liquid volume can be calculated. All is required to select the component from the list of components and equivalent liquid volume will be calculated automatically as the gaseous volume is typed.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

Conversion - [Gas To Liquid Conversion]
© 2013 Process Design

Conversions

Gas Conversion

Gases

Gas: PROPANE

Volume of Gas (MMSCF): 12

% age Gas to Liquid Conversion: 100

Results

Weight of Gas (lbm): 1394371.542

Volume of Liquid Gas (Liters): 1087705.636

Volume of Liquid Gas (gallons): 287372.691

Ok

Prepared by: Imran Aslam
Process Engineer
imranaslam@petrosol.com
www.petrosol.com

Exit

Thursday Feb-14-2013 12:50:53 am

Plant Nitrogen Purging

Volume of Plant Piping/Vessels (FT³): 500000

Purging Pressure (Psi): 250

Purging Temperature (Deg F): 75

N2 Compressibility @ P, T: .99

Results

N2 Volume Required (MMSCFD): 8.9123843

Weight of Nitrogen (lbm): 657872.517

Liquid Nitrogen Required (Liter): 371485.227

Liquid Nitrogen Required (Gallons): 98146.692

Calculate

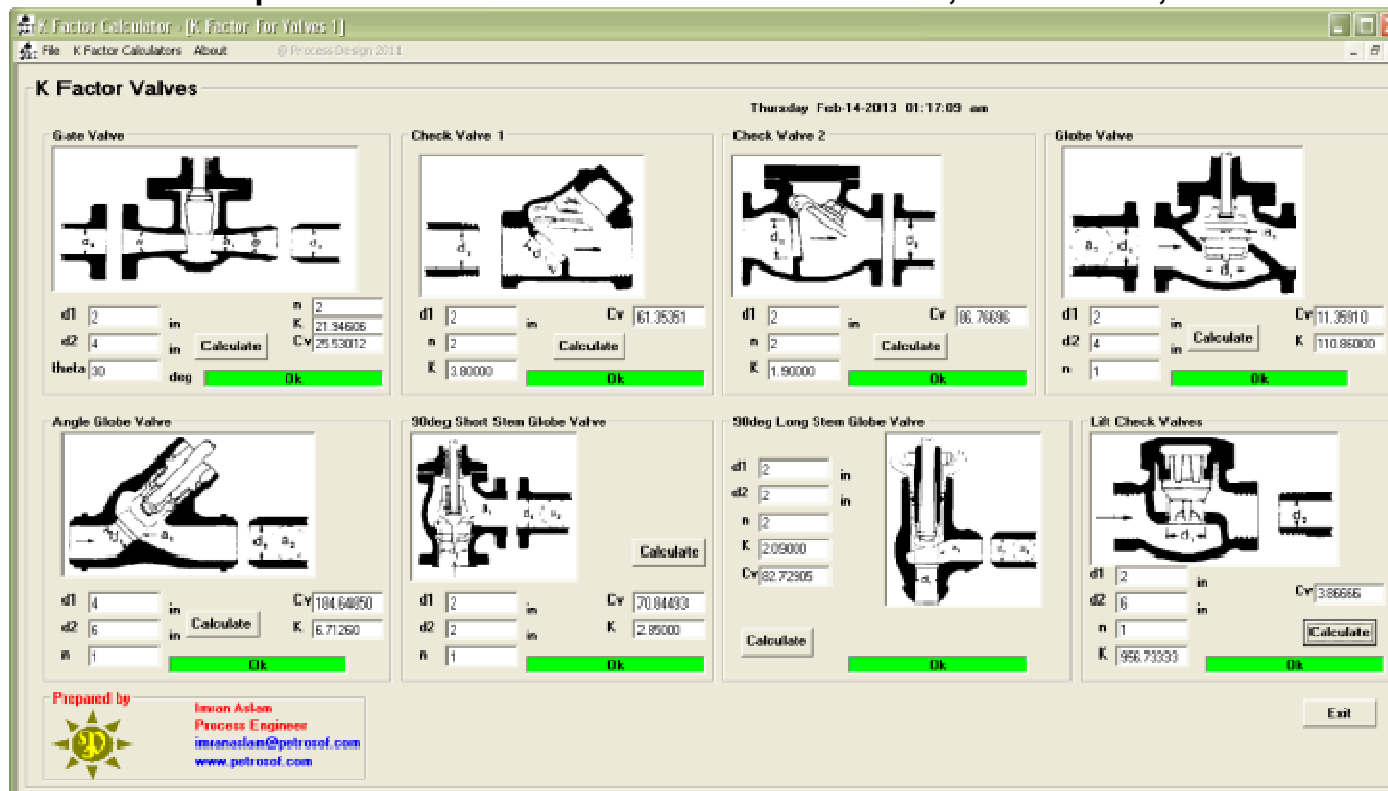
Ok

30- K FACTOR CALCULATIONS

In fluid hydraulic calculations, flow resistance coefficient is the key variable to be calculated to determine the pressure drop. There are various types of fittings and valves normally used in the piping system and each type has different value of K depending on the size and internal body casting. This software is developed with great precision to calculate the K factor for all types of known fittings in the piping system. This is a complete package consisting of four sets of screens each can be pulled up from the drop down menu on the title bar of the program. This program is very simple to use and Engineers can obtain the results with little inputs without manual calculations of lengthy equations.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.



31- INCOMPRESSIBLE FLUID HYDRAULICS

Hydraulic calculation is the basic requirement of Process Design. This software is developed with great commitment to accurately calculate the pipeline hydraulics carrying incompressible fluid. Engineers can define a complete isometric layout of the pipes installed at different elevations including various types of fittings and valves. Program can determine the hydraulic calculations of each pipe segment and displays the summary results in tabulated form on the screen while a detailed calculations analysis of each individual item is provided on hydraulics section of the program.

All possible errors and warning are captured and display in the message bar on the screen.

**An introductory demonstration of this software
is available online at www.petrosof.com**

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

[illegible]

32- GAS HYDRAULICS

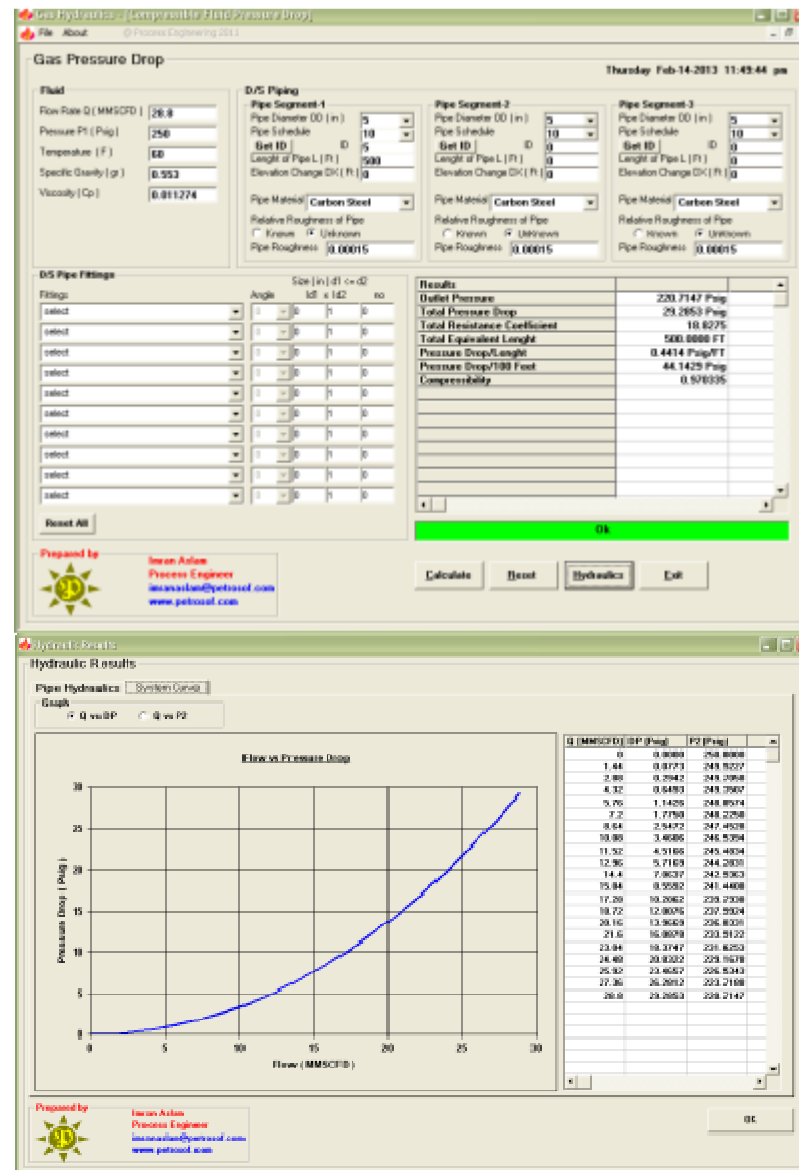
Flow of gas in the pipeline is very different than the liquid flow due to the nature of fluid. Properties of the compressible fluid changes with the temperature and pressure drop in the pipe and hydraulic calculations requires more attentions and care in order to predict the accurate results. The Gas Hydraulic software is developed with great effort and time to precisely calculate pressure drop, velocity, compressibility and other important hydraulic parameters.

A complete piping system can be defined along with fittings and valves with elevation details. A separate section of tabulated and graphical results are compiled within the software. An important feature of the program is; it generates the pressure drop and system resistance curves and presents a breakdown of pressure drop over the entire range of flow and pipe length.

All possible errors and warning are captured and display in the message bar on the screen.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.



33- PUMP HYDRAULICS

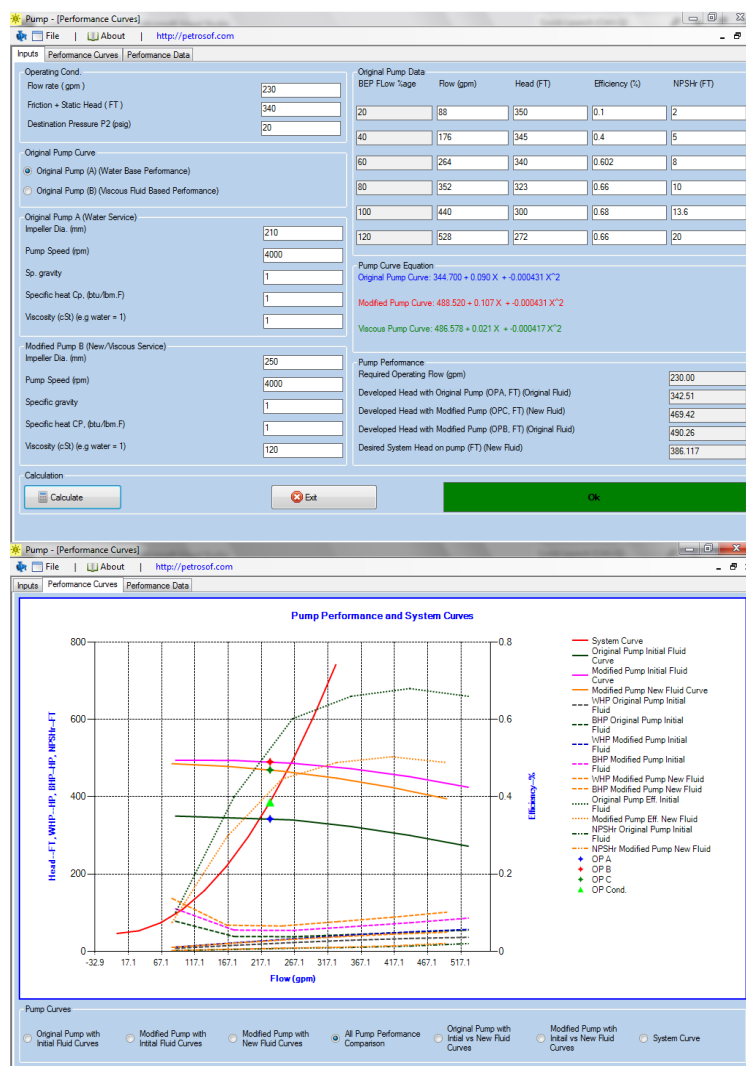
Pump sizing and system hydraulic calculation is the most important and challenging task in Process Design. Engineers often face the situation where they design a new system or have to determine the performance of existing pump system and its hydraulics calculations.

This application is designed with high accuracy to model the performance curves of centrifugal pump provided vendors original performance curves. Then engineers can specify the new field conditions to determine performance of the pump. A system resistance curves is also developed in the application. An exquisite application specially designed for process engineering calculation.

All possible errors and warning are captured and display in the message bar on the screen.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.



34- PETROLEUM FRACTION PHYSICAL PROPERTIES

This software is developed to calculate the physical properties of hypothetical petroleum fractions. This program contains a set of seven complex empirical equations to which the manual interpolation is laborious and tedious. A very handy and useful tool for quick calculation without using graphs or tables.

Errors and program limitations are cautioned through message bar on the screen.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

Physical Properties
About Help

Petroleum Fractions Physical Properties Calculator

Riazi-Daubert Correlation


Input

Normal Boiling Point (Deg F)

Specific Gravity

Properties

Molecular Weight	<input type="text" value="93.020771"/>
Critical Pressure (Psia)	<input type="text" value="430.675951"/>
Critical Temperature (Deg F)	<input type="text" value="464.851206"/>
Critical Volume (ft ³ /Lbm)	<input type="text" value="0.065802"/>
Accentric Factor	<input type="text" value="0.277840"/>
Critical Compressibility Zc	<input type="text" value="0.265738"/>
Edmister	<input type="text" value="0.265559"/>
Haugen	<input type="text" value="0.268773"/>
Sherwood	<input type="text" value="0.067493"/>
Salema	<input type="text" value="0.266016"/>
Nath	<input type="text" value=""/>

Prepared by
 **Imran Aslam**
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35- PRESSURE RELIEF VALVE SIZING [GAS SERVICE]

The most important part of Process Engineering is Pressure Relief Valve Designing. Accurate sizing of PSV is highly important for the life and safety of equipment.

This software is developed with great precision and care to accurately determine the required orifice size of PSV in gas service.

A complete list of most common gases is given in the program to help defining the physical properties which users can alter as per requirements. Selection of different types of PSV, back pressure, set pressure and over pressure range can be defined in the input section.

The result section gives complete information on all the sizing constants and mass flow rate and volumetric flow rates at standard and actual conditions. Also calculate the rated flow of selected orifice size.

Errors and program limitations are cautioned through message bar on the screen.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

Gas/Vapors Relief Valve Sizing

Friday Feb-15-2013 01:11:58 am

Inputs

PSV Tag#

Type of Relief Valve: PSV

Fluid: User Defined

PSV Style: Conventional Type

Superimposed Pressure: Superimposed Constant

Flow Rate W (lbm/hr): 53500

Safety Factor (% age): 10

Set Pressure P (Psig): 75

Over Pressure (% age): 10

Superimposed Pressure (psig): 55

Built-up Back Pressure (psig): 0

Inlet Relieving Temperature T (deg F): 167

Compressibility Factor (Z): 1

Molecular Weight M (lbm/lbmol): 65

Heat Capacity Ratio K: 1.09

Gas Specific Gravity (gr): 1

Noise Calculation in Pipe (Ft): 100

Results

Flow Regime: Sub-Critical

Required Flow Rate W (lbm/hr): 58850.0000

Standard Vapors Flow (SCFM): 5725.049

Actual Vapors Flow (ACFM): 1043.985

EQ. Air Flow @ STP (SCFM): 8577.023

Allowable Over Pressure (psig): 7.5

Sizing Coefficient (C): 326.0000

Discharge Coefficient (Kd): 0.9750

Combination Correction Factor (Kc): 1.0000

Back Pressure Correction Factor (Kb): 0.9300

Total Back Pressure (psig): 55.0000

Total Back Pressure (psia): 69.7

Back Pressure % age: 72.0000

Relieving Pressure (Psia): 97.2000

Orifice Area (in²): 6.3610

Pressure Ratio (PR): 1.5000

Sound Pressure @ 100 Ft (Decible): 29.0000

Noise Intensity @ 100 Ft (Decible): 82.0000

Noise Intensity @ 100 Ft: 82.0000

CDTP SP for Conventional PSV's (psig): 20.0000

API PSV Orifice Size Selected (in²): 6.3800

API PSV Style Selected: P

Rated Flow (lbm/hr): 59022.1487

Calculate Reset Exit

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Ok

36- PRESSURE RELIEF VALVE SIZING [LIQUID SERVICE]

The most important part of Process Engineering is Pressure Relief Valve Designing. Accurate sizing of PSV is highly important for the life and safety of equipment.

This software is developed with great precision and care to accurately determine the required orifice size of PSV in liquid service. Selection of different types of PSV, back pressure, set pressure and over pressure range can be defined in the input section.

The result section gives complete information on all the sizing constants and size of orifice.

Errors and program limitations are cautioned through message bar on the screen.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

PSV Sizing - [PSV Liquid Service]
© Process Engineering 2011

Friday Feb-15-2013 10:22:53 pm

Liquid Relief Valve Sizing

Inputs

PSV Tag#

Type of Relief Valve: **PSV**

PSV Style: **Conventional Type**

Superimposed Pressure: **Superimposed Constant**

Flow Rate W (gpm)

Safety Factor (% age)

Set Pressure P (psig)

Over Pressure (% age)

Superimposed Pressure (psig)

Built-up Back Pressure (psig)

Viscosity (CP)

Gas Specific Gravity (gr)

Results

Required Flow Rate W (gpm) **1980**

Equivalent Water Flow (gpm) **1878.393**

Allowable Over Pressure (psig) **25**

Viscosity Correction Factor (Kv) **0.969**

Discharge Coefficient (Kd) **0.65**

Combination Correction Factor (Kc) **1**

Back Pressure Correction Factor (Kb) **1**

Reynold Number (Re) **5711**

Total Back Pressure (psig) **50**

Total Back Pressure (psia) **64.7**

Back Pressure % age **20**

Relieving Pressure (Psia) **289.7**

Orifice Area (in²) **5.234**

CDTPSP for Conventional PSVs (psig) **200**

API PSV Orifice Size Selected (in²) **6.38**

API PSV Style Selected **P**

Calculate **Reset** **Exit**

Ok

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37- PRESSURE RELIEF VALVE SIZING [STEAM SERVICE]

The most important part of Process Engineering is Pressure Relief Valve Designing. Accurate sizing of PSV is highly important for the life and safety of equipment.

This software is developed with great precision and care to accurately determine the required orifice size of PSV. Selection of different types of PSV, back pressure, set pressure and over pressure range can be defined in the input section.

The result section gives complete information on all the sizing constants and size of orifice.

Errors and program limitations are cautioned through message bar on the screen.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

PSV Sizing - [PSV Steam Service]
 File About Help © Process Engineering 2011
 Friday Feb-15-2013 10:39:13 pm

Steam Relief Valve Sizing

Inputs

PSV Tag#

Type of Relief Valve: **PSV**

PSV Style: **Conventional Type**

Superimposed Pressure: **Superimposed Constant**

Steam Characteristic: **Saturated Steam**

Flow Rate W (gpm) **153500**

Safety Factor (% age) **10**

Set Pressure P (Psig) **1750**

Over Pressure (% age) **10**

Temperature (F) **400**

Superimposed Pressure (psig) **0**

Built-up Back Pressure (psig) **0**

Noise Calculation in Pipe (Ft) **100**

Results

Flow Regime: **Critical**

Required Flow Rate W (lbm/hr)	168850
Allowable Over Pressure (psig)	175
Discharge Coefficient (Kd)	0.65
Combination Correction Factor (Kc)	1
Back Pressure Correction Factor (Kb)	1
Superheat Steam Correction Factor (Ksh)	1
Napier Correction Factor (KN)	1.021
Total Back Pressure (psig)	0
Total Back Pressure (psia)	14.7
Back Pressure % age	1
Relieving Pressure (Psia)	1939.7
Orifice Area (in^2)	2.565
CDTP SP for Conventional PSV's (psig)	1750
API PSV Orifice Size Selected (in^2)	2.853
API PSV Style Selected	L
Pressure Ratio (PR)	132
Sound Pressure @ 100 Ft (Decible)	58
Noise Intensity @ 100 Ft (Decible)	120
Noise Intensity @ 100 Ft	120

Calculate **Reset** **Exit**

Ok

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38- PRESSURE RELIEF VALVE SIZING [THERMAL RELIEF]

Thermal relief valve is somewhat different than the regular relief valves as it is not meant to full relief instead, it fulfills the purpose of relieving a small volume through the valve enough to bring the pressure down that was increase due to the trapped liquid inside the pipe due to expansion caused by the ambient temperature.

This software is developed with great precision and care to accurately determine the required orifice size of PSV. Selection of different types of PSV, back pressure, set pressure and over pressure range can be defined in the input section.

The result section gives complete information on all the sizing constants, mass flow rate and size of orifice.

Errors and program limitations are cautioned through message bar on the screen.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

Thermal Relief Valve Sizing

Inputs

PSV Data

PSV Tag#

Type of Relief Valve: PSV

PSV Style: Conventional Type

Superimposed Pressure: Superimposed Constant

Safety Factor (% age): 10

Set Pressure P (psig): 250

Over Pressure (% age): 10

Superimposed Pressure (psig): 50

Built-up Back Pressure (psig): 0

Process Data

Fluid: Propane

Pipe Material: Carbon Steel

Pipe Size D (in): 4

Pipe Schedule: 40

Length of Pipe Exposed L (FT): 10

Isolation Valve Size (in): 4

Elapsed Time of Valve (sec): 10

Normal Temperature in Pipe T1 (F): 90

Normal Pressure in Pipe P1 (psig): 100

Viscosity (CP): 388

Gas Specific Gravity (gr): 0.9

Maximum Ambient Temperature (F): 100

Results

Linear Expansion (alpha): 0.0000067

Modulus of Elasticity (E): 30000000

Isothermal Compressibility (Z): 0.0000189

API Gravity (API): 25.7

Liquid Cubic Expansion (Betas): 0.0004

Valve Leakage Rate (in^3/sec): 0.000762211

Wall Thickness of Pipe (in): 0.2370

Relieving Temperature T2 (F): 97.690

Heat Transfer Rate Q (MMBtu/hr): 0.2727

Specific Heat @ T2 (Btu/lb.F): 22

Required Flow Rate W (gpm): 0.0121

Equivalent Water Flow EQW (gpm): 0.011

Allowable Over Pressure (psig): 25

Viscosity Correction Factor (Kv): 0.122

Discharge Coefficient (Kd): 0.65

Combination Correction Factor (Kc): 1

Back Pressure Correction Factor (Kb): 1

Reynold Number (Re): 14

Total Back Pressure (psig): 50

Total Back Pressure (psia): 64.7

Back Pressure % age: 20

Relieving Pressure (psia): 289.7

Orifice Area (in^2): 0

CDTP SP for Conventional PSVs (psig): 200.0000

API PSV Orifice Size Selected (in^2): 0.11

API PSV Style Selected: 0

Calculate

Reset

Exit

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Ok

39- PRESSURE RELIEF VALVE SIZING FIRE CASE [GAS SERVICE]

This software is developed with great commitment to precisely determine the required orifice size of PSV and relieving rate through the vessel in case of fire.

Selection of different types of PSV, back pressure, set pressure and over pressure range can be defined in the input section.

The result section gives complete information on all the sizing constants, mass flow rate and size of orifice.

Errors and program limitations are cautioned through message bar on the screen.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

PSV Sizing - [PSV Fire Case Gas Service]
 © Process Engineering 2011
 Saturday, Feb-16-2013 12:32:34 am

Fire Relief Valve Sizing for Vapors

Inputs

PSV Tag#

Type of Relief Valve: **PSV**

Fluid: **User Defined**

PSV Style: **Conventional Type**

Superimposed Pressure: **Superimposed Constant**

Safety Factor (% age): **10**

Set Pressure P (Psig): **100**

Over Pressure (% age): **21**

Superimposed Pressure (psig): **0**

Build-up Back Pressure (psig): **0**

Normal Operating Temperature (deg F): **125**

Normal Operating Pressure (psig): **80**

Vessel/Wall Temperature (deg F): **1100**

Exposed Area of Vessel (ft²): **200**

Molecular Weight M (lbm/lbmol): **65**

Heat Capacity Ratio K: **1.09**

Gas Specific Gravity (gr): **1**

Compressibility (Z): **1**

Noise Calculation in Pipe (Ft): **100**

Results

Required Flow Rate W (lbm/hr): **0.7189**

Vapor Flow @ STP (SCFM): **0.070**

Actual Flow (ACFM): **0.012**

Equivalent Air Flow @ STP (SCFM): **0.105**

Allowable Over Pressure (psig): **21**

Sizing Coefficient (C): **326.0000**

Discharge Coefficient (Kd): **0.9750**

Vessel/Wall Temperature (deg R): **1560.0000**

Fire Relief Factor: **0.0207**

Total Back Pressure (psig): **0.0000**

Total Back Pressure (psia): **14.7**

Back Pressure % age: **11.0000**

Relieving Pressure (Psia): **135.7000**

Orifice Area (in²): **0.3917**

Pressure Ratio (PR): **9.2000**

Sound Pressure @ 100 Ft (Decible): **57.6000**

Noise Intensity @ 100 Ft (Decible): **62.0000**

Noise Intensity @ 100 Ft: **62.0000**

CDTP SIP for Conventional PSVs (psig): **100.0000**

API PSV Orifice Size Selected (in²): **0.5030**

API PSV Style Selected: **G**

Calculate **Reset** **Exit** **Ok**

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40- PRESSURE RELIEF VALVE SIZING FIRE CASE [LIQUID SERVICE]

This software is developed with great commitment to precisely determine the required orifice size of PSV and relieving rate through the vessel filled with liquid in case of fire.

Selection of different types of PSV, back pressure, set pressure and over pressure range can be defined in the input section.

The result section gives complete information on all the sizing constants, mass flow rate and size of orifice.

Errors and program limitations are cautioned through message bar on the screen.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

41- PRESSURE RELIEF VALVE SIZING TWO PHASE [SUB-COOLED LIQUIDS]

PSV sizing for two phase flow is entirely different than other types of sizing methods which involves iterative solutions to complex equations to correctly size the orifice. This software is developed with great accuracy to solve the equations to calculate the factors and achieve the required orifice size.

Selection of different types of PSV, back pressure, set pressure and over pressure range can be defined in the input section. Also users can select the possible scenarios and conditions of the two phase fluid involved in the sizing.

The result section gives complete information on all the sizing constants, mass flow rate and size of orifice.

Errors and program limitations are cautioned through message bar on the screen.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

PSV Sizing - [PSV Two Phase Subcooled Liquid]

Sub-Cooled Liquid Relief Valve Sizing Saturday Feb 16, 2013 12:57:09 am

Inputs

PSV Tag: []

Type of Relief Valve: [PSV]

PSV Style: [Balanced Bellows Type]

Supersaturated Pressure: [Supersaturated Constant]

Flow Rate (lb/hr): [100]

Set Pressure (PSig): [10]

Over Pressure (PSig): [10]

Supersaturated Pressure (PSig): [0]

Back-up Back Pressure (PSig): [10]

Initial Relieving Temperature (°F): [100]

Molecular Weight: [1.0]

Heat Capacity Ratio (Cp/Cv): [1.0]

Notes: Calculations in Pipe (R) []

Condition-1

System Component: [Single Component] [Multi Component]

Condition-2

Multi Component DP Range (deg F): [] < 150 deg F [] > 150 deg F

Condition-3

Single Component Thermodynamic Cond. [] T < 0.9 Tc [] T > 0.9 Tc [] T < 0.9 Tc [] T > 0.9 Tc

Saturation (vapor) pressure (PSia) for multi component use: [32.9]

Bubble Point Pressure @ T (°F) (PSig): []

Diff. of Sp. Vol. of Vap/Liquid (ft³/lb): [0.9654]

Diff. of Latent Heat of Vap. of Vap/Liq (Btu/lb): [152.3]

Specific Heat of Liquid @ const. P Cp (Btu/lb·°F): [0.6365]

Liquid Density (lb/ft³): [31.92]

Liquid Density (lb/ft³) @ 90% Ps (lb/ft³): [0.382950]

Subcooling Region: []

High Subcooling Region (Falsifying occurs d/t of heat)

Results

Flow Regime: []

Required Flow Rate (lb/hr): [110.0000]

Allowable Over Pressure (PSig): [26]

Transverse Solution Pressure Ratio (Rst): [0.9445]

Discharge Coefficient (Kd): [0.6500]

Combustion Correction Factor (Kc): [1.0000]

Back Pressure Correction Factor (Kb): [1.0000]

Mass Flow G (lb/hr·ft²): [7566.471]

Orifice parameter (m): [6.529]

Total Back Pressure (PSig): [10.0000]

Total Back Pressure (PSia): [24.7]

Back Pressure (PSig): [4.0000]

Liquid Density (lb/ft³): [300.7000]

Relieving Pressure (PSig): [0.2292]

Orifice Area (in²): [16.0000]

Pressure Ratio (PR): [50.0000]

Sound Pressure @ 100 ft (Decible): [60.0000]

Noise Intensity @ 100 ft (Decible): [60.0000]

Noise Intensity @ 100 ft: [100 ft]

(2) P SPS for Conventional PSVs (PSig): []

API PSV Orifice Size Selected (in²): []

API PSV Style Selected: []

Note:

This method should be used for Two-phase system (highly subcooled liquid either non-condensable gas, condensable vapor or both) where PPS and does not flash. Also used for Subcooled (including saturated) liquid where PPS and flashes. No condensable vapor or noncondensable gas present. Common noncondensable gases: air, oxygen, nitrogen, hydrogen, carbon dioxide, carbon monoxide and hydrogen sulfide.

42- PRESSURE RELIEF VALVE SIZING TWO PHASE METHOD 1 [FLASHING LIQUIDS]

PSV sizing for two phase flow is entirely different than other types of sizing methods which involves iterative solutions to complex equations to correctly size the orifice.

This software deals with different type of two phase fluid and it is developed with great accuracy to solve the equations to calculate the factors and achieve the required orifice size.

Selection of different types of PSV, back pressure, set pressure and over pressure range can be defined in the input section. Also users can select the possible scenarios and conditions of the two phase fluid involved in the sizing.

Two-Phase Flashing and Non-Flashing-I Saturday Feb 16 2003 01:15:31 am

Inputs

PSV Tag# []

Type of Relief Valve: **PSV**

PSV Style: **Balanced Bellows Type**

Superimposed Pressure: **Superimposed Constant**

Flow Rate W (lb/min): **477**

Safety Factor (N₁): **10**

Set Pressure P (psig): **1500**

Over Pressure (N₂): **10**

Superimposed Pressure (psig): **0**

Back-up Back Pressure (psig): **95**

Inlet Relieving Temperature T (deg F): **200**

Molecular Weight: **100**

Normal Calculation in Pipe (P): **100**

Condition-1 ☒ Flashing ☐ Non-Flashing

Condition-2 System Component: ☒ Single Component ☐ Multi-Component

Condition-3 Multi-Component GP Range (deg F): ☒ T₁ < 150 deg F ☐ T₁ > 150 deg F

Condition-4 Single Component Thermodynamic Cond.: ☒ T₁ < 0.9 or P₁ < 0.5 ☐ T₁ > 0.9 or P₁ > 0.5

Results

Flow Regime: **Kirkwood**

Required Flow Rate W ₁ (lb/min)	524.7000
Allowable Over Pressure (psig)	150
Critical Pressure Ratio (x _c)	0.9999
Discharge Coefficient (K _d)	0.6500
Combustion Correction Factor (K _c)	1.0000
Back Pressure Correction Factor (K _b)	1.0000
Mass Flux G (lb/min/ft ²)	6.505
Design parameter (m)	579031.656
Total Back Pressure (psig)	15.0000
Total Back Pressure (psia)	23.7
Back Pressure (psig)	1.0000
Relieving Pressure (P ₁)	1664.7000
Orifice Area (in ²)	3.7795
Pressure Ratio (P ₁)	10.0000
Sound Pressure @ 100 Ft (Decible)	50.0000
Noise Intensity @ 100 Ft (Decible)	80.0000
Noise Intensity @ 100 Ft	80.0000
CDTP (P ₁ vs Conventional PSV's) (psig)	N/A
API PSV Orifice Size Selected (in ²)	4.3400
API PSV Style Selected	N

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Calculation **Reset** **Exit**

Note:
This method should be used for Two-phase system (Both flashing and nonflashing). No noncondensable gas present in the system. Common noncondensable gases: air, O₂, N₂, H₂, CO₂, C₂H₆ and H₂S

The result section gives complete information on all the sizing constants, mass flow rate and size of orifice.

Errors and program limitations are cautioned through message bar on the screen.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

43- PRESSURE RELIEF VALVE SIZING TWO PHASE METHOD 2 [FLASHING LIQUIDS]

PSV sizing for two phase flow is entirely different than other types of sizing methods which involves iterative solutions to complex equations to correctly size the orifice.

This software based on a method 2 for different type of two phase fluid. It is developed with great accuracy to solve the equations to calculate the factors and achieve the required orifice size.

Selection of different types of PSV, back pressure, set pressure and over pressure range can be defined in the input section. Also users can select the possible scenarios and conditions of the two phase fluid involved in the sizing.

The result section gives complete information on all the sizing constants, mass flow rate and size of orifice.

Errors and program limitations are cautioned through message bar on the screen.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

Two-Phase Flashing and Non-Flashing-II

Saturday Feb-16-2012 10:29:36 pm

Inputs

PSV Tag:

Type of Relief Valve:

PSV Style:

Superimposed Pressure:

Flow Rate W (lbm/hr):

Safety Factor (% age):

Set Pressure P (psig):

Over Pressure (% age):

Superimposed Pressure (psig):

Built-up Back Pressure (psig):

Inlet Relieving Temperature T (deg F):

Molecular Weight:

Noise Calculation in Pipe (ft):

Flow Characteristics

Non-Flashing Flow: ☐

Conditions

A) ☐ True

B) ☐ True

C) ☐ True

Results

Flow Regime	Critical
Required Flow Rate W (lbm/hr)	169213.00000
Allowable Over Pressure (psig)	60
Inlet Gas Mol Frac in Vapor Phase	0.0225
Discharge Coefficient (Kd)	0.9500
Combination Correction Factor (Kc)	1.0000
Back Pressure Correction Factor (Kb)	1.0000
Mass Flux G (lbm/sec ft ²)	2782.340
Omega parameter (w)	0.931
Total Back Pressure (psig)	95.0000
Total Back Pressure (psia)	49.7
Back Pressure (% age)	9.0000
Relieving Pressure (Psia)	474.7000
Orifice Area (in ²)	2.0620
Pressure Ratio (PR)	9.7000
Sound Pressure @ 100 ft (Decibel)	97.9500
Noise Intensity @ 100 ft (Decibel)	114.0000
Noise Intensity @ 100 ft	114.0000
CDTP SP for Conventional PSVs (psig)	N/A
API PSV Orifice Size Selected (in ²)	3.6000
API PSV Style Selected	N

OK

Note

This method can be used for sizing pressure relief valves handling two phase flashing flow with both condensable and non-condensable gas or vapors

44- RUPTURE DISC SIZING [ATMOSPHERIC RELEASE]

Rupture discs are another means to relieve pressure from equipment. Mostly they are installed on the shell side of heat exchangers to protect over pressurizing the shell from a leak of high pressure fluid from inside tubes.

Mostly flow through rupture discs are not required to be calculated however, in some special cases where it is required to estimate the flow through rupture disc relieved to atmosphere this software can be a handy tool to quickly calculate the flow.

This software is developed with great care for precise calculations.

The result section gives complete information on all the sizing constants, mass flow rate and choked flow conditions.

Errors and program limitations are cautioned through message bar on the screen.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

Inputs

PSV Tag#

Rupture Disk Set Pressure P (Psig) 100

Over Pressure (% age) 10

Inlet Relieving Temperature T (deg F) 200

Compressibility Factor (Z) 1

Molecular Weight M (lbm/lbmol) 20

Pipe Dimensions

Pipe Diameter OD (in) 8

Pipe Schedule STD

Get ID (in) 7.981

Length of Pipe L (Ft) 15

Result

Actual Pressure Drop (Act DP, Psia) 110.000

Limiting Pressure Drop (Lim DP, Psia) 81.788

Relieving Pressure (Psia) 124.700

Actual Pressure Drop Ratio (DP/P1) 0.882

Actual Expansion Factor (Act Y) 0.542

Limiting Pressure Drop Ratio (Lim DP/P1) 0.656

Limiting Expansion Factor (Lim Y) 0.659

Assumed K (Cp/Cv) 1.3

Specific Volume V (ft³/lbm) 2.840

K Pipe 0.316

K Pipe Entrance 0.500

K Pipe Exit 1.000

K Rupter Disk 1.500

Total K 3.316

Moody Friction Factor (f) 0.014

Flow Rate W (lbm/hr) 210697.108

Flow is Choked

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45- HORIZONTAL TWO PHASE SEPARATOR SIZING

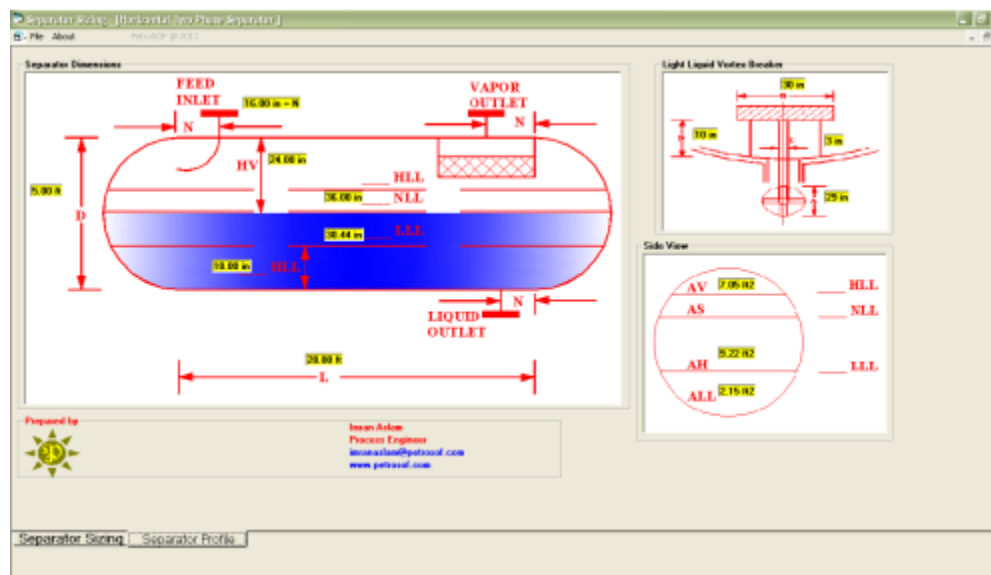
In oil and gas facilities separators are the key equipment used both offshore and onshore plants for oil, water and gas separation.

This software is developed with great precision to determine the sizing parameters of separators by solving complex iterative equations. Demister pad, inlet and outlet nozzle sizing, residence time, slug lengths, hold up time and separator weight and pressure ratings are calculated simultaneously. Besides, liquid levels at normal, low and high points are determined and respective alarm set points are calculated. All calculated results including complete level and alarm information are also displayed on the separator picture on the screen.

Errors and program limitations are cautioned through message bar on the screen.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.



46- HORIZONTAL THREE PHASE SEPARATOR SIZING WITHOUT WEIR AND BOOT

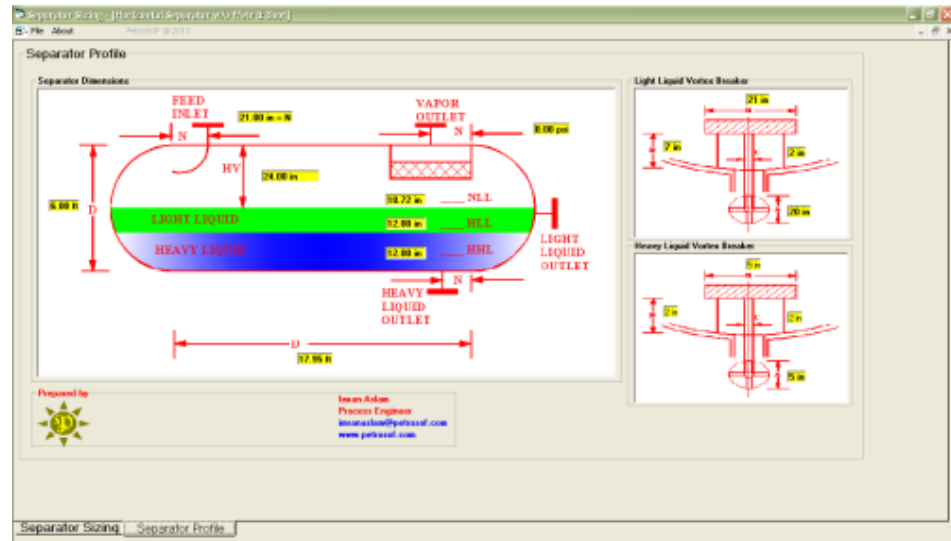
In oil and gas facilities separators are the key equipment used both offshore and onshore plants for oil, water and gas separation. To separate the three components in the associated gas, three phase separators are mostly the first equipment in the battery limit of any gas plant where separation takes place also, separator acts as slug catchers as well.

This software is developed with great precision to determine the sizing parameters of three phase separators by solving complex iterative equations. Demister pad, inlet and outlet nozzle sizing, residence time, slug lengths, hold up time and separator weight and pressure ratings are calculated simultaneously. Besides, liquid levels at normal, low and high points are determined and respective alarm set points are calculated. All calculated results including complete level and alarm information are also displayed on the separator picture on the screen.

Errors and program limitations are cautioned through message bar on the screen.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.



47- HORIZONTAL THREE PHASE SEPARATOR SIZING WITH WEIR

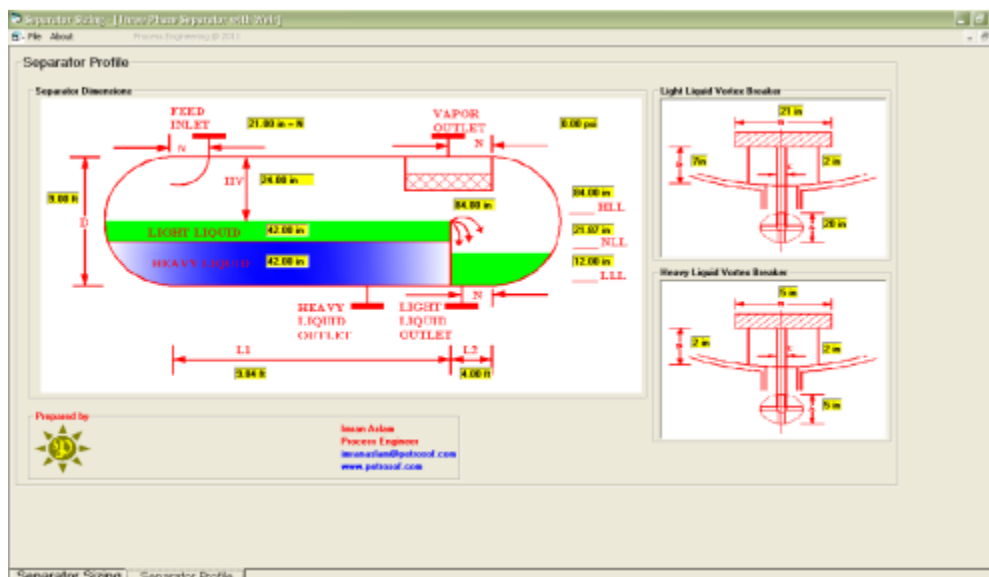
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Errors and program limitations are cautioned through message bar on the screen.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.



48- HORIZONTAL THREE PHASE SEPARATOR SIZING WITH BOOT

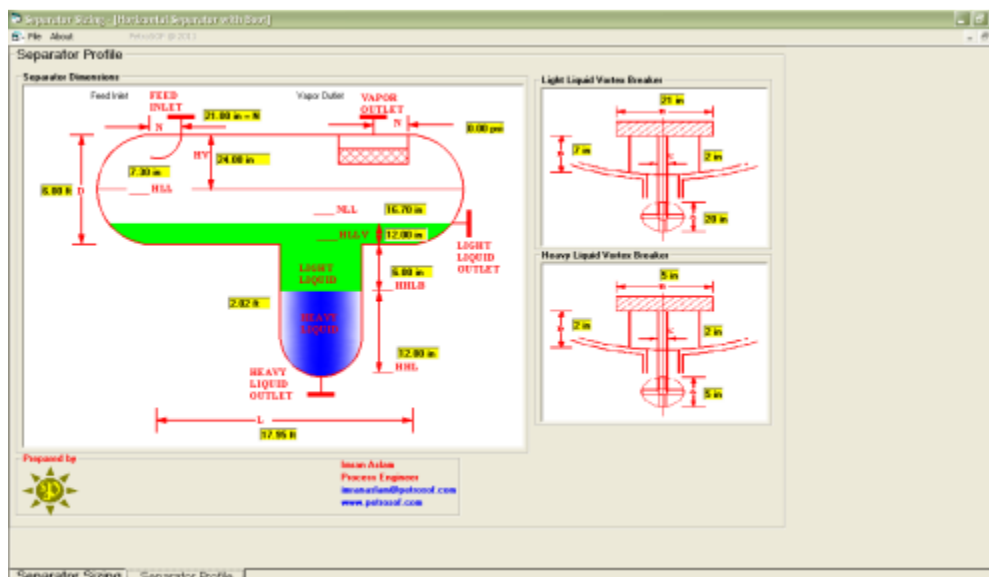
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This software is developed with great precision to determine the sizing parameters of three phase separators by solving complex iterative equations. Demister pad, inlet and outlet nozzle sizing, residence time, slug lengths, hold up time and separator weight and pressure ratings are calculated simultaneously. Besides, liquid levels at normal, low and high points are determined and respective alarm set points are calculated. All calculated results including complete level and alarm information are also displayed on the separator picture on the screen.

Errors and program limitations are cautioned through message bar on the screen.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.



49- HORIZONTAL THREE PHASE SEPARATOR SIZING WITH BUCKET AND WEIR

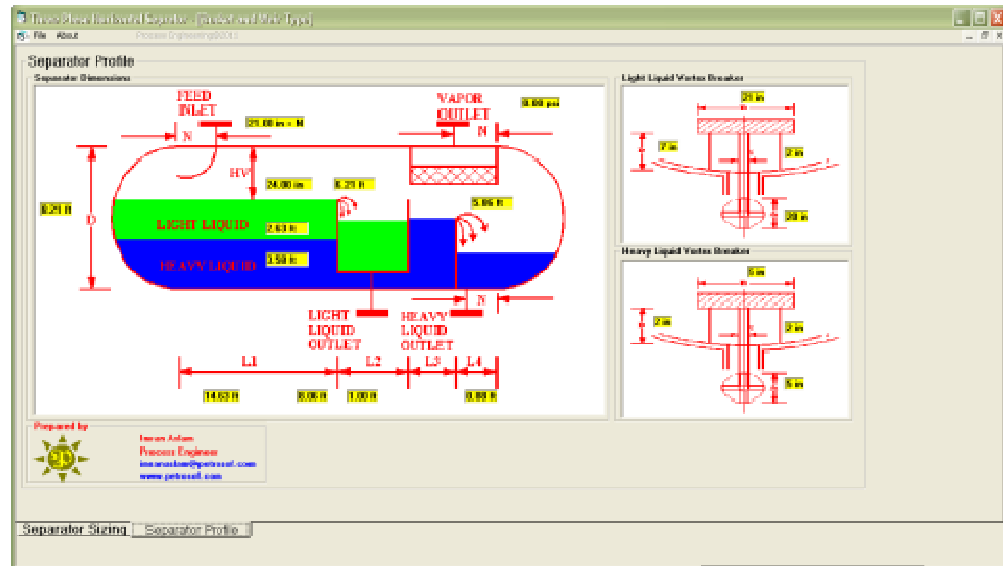
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This software is developed with great precision to determine the sizing parameters of three phase separators by solving complex iterative equations. Demister pad, inlet and outlet nozzle sizing, residence time, slug lengths, hold up time and separator weight and pressure ratings are calculated simultaneously. Besides, liquid levels at normal, low and high points are determined and respective alarm set points are calculated. All calculated results including complete level and alarm information are also displayed on the separator picture on the screen.

Errors and program limitations are cautioned through message bar on the screen.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.



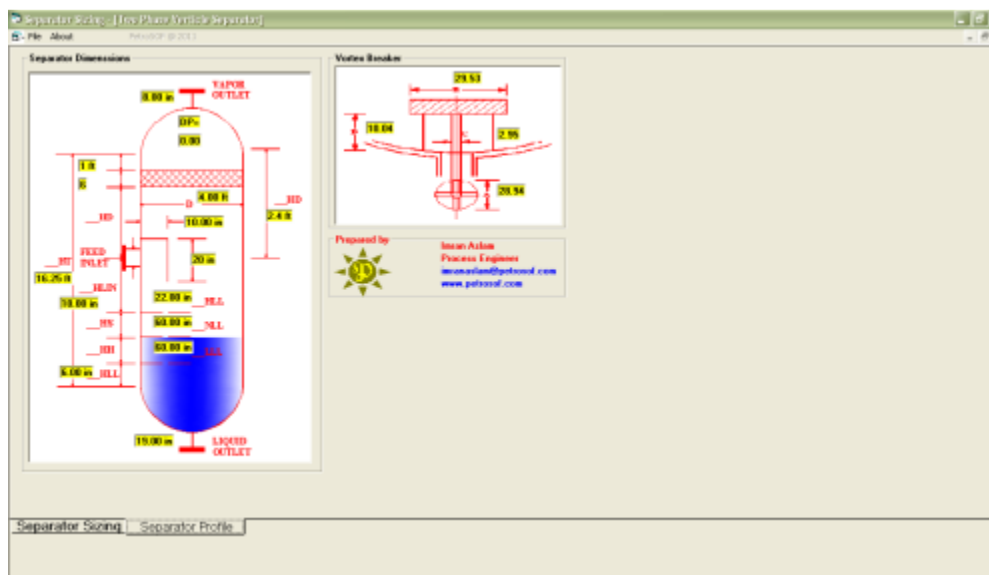
50- VERTICAL TWO PHASE SEPARATOR SIZING

In oil and gas facilities separators are the key equipment used both offshore and onshore plants for oil, water and gas separation.

This software is developed with great precision to determine the sizing parameters of three phase separators by solving complex iterative equations. Demister pad, inlet and outlet nozzle sizing, separator capacity, residence time, slug lengths, hold up time and separator weight and pressure ratings are calculated simultaneously. Besides, liquid levels at normal, low and high points are determined and respective alarm set points are calculated. All calculated results including complete level and alarm information are also displayed on the separator picture on the screen. Errors and program limitations are cautioned through message bar on the screen.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.



51- VERTICAL THREE PHASE SEPARATOR SIZING

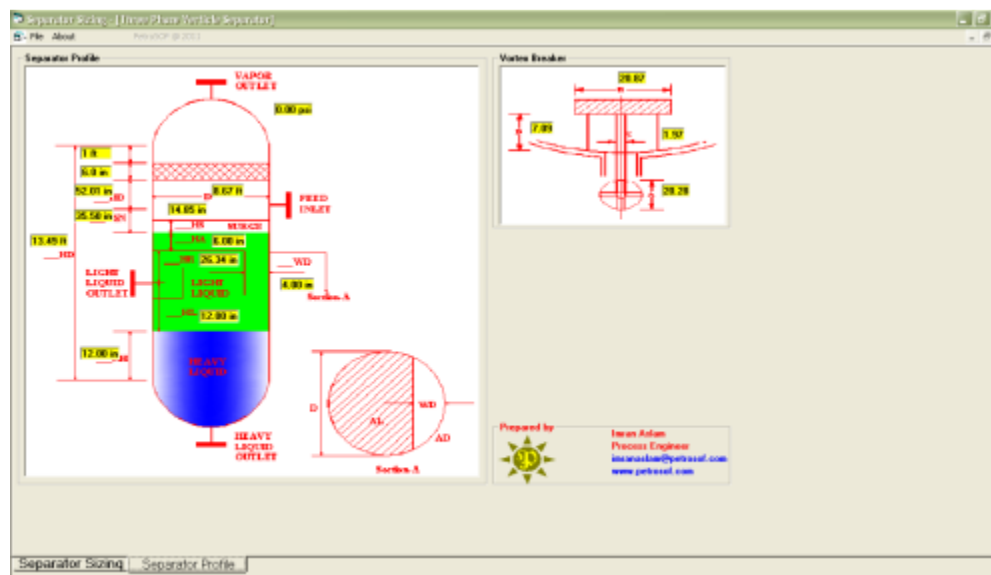
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This software is developed with great precision to determine the sizing parameters of three phase separators by solving complex iterative equations. Demister pad, inlet and outlet nozzle sizing, residence time, slug lengths, hold up time and separator weight and pressure ratings are calculated simultaneously. Besides, liquid levels at normal, low and high points are determined and respective alarm set points are calculated. All calculated results including complete level and alarm information are also displayed on the separator picture on the screen.

Errors and program limitations are cautioned through message bar on the screen.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.



52- STEEL PIPE CATALOG

Pipe and fittings dimensions are often required to prepare accurate isometric drawings for new projects and existing plant piping modifications. This quick piping catalog is prepared to provide complete dimensions details of any ANSI piping class.

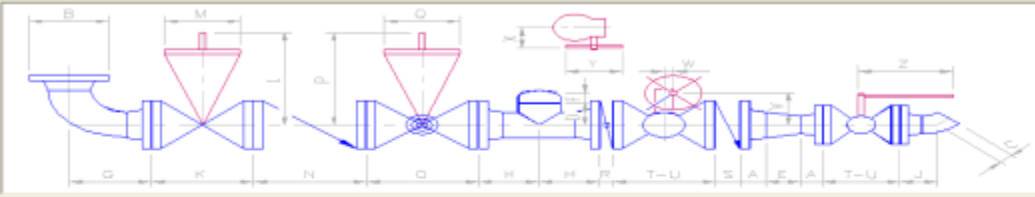
An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

Steel Catalog - [Pipe Steel Data]
Process Engineering © 2011

Select
ANSI 150 # RF
ANSI 300 # RF
ANSI 600 # RF
ANSI 900 # RF
ANSI 1500 # RF
ANSI 300 # RTJ
ANSI 600 # RTJ
ANSI 900 # RTJ
ANSI 1500 # RTJ

Exit



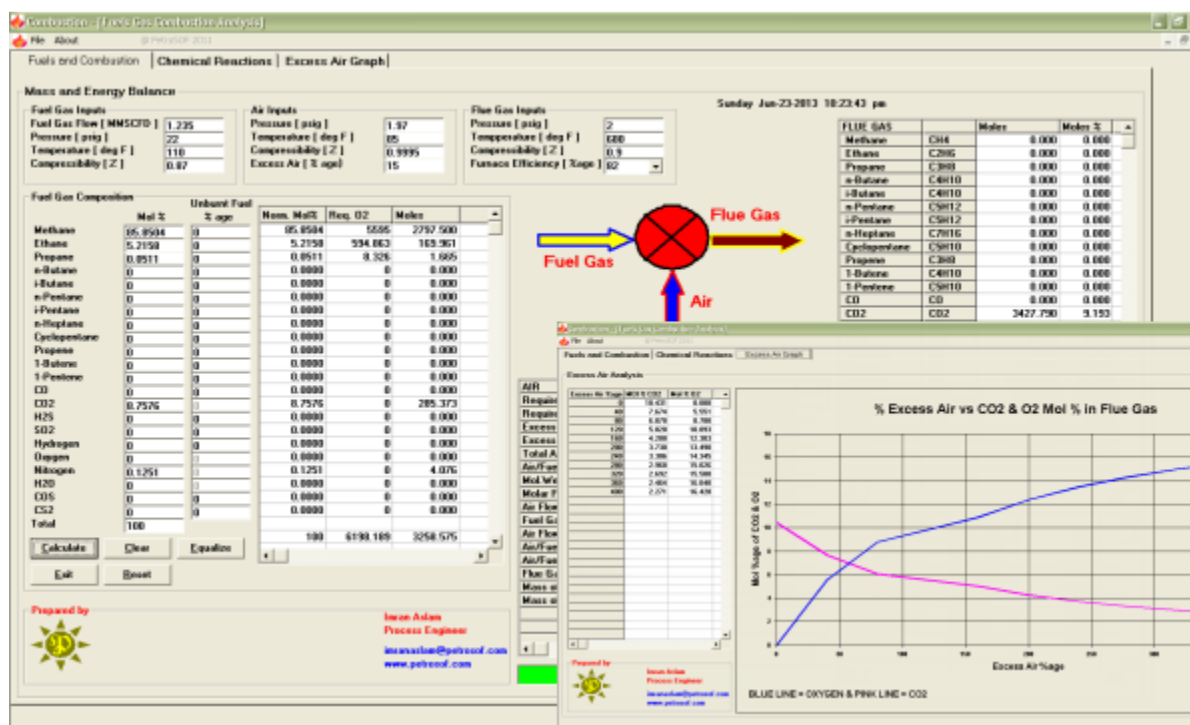
SIZE	PIPE OD	WN FLG	OD FLG	45 ELL	TEE	REDUCER	CAP	LR ELL & WN FLG	TEE & WN FLG	45 ELL & FLG	GATE VALVE	GATE VALVE	GATE VALVE	CHECK VALVE	GLOBE VALVE	GLOBE VALVE	GLOBE VALVE
		A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q
1 in	1 5/16 in	2 7/16 in	4 7/8 in	7/8 in	1 1/2 in	2 in	1 1/2 in	3 15/16 in	3 15/16 in	3 5/16 in	---	---	---	---	---	---	---
1 1/2 in	1 7/8 in	2 11/16 in	6 1/8 in	1 1/8 in	2 1/4 in	2 1/2 in	1 1/2 in	4 15/16 in	4 15/16 in	3 13/16 in	7 1/2 in	16 3/4 in	8 in	---	---	---	---
2 in	2 3/8 in	2 3/4 in	6 1/2 in	1 3/8 in	2 1/2 in	3 in	1 1/2 in	5 3/4 in	5 1/4 in	4 1/8 in	8 1/2 in	18 in	8 in	10 1/2 in	10 1/2 in	17 3/4 in	9 in
2 1/2 in	2 7/8 in	3 in	7 1/2 in	1 3/4 in	3 in	3 1/2 in	1 1/2 in	6 3/4 in	6 in	4 3/4 in	9 1/2 in	19 in	8 in	11 1/2 in	11 1/2 in	19 in	10 in
3 in	3 1/2 in	3 1/8 in	8 1/4 in	2 in	3 3/8 in	3 1/2 in	2 in	7 5/8 in	6 1/2 in	5 1/8 in	11 1/8 in	23 1/4 in	9 in	12 1/2 in	12 1/2 in	20 1/2 in	10 in
4 in	4 1/2 in	3 3/8 in	10 in	2 1/2 in	4 1/8 in	4 in	2 1/2 in	9 3/8 in	7 1/2 in	5 7/8 in	12 in	26 1/4 in	10 in	14 in	14 in	24 3/4 in	14 in
6 in	6 5/8 in	3 7/8 in	12 1/2 in	3 3/4 in	5 5/8 in	5 1/2 in	3 1/2 in	12 7/8 in	9 1/2 in	7 5/8 in	15 7/8 in	30 1/2 in	14 in	17 1/2 in	17 1/2 in	29 3/4 in	18 in
8 in	8 5/8 in	4 3/8 in	15 in	5 in	7 in	6 in	4 in	16 3/8 in	11 3/8 in	9 3/8 in	16 1/2 in	47 in	16 in	21 in	22 in	36 1/2 in	24 in
10 in	10 3/4 in	4 5/8 in	17 1/2 in	6 1/4 in	8 1/2 in	7 in	5 in	19 5/8 in	13 1/8 in	10 7/8 in	18 in	56 1/2 in	20 in	24 1/2 in	---	---	---
12 in	12 3/4 in	5 1/8 in	20 1/2 in	7 1/2 in	10 in	8 in	6 in	23 1/8 in	15 1/8 in	12 5/8 in	19 3/4 in	64 1/4 in	20 in	28 in	---	---	---
14 in	14 in	5 5/8 in	23 in	8 3/4 in	11 in	13 in	6 1/2 in	26 5/8 in	16 5/8 in	14 3/8 in	30 in	75 1/4 in	27 in	---	---	---	---
16 in	16 in	5 3/4 in	25 1/2 in	10 in	12 in	14 in	7 in	29 3/4 in	17 3/4 in	15 3/4 in	33 in	81 in	27 in	---	---	---	---
18 in	18 in	6 1/4 in	28 in	11 1/4 in	13 1/2 in	15 in	8 in	33 1/4 in	19 3/4 in	17 1/2 in	36 in	91 1/2 in	30 in	---	---	---	---
20 in	20 in	6 3/8 in	30 1/2 in	12 1/2 in	15 in	20 in	9 in	36 3/8 in	21 3/8 in	18 7/8 in	39 in	99 3/4 in	36 in	---	---	---	---
24 in	24 in	6 5/8 in	36 in	15 in	17 in	20 in	10 1/2 in	42 5/8 in	23 5/8 in	21 5/8 in	45 in	120 1/2 in	36 in	---	---	---	---
26 in	26 in	7 1/4 in	38 1/4 in	16 in	19 1/2 in	24 in	10 1/2 in	46 1/4 in	26 3/4 in	23 1/4 in	---	---	---	---	---	---	---
28 in	28 in	7 3/4 in	40 3/4 in	17 1/4 in	20 1/2 in	24 in	10 1/2 in	49 3/4 in	28 1/4 in	25 in	---	---	---	---	---	---	---
30 in	30 in	8 1/4 in	43 in	18 1/2 in	22 in	24 in	10 1/2 in	53 1/4 in	30 1/4 in	26 3/4 in	---	---	---	---	---	---	---
36 in	36 in	9 1/2 in	50 in	22 1/4 in	26 1/2 in	24 in	10 1/2 in	63 1/2 in	36 in	31 3/4 in	---	---	---	---	---	---	---
42 in	42 in	7 7/8 in	58 3/4 in	26 in	30 in	24 in	12 in	70 7/8 in	37 7/8 in	33 7/8 in	---	---	---	---	---	---	---

53- FUELS AND COMBUSTION

In oil and gas facilities heating system is the main utility to provide heat to exchangers and re-boilers. Often engineers are required to optimize the furnace performance by analyzing the combustion process of the fuel gas. This program is developed in order to carry out complete fuels and combustion analysis by mass and energy balance. Most common components found in fuel gas are provided in the program. A rigorous calculations method is used specifically to determine the optimum excess air in order to control the carbon dioxide and oxygen emission in the flue gas.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible with Windows 95-2000/XP/7/8.



54- CONTROL VALVE SIZING [TWO PHASE SERVICE]

A comprehensive and detailed valve sizing software has been developed with great care and efforts to help out Design Engineers to appropriately size the valve for two phase service.

Users are cautioned about incorrect inputs and limitations during valve sizing and guide them to achieve the correct results.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

Control Valve Sizing - [Valve Sizing For Two Phase Flow]

File Valve Sizing Programs About @ Process Engineering 2011

Valve Sizing For Two Phase Service

Inputs

Valve Tag #	Minimum	Normal	Maximum
Two Phase Flow Rate Q (SCFH)	246	446	646
Vapor Fraction (Fvap)	0.9	0.9	0.9
Valve Inlet Pressure P1 (Psig)	200	200	200
Valve Outlet Pressure P2 (Psig)	100	150	180
Inlet Temperature T1 (deg F)	60	60	60
Specific Gravity (Sp G)	0.67	0.67	0.67
Vapor Pressure PV @ T1 (Psis)	0.37	0.37	0.37
Critical Pressure Pc (Psis)	670	670	670
Heat Capacity Ratio (K)	1.27	1.27	1.27
Compressibility (Z)	0.96	0.96	0.96
Molecular Weight (M)	19.41	19.41	19.41
Two Phase Fluid Viscosity (CP)	0.012	0.012	0.012
Liquid Density @ T1, P1 (lbs/ft3)	5	5	5

Copy Max Cond to Min and Norm

Selected Valve

Valve Size (in.) 8 Assume Valve Size = 1/2 Pipe Valve XT 0.94
 Valve Cv @ 100% Open 1300 Valve FL 0.94
 Valve Cv @ 10% Open 35 Valve Fd 0.94

Valve Characteristics ☒ Equal Range ☐ Linear

U/S Pipe Dimensions

Pipe Size OD (in.) select Pipe Schedule SCH select
 Get ID (in.) 8

D/S Pipe Dimensions

Pipe Size OD (in.) select Pipe Schedule SCH select
 Get ID (in.) 8

Results

	Minimum	Normal	Maximum
Preliminary Cv	201.236	531.275	1215.598
Piping Geometric Factor FP	1	1	1
Required Cv	201.236	531.275	1215.598
Actual DP	100	50	20
Mac Number in Valve	0.008	0.011	0.014
Mac Number in Pipe	0.008	0.011	0.014
Expansion Factor (Y)	0.818	0.909	0.964
Pressure Ratio (X)	0.466	0.233	0.093
Minimum Pressure Drop Ratio (XT)	0.514	0.257	0.103
Velocity in Pipe Vp (ft/sec)	10.046	13.993	17.756
Velocity in Valve Vv (ft/sec)	10.046	13.993	17.756
Choked DP	189.397	189.397	189.397
Reynold Number Factor (FR)	1	1	1
Flow	Turbulent	Turbulent	Turbulent

Get Required CV Ok

Valve Selection

Service ☒ Flow ☐ Pressure ☐ Level ☐ Temperature

Load Values
 Installed Valve Characteristics Equal Percentage Valve
 Controller Action Reverse Acting

Valve Type ☒ AFC ☐ AFD ☐ PV Sensing ☒ U/S of Valve ☐ D/S of Valve

Valve Selection Criteria
 1- Select Valve with: Equal-Percentage Valve
 2- Valve has Creq at 90-95% opening = 1215.598
 3- Valve has Creq at 60-70% opening = 531.275
 4- Valve has Creq at 20-40% opening = 201.236
 5- Valve has XT Value > 0.103

Valve Conditions

Graphs

Water Characteristics

Valve Opening (%) vs. Flow Rate (GPM)

Prepared by
 Imran Aslam
 Process Engineer
 imranaslam@petrosol.com
 www.petrosol.com

55- CONTROL VALVE SIZING [STEAM SERVICE]

A comprehensive and detailed valve sizing software has been developed with great care and efforts to help out Design Engineers to appropriately size the valve for steam service.

Users are cautioned about incorrect inputs and limitations during valve sizing and guide them to achieve the correct results.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

Control Valve Sizing - [Steam Service]

File About www.petrosof.com

Valve Sizing For Steam Service

Inputs

Valve Tag #: _____

	Minimum <input checked="" type="checkbox"/>	Normal <input checked="" type="checkbox"/>	Maximum <input checked="" type="checkbox"/>
Flow Rate W / (lbm/hr)	1500	1700	2000
Valve U/S P1 (Psig)	200	200	200
Valve D/S P2 (Psig)	150	170	180
Inlet Temperature T1 (deg F)	250	250	250
Specific Gravity (Sp G)	1	1	1
Vapor Pressure @ T1 Pv1 (Psia)	0.37	0.37	0.37
Critical Pressure Pc (Psia)	3208	3208	3208
Viscosity V (CP)	0.1	0.1	0.1

Copy Max Cond to Min and Norm

Steam Quality

☐ Saturated ☒ Superheated

Valve Size

Assume Valve Size (in) **3** Assume Valve Size <= 1/2 Pipe size

Valve Cv @ 100% Open	15	Valve KV	0.94
Valve CV @ 10% Open	1	Valve XT	0.94
Valve FL	0.94	Valve Fd	0.94

Valve Characteristics ☒ Equal %age ☐ Linear

Pipe Size

U/S Pipe Dimensions

Pipe Size OD (in) **select**

Pipe Schedule SCH **select**

Get ID (in) **B**

D/S Pipe Dimensions

Pipe Size OD (in) **select**

Pipe Schedule SCH **select**

Get ID (in) **B**

Results

	Minimum	Normal	Maximum
Preliminary Cv	6.485	9.25	13.173
Required Recovery Factor FL	0.483	0.374	0.305
Critical Pressure Ratio Factor FF	0.957	0.957	0.957
Reynold Number	101921119	96729629	95392499
Piping Geometric Factor FLF	0.94	0.939	0.939
Required Cv	6.485	9.25	13.173
Actual DP	50	30	20
Velocity in Pipe Vp (ft/min)	1.149	1.303	1.532
Velocity in Valve Vv (ft/min)	8.173	9.263	10.897
Choked DP (Psia)	94.85	94.846	94.837

Warnings: <<Note-1>>
<<Note-2>>
<<Note-3>>

Valve Selection Summary Results

Service ☒ Flow ☐ Pressure ☐ Level ☐ Temperature

Load Varies Installed Valve Characteristics **Equal Percentage Valve Reverse Acting**

Controller Action

Valve Type ☒ AFC ☐ AFO

PV Sensing ☒ U/S of Valve ☐ D/S of Valve

Valve Selection Criteria

For flow
Valve Characteristics

Valve Tag: _____

Valve Characteristics

For level
Valve Characteristics

For pressure
Valve Characteristics

For temperature
Valve Characteristics

OK Warning Error

Characteristics **Reset** **Exit**

Saturday Dec-07-2013 02:49:05 pm

Prepared by

Imran Aslam
Process Engineer
imanaslam@petrosol.com
www.petrosol.com

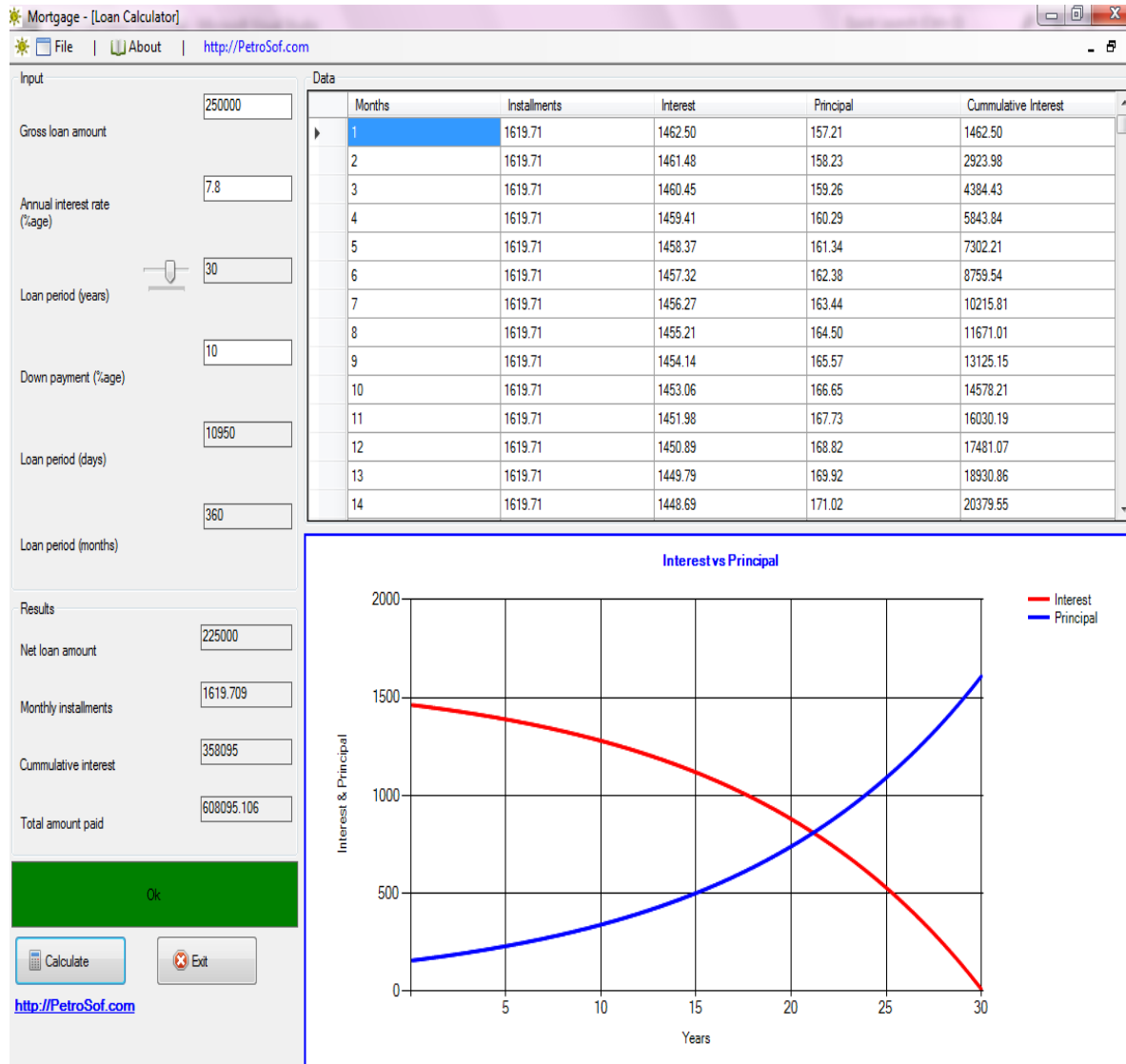
56- LOAN CALCULATOR

Loan calculator is a simple yet complete application to determine the mortgage. This is a simple application where user's define the basic information of amount of loan, installment period and down payment then by simply pressing calculate button a complete tabulated details of installment, principal and cumulative interest amount is calculated for the entire period of loan. Also, a graph between principal amount and interest amount is drawn.

Users are cautioned about incorrect inputs and limitations during valve sizing and guide them to achieve the correct results.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.



57- NATURAL GAS PHYSICAL PROPERTIES

This application is developed to calculate the natural gas properties such as compressibility, molecular weight, viscosity, critical pressure and temperature. Also, this application is combined with another utility to calculate the physical properties of hypothetical hydrocarbon components. The application used highly accurate empirical equation to model all the physical properties of natural gas and hypothetical hydrocarbons.

Users are cautioned about incorrect inputs and limitations during valve sizing and guide them to achieve the correct results.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

Natural Gas - [Compressibility]

File | Applications | About | <http://PetroSof.com>

Natural Gas Compressibility

Inputs

Pressure, P (Psig) 650

Temperature, T (deg F) 70

Specific gravity, Sp.G 0.65

H2S Mol% 2

CO2 Mol% 4

N2 Mol% 6

Compressibility Model

☒ Beggs and Brill

☐ Papay

☐ Hall-Yarborough

☐ Dranchuk-Abu-Kassem

☐ Dranchuk-Purvis-Robinson

Critical Properties Model

☒ Brown et al (1948) and Standing (1977) Natural Gas System

☐ Brown et al (1948) and Standing (1977) Gas Condensate System

☐ Boyun Guo and Ali Ghalambor Simple Equation

☐ Ahmed (1989) Natural Gas System

Critical Properties Correction Methods

☒ Wichert-Aziz Correction Method

☐ Carr-Koyashi-Burrows Correction Method

Viscosity Model

☒ Carr-Kobayashi-Burrows-Method

☐ Lee-Gonzalez-Eakin Method

☐ Dean and Stiel Method

Results

Compressibility, Z 0.8952

Viscosity, Mue (CP) 0.0199

Molecular Weight Mw 18.850

Critical Pressure Pc (Psia) 670.906

Critical Temperature Tc (Deg F) 373.969

Ok

Calculate

Exit

<http://PetroSof.com>

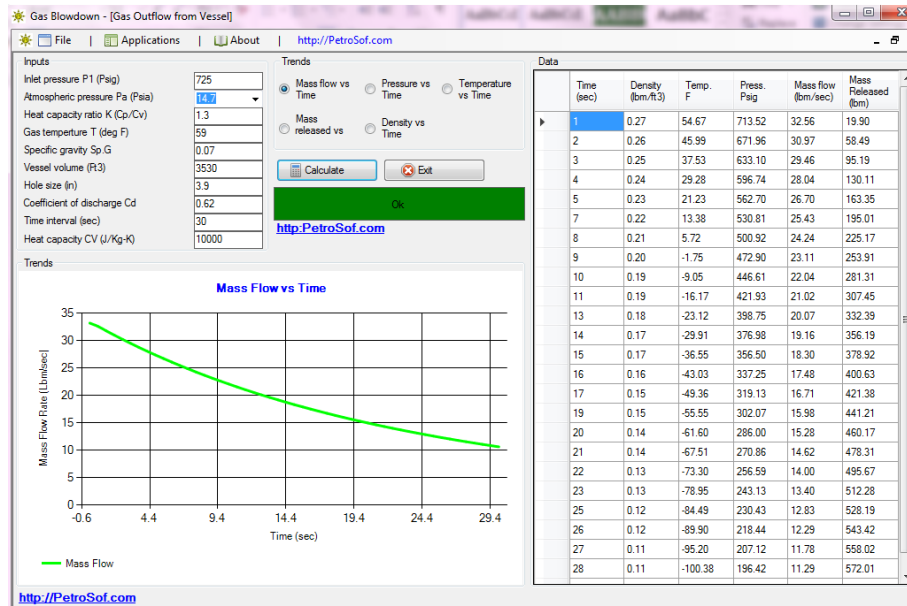
58- PIPELINE GAS BLOWDOWN

Gas blow down application is developed with high accuracy. This application comprised of two individual applications to calculate the gas blow down time from a pipeline and other application is developed to calculate the time rated gas depressurization rate through hole in the pipeline. Calculation details are enlisted in the tabulated form and graph for rated flow and temperature versus time is plotted.

Users are cautioned about incorrect inputs and limitations during valve sizing and guide them to achieve the correct results.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.



Gas Blowdown - [Gas Pipeline Blowdown Time]

Inputs:

- Inlet pressure P1 (Paig): 855.3
- Atmospheric pressure Pa (Paia): 14.7
- Heat capacity ratio K (Cp/Cv): 1.3
- Gas temperature T (deg F): 50
- Gas specific gravity Sp G: 0.6
- Length of pipeline L (ftm): 25
- Blowdown valve size (in): 8
- Valve coefficient of discharge Cd: 0.85
- Time loss due to vent pipe (Tage): 5
- Pipe Dimensions: 36
- Pipe size ND (in): 10
- Pipe schedule: 36

Results:

- Gas compressibility Z: 0.868
- Gas molecular weight MW: 17.376
- Moody friction factor Fm: 0.011
- Pipeline volume (R3): 579623.845
- Sonic velocity C (ft/sec): 1282.134
- Valve cross sectional area (in²): 50.265
- Pipe-to-valve throat area ratio Ar: 23.624
- Pipe cross sectional area Ap (in²): 1017.876
- Sonic blowdown time Tc (sec): 3.475
- Sub-Sonic blowdown time TS (sec): 0.783
- Time constant Tv: 2306.519
- Equation factor (a1): 0.853
- Equation factor (a2): 0.315
- Equation factor (a3): -0.195
- Equation factor (a4): 0.040
- Correction factor CF: 1.050
- Blowdown time Tb (min): 180.549
- Gas density (lbm/ft³): 3.184
- Critical pressure ratio Pc: 0.546
- Actual pressure ratio: 0.017
- Flow conditions: Critical
- Flow coefficient: 1.000
- Mass flow rate (lbm/sec): 708.626

59- RESERVOIR ENGINEERING

This application is developed with high accuracy to determine the important parameters required in reservoir engineering applications. The program contains three sub applications within a main software as follows.

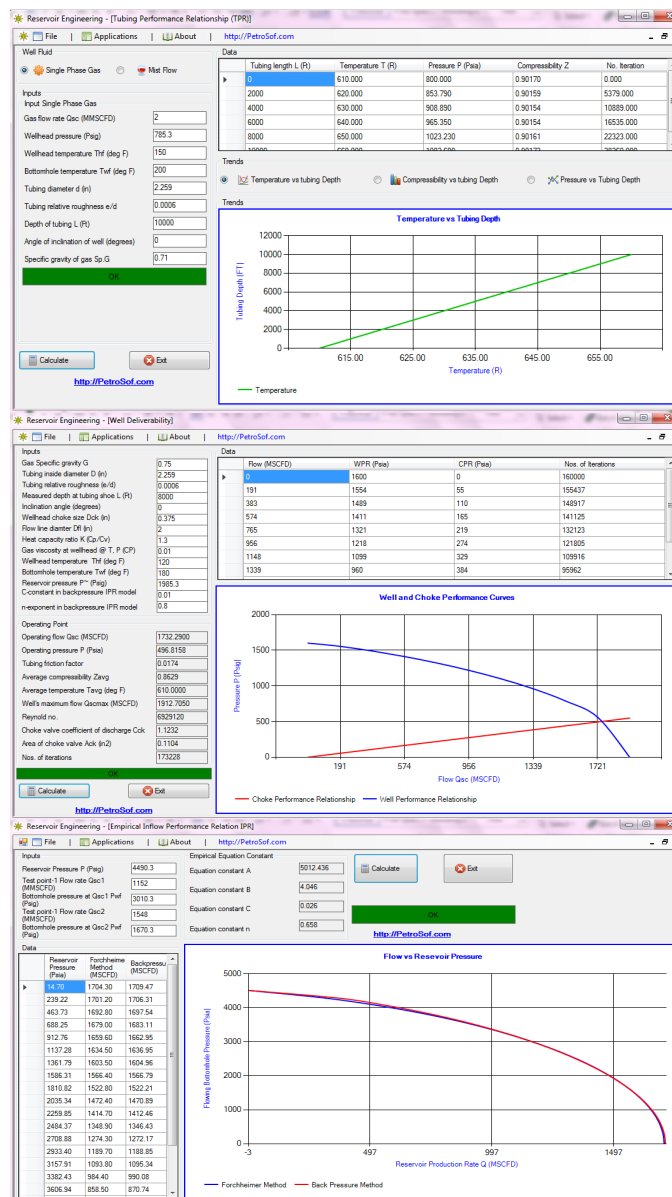
- Well tubing performance relationship
- Well deliverability (choke and tubing)
- Empirical well inflow performance relationship

Application is simple to use where users provide input in the input fields and remaining calculations are done by pressing the calculate button and results are displayed in graphical and tabulated form in the application.

Users are cautioned about incorrect inputs and limitations during valve sizing and guide them to achieve the correct results.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.



60- CENTRIFUGAL PUMP PERFORMANCE CURVES

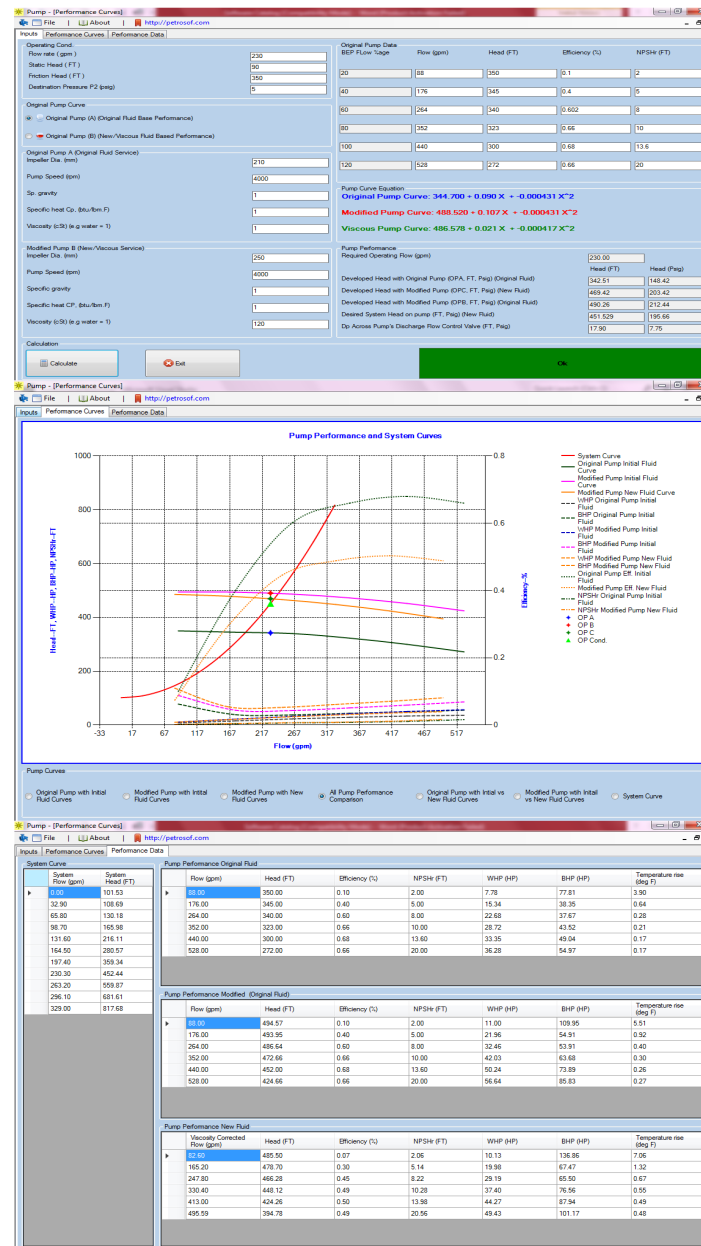
Centrifugal pump performance curve application is a highly accurate and a specialized application to model the pump curve. Application is designed to developed performance curves of centrifugal pump, modifying the performance curves of exiting pump. Also, to modify and calculate the performance of exiting pump in a new fluid service conditions.

Application is highly accurate the ANSI and API governing empirical relations are used as per governing standards to model the pump curves.

Application comes with variety of results where users will provide simple inputs of fluid in input fields and application will calculate entire range of performance curves and display tabulated results. Application warns the users for possible errors and display error messages to accurately use the application to obtain the desired results.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.



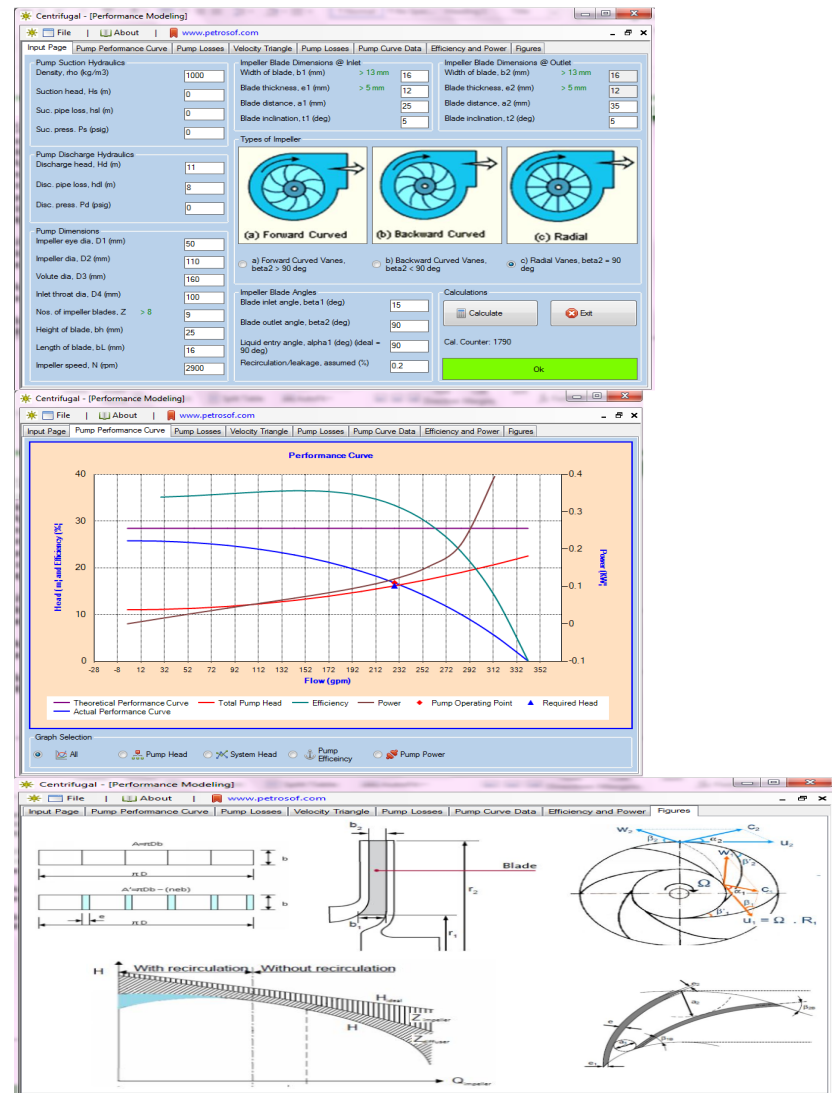
61- CENTRIFUGAL PUMP DESIGN

Centrifugal pump design application is a specialized software to design a centrifugal pump mechanical details to achieve the desired performance in the field. Application uses API and ANSI standard guidelines to model the pump. User can simply provide the information in the input fields and entire range of performance curves and mechanical details are calculated and shown in graphical form within the application.

Users are cautioned about incorrect inputs and limitations during valve sizing and guide them to achieve the correct results.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.



62- CHEMICAL INJECTION

Chemical injection application is developed as a specialized tool to calculate the accurate injection rate of chemical in process fluid stream especially in steam system and boiler water treatment. The application comprised off two sub applications. One application is for chemical injection in process fluid and second application is developed to model the dilution schematic of caustic soda which is also an important chemical used in water treatment in oil and gas industry.

The application is simple to use where user needs to provide required information in input fields and results are obtained with simple pressing calculate button.

Users are cautioned about incorrect inputs and limitations during valve sizing and guide them to achieve the correct results.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

The image displays two screenshots of software applications. The top screenshot is titled "Process - [Chemical Dilution and Injection]" and shows a form for calculating chemical injection rates. It includes sections for "Concentrated Chemical", "Diluted Chemical", and "Injected Chemical". The bottom screenshot is titled "Process - [Caustic Soda (NaOH) Dilution]" and shows a form for calculating the dilution of NaOH. It includes sections for "Conc. NaOH", "Dilution of NaOH", "Cooling Water", and "Diluted NaOH Solution". Both forms have a "Calculate" button and a "Flowsheet" diagram illustrating the process.

Process - [Chemical Dilution and Injection]

Concentrated Chemical		Diluted Chemical		Injected Chemical	
Volume of Solution, V1 (Lt)	1	Dilution Factor	2	Process flowrate, (m3/hr)	28.3
Conc., C1 (select units)	w/w % 47	Final density of solu., rho2 (gm/ml)	1.28	Chem. conc. in process stream, (ppm)	290
Molecular Weight, Mw	40	Final volume of solu., V2 (Lt)	2.00	Chem. inj. rate, (Lt/hr)	25.74
Density of solu., rho1 (gm/ml)	1.06	Molarity of solu., M2 (gmol/Lt)	6.23		
Mass of solu., (gm)	1060.00	Mass of solute, (gm/Lt)	249.10		
Mass of solute, (gm)	498.20	Total mass of solute, (gm/solu)	498.20		
Conc. of solute	w/v % 49.82	Conc. of solute, C2 (w/v %)	24.91		
Molarity of solu., M1 (gmol/Lt)	12.46	Mass of solu., (gm)	2560.00		
		Conc. of solute, C2 (w/v %)	19.46		

Flowsheet: VENDOR CHEMICAL → DILUTION → DAY TANK SOLUTION → INJECTION RATE → PROCESS VESSEL

Process - [Caustic Soda (NaOH) Dilution]

Conc. NaOH		Dilution of NaOH		Cooling Media Balance	
Initial Con. of NaOH Sol. (A)		Temperature of water, T3 (deg C)	40	Cooling media inlet temp., T4 (deg C)	35
Initial volume, V1 (m3/hr)	1	Water flow rate, V3 (m3/hr)	2.45	Cooling media outlet temp., T5	55
Initial temperature, T1 (deg C)	45	Mass flow of water, m3 (kg/hr)	2446	Req. mass flow rate, m4 (kg/hr)	3431
Initial conc., C1 (w/w %)	49			Req. volu. flow rate, V4 (m3/hr)	3.43
Initial density, d1 (kg/m3)	1498			Sp. heat, spH (kJ/kg C)	4.184
Mass flow of NaOH, m1 (kg/hr)	1498	Enthalphy, E3 (kJ/kg)	167	Heat of diluted NaOH, (kJ/hr)	926296
		Heat contents, H3 (kJ/hr)	409407	Rise of temperature, (deg C)	19.03
Enthalphy, E1 (kJ/kg)	345			Diluted NaOH temp, (deg C)	64.03
Heat contents, H1 (kJ/hr)	516889			Heat liberated, (kJ/hr)	287082

Flowsheet: Initial Conc. of NaOH Solution (A) → Mixer → NaOH Cooler → Final Conc. of NaOH Solution

63- CENTRIFUGAL COMPRESSOR PERFORMANCE CURVES

Centrifugal compressor curve application is a specialized application developed with high accuracy to evaluate, analyze and calculate performance curves of a centrifugal compressor based on all the speed variations and power requirement.

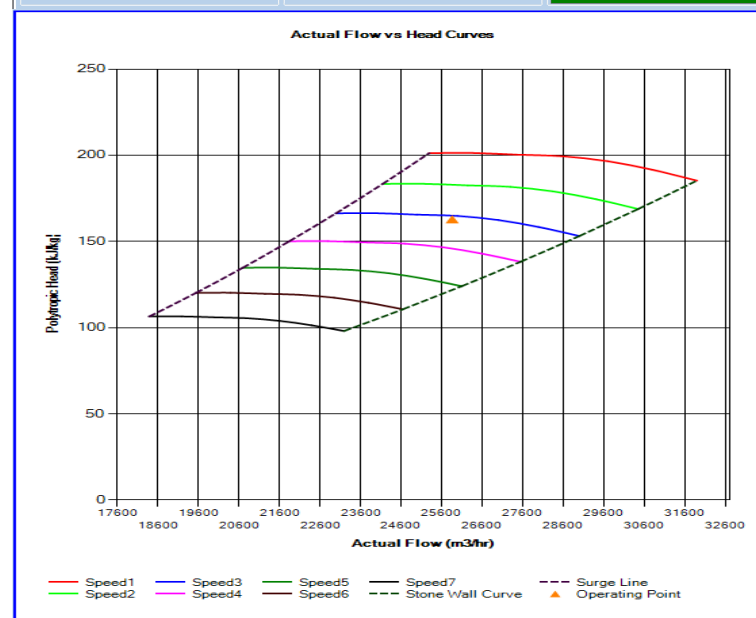
Application can develop entire envelop of performance curve for entire range of compressor for flow, temperature, head, power and pressure. Also, a detailed tabulated results of performance curves are displayed in the tables for evaluation. Further a unique feature of application is to develop stone-wall and surge curves of compressor for entire speed variations.

The application is simple to use where user needs to provide required information in input fields and results are obtained with simple pressing calculate button.

Users are cautioned about incorrect inputs and limitations during valve sizing and guide them to achieve the correct results.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.



64- GAS TURBINE CENTRIFUGAL COMPRESSOR

Gas turbine centrifugal compressor is highly specialized application to model the performance curve of centrifugal compressor driven by gas turbine. The application can be used to model the gas turbine performance along with centrifugal compressor. Also, a unique feature of application is to cover the performance of heat recovery steam generator (HRSG) which is a final element of gas turbine compressor unit.

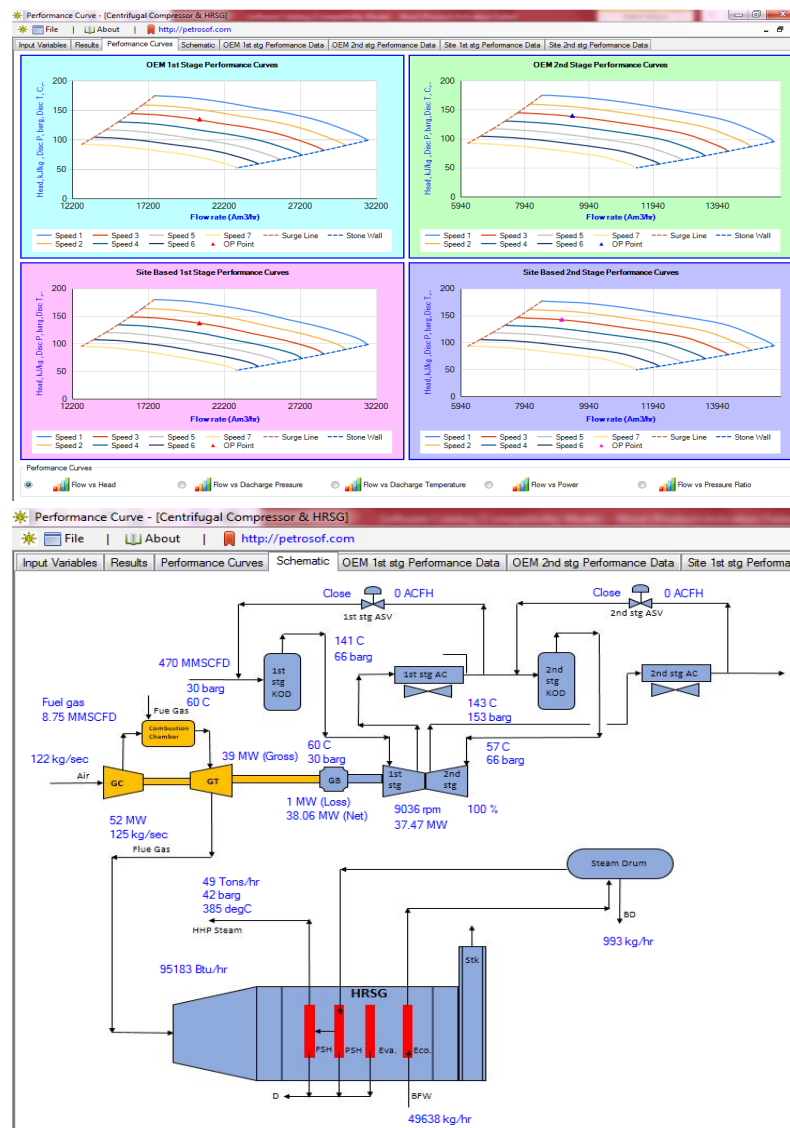
This application is develop with high accuracy to model correctly the complete unit including gas turbine, HRSG and centrifugal compressor. Application offers a complete details of tabulated results along with graphical presentation.

The application is simple to use where user needs to provide required information in input fields and results are obtained with simple pressing calculate button.

Users are cautioned about incorrect inputs and limitations during valve sizing and guide them to achieve the correct results.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.



65- COMPRESSOR SETTLEOUT PRESSURE

Compressor settle out pressure application is a unique and specialized application that can calculate the residual settle out pressure in a compressor loop after quick or sudden shutdown scenario.

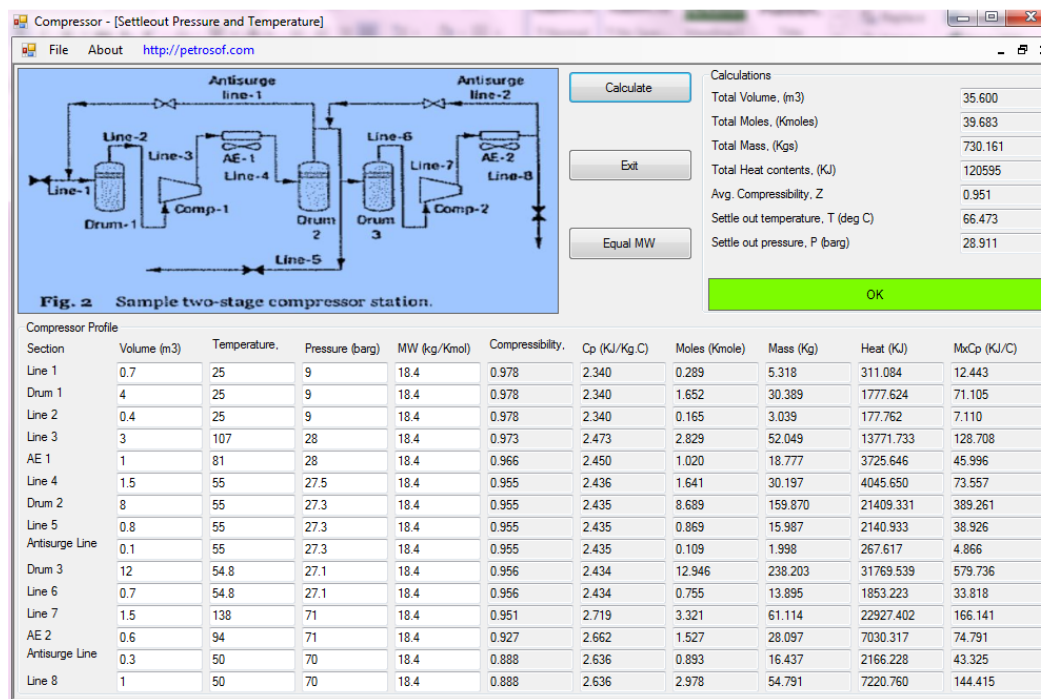
This application is developed with high accuracy to evaluate and calculate the emergency situation of compressor shutdown and pressure packing in the loop.

The application is simple to use where user needs to provide required information in input fields and results are obtained with simple pressing calculate button.

Users are cautioned about incorrect inputs and limitations during valve sizing and guide them to achieve the correct results.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.



66- DYNAMIC PRESSURE

Dynamic pressure tool is developed with high accuracy based on the TOTAL's design standards to evaluate the piping dynamic pressure considering the flow of process fluid.

Dynamic pressure evaluation is an important phenomenon during the sizing of the process piping new or any modifications required in the existing piping system. This tool is highly recommended for the process engineering applications.

The application is simple to use where user needs to provide required information in input fields and results are obtained with simple pressing calculate button.

Users are cautioned about incorrect inputs and limitations during valve sizing and guide them to achieve the correct results.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

The screenshot displays the 'Dynamic Pressure - [Piping System]' software interface. It is organized into several sections:

- Pipe Dimensions:** Includes input fields for Pipe OD (in), Pipe Thickness, e (mm), Fluid Molecular Weight, MW, Mass Flow, Kg/hr, Pressure, P (Paig), Temperature, T (deg F), Fluid Phase (dropdown), Piping Support (dropdown), Design Case (dropdown), and Pipe Service (dropdown).
- Fluid Properties:** Includes input fields for Liquid Density, dL (lbm/ft3), Vapor Fraction, Vt, H2S Mol%, CO2 Mol%, N2 Mol%, and C7+ Mol%.
- Allowable Maximum Limit:** Displays calculated values for Alpha Factor, Beta Factor, Dynamic Pressure (Max. allowable), Pa, Pipe Area, m2, Density @ P, T, Kg/m3, Actual Flow (Max. allowable), ft3/day, Standard Flow (Max. allowable), MMSCFD, Mass Flow (Max. allowable), Kg/hr, and Velocity (Max. allowable), m/sec.
- Actual Conditions:** Displays calculated values for Standard Flow (Actual), MMSCFD, Viscosity, CP, Compressibility, Z, Actual Flow, ft3/day, Actual Velocity, m/sec, Dynamic Pressure (Actual), Pa, Erosional Constant, C, Erosional Velocity (API 14E), m/sec, Reynold No., and Flow.
- Warnings:** A yellow box highlights several warnings: 'Actual Flow (ft3/day) > Max. Allowable Actual Flow (ft3/day)', 'Standard Flow Actual (MMSCFD) > Max. Allowable Standard Flow (MMSCFD)', 'Mass Flow Actual (kg/hr) > Max. Allowable Mass Flow (kg/hr)', 'Actual Velocity > Max. Allowable Velocity', and 'Actual Velocity > Erosional Velocity'.
- Buttons:** Includes 'Calculate', 'Exit', and 'Ok' buttons.

67- GAS FLOW EQUATIONS

Gas flow equation is a tool developed to calculate the natural gas flow and associated process parameters in long pipelines. This tool is highly reliable and used in oil and gas industry for the evaluation of the gas flow through piping.

This application allow user to model flow through pipeline for eight (08) highly accurate flow equations available in the industry. User can model the flow through all the equations simultaneously for quick comparison and analysis.

The application is simple to use where user needs to provide required information in input fields and results are obtained with simple pressing calculate button.

Users are cautioned about incorrect inputs and limitations during valve sizing and guide them to achieve the correct results.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

The screenshot displays the 'Natural Gas - Flow Equations' software interface. It features a 'Requirement' section on the left with checkboxes for calculating flow, pressure, friction factor, viscosity, and gas Z. The 'Inputs' section contains fields for gas flow, pressure, temperature, specific gravity, compressibility, viscosity, heat capacity ratio, and injection. The 'Pipe Dimensions' section allows for selecting pipe material, roughness, length, diameter, and schedule. The 'Results' section shows calculated values for Moody friction factor, relative roughness, compressibility, viscosity, critical pressure, molecular weight, gas density, average compressibility, line pack volume, erosional velocity, and equivalent length. A table at the bottom lists results for eight different flow equations: General, Weymouth, IGT, Panhandle A, Panhandle B, Mueller, Fitch, and Spitzglass LP/HP. Each row in the table provides values for flow, flow max, mass flow, pipe inlet/outlet velocity, pipe erosion, Reynolds number, condition, and profile.

Flow Equations	Flow (MMSCFD)	Flow max (MMSCFD)	Mass Flow (lbm/day)	Pipe Inlet Velocity (ft/sec)	Pipe Outlet Velocity (ft/sec)	Pipe Erosion	Reynold No.	Condition	Profile
General	86.74	141.95	3973370	9.68	9.88	N/A	3139905	Turbulent	Sub-Critical
Weymouth	100.09	163.80	4584770	11.17	11.40	N/A	3623070	Turbulent	Sub-Critical
IGT	111.72	193.00	5117416	12.47	12.73	N/A	4043998	Turbulent	Sub-Critical
Panhandle A	125.89	214.18	5766794	14.05	14.34	N/A	4557164	Turbulent	Sub-Critical
Panhandle B	128.01	211.56	5863689	14.29	14.58	N/A	4633734	Turbulent	Sub-Critical
Mueller	131.41	231.55	6019546	14.67	14.97	N/A	4756899	Turbulent	Sub-Critical
Fitch	100.39	170.56	4598864	11.21	11.44	N/A	3634058	Turbulent	Sub-Critical
Spitzglass LP	9.99	17.92	457424	1.11	1.14	N/A	361475	Turbulent	Sub-Critical
Spitzglass HP	81.81	133.89	3747651	9.13	9.32	N/A	2961552	Turbulent	Sub-Critical

68- LIQUID PRESSURE DROP

Liquid pressure drop application is developed with high accuracy to model the pressure drop through series of pipes with varying size and lengths. Also, piping hydraulic details are calculated and shown in tabulated format for each section of the pipe and graphical presentation of the pipe hydraulic is developed and shown in the application for analysis.

Application uses eight types of friction factor calculation options and three types of K-factor calculation models in the application.

The application is simple to use where user needs to provide required information in input fields and results are obtained with simple pressing calculate button.

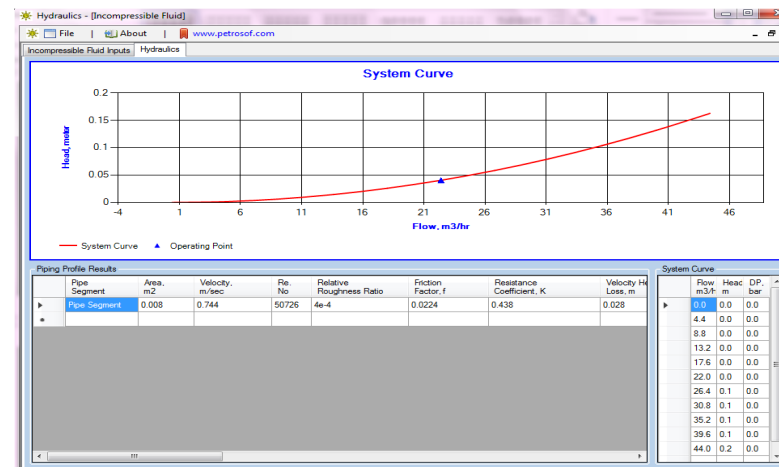
Users are cautioned about incorrect inputs and limitations during valve sizing and guide them to achieve the correct results.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

The screenshot shows the 'Hydraulics - [Incompressible Fluid]' application window. It features a menu bar (File, Edit, About) and a toolbar. The main area is divided into several sections:

- Inputs:** Fields for Inlet Pressure P1 (22), Flowrate Q (22), Density (1000), Viscosity (1.5), Vapor Pressure (5), Critical Pressure (100), Destination Pressure (0), and Pipe Friction Factor (Churchill and Ussai Equation).
- Head Loss Results:** Calculated values for Velocity Head Loss (0.028), Fitting Head Loss (0.012), Elevation Head Loss (0.000), Pressure Head Loss (0.000), Resistance Coefficient (0.4380), Head Loss by K method (0.0406), and Head Loss by Eq. method (0.0406).
- Pressure Drop Results:** Calculated values for Pressure Drop (0.0040), Total Eq. Length L (2.000), Outlet Pressure P2 (21.996), and DP / Eq. Length (0.002).
- Calculate:** A button to perform the calculation.
- Exit:** A button to close the application.
- Pipe Profile:** A table listing pipe segments with columns for Item, Comp, Material, Pipe NPS, Pipe SCH, Lin, EL(+/-), OD(in), Rel Rof (in), Fitting, Pipe ID2, Angle, Qty, and K.



69- LOOPED PIPING

Looped piping application is a specialized software to model the flow of gas through a looped piping network. Looped flow piping scenario often exist in the oil and gas industry where process engineer require to determine the accurate flow through the system based on the natural resistance of the looped piping network.

The application is simple to use where user needs to provide required information in input fields and results are obtained with simple pressing calculate button.

Users are cautioned about incorrect inputs and limitations during valve sizing and guide them to achieve the correct results.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

The screenshot displays the 'Looped Pipes - [Pipe Flow]' software interface. The window title is 'Looped Pipes - [Pipe Flow]'. The interface is divided into several sections:

- Inputs:** Contains fields for Gas Flow (MMSCFD), Pressure (Psig), Temperature (deg F), Inlet Pipe OD (in), Pipe Wall Thickness (mm), Pipe Material, Pipe OD (in), Wall thickness (mm), Pipe Length (ft), and CI Inhibitor.
- Loop-1 ABE:** Contains fields for Gas Mass Flow (lbm/hr), Actual Flow (ft³/sec), Static Head, HA (ft), Pipe Coefficient, K, Area of Pipe (ft²), C Factor @ API 14E, Hazen Williams C Factor, Velocity in Pipe (ft/sec), Erosional Velocity (ft/sec), Vapor Fraction, Vapor Density @ STP (lbm/ft³), Vapor Density @ TP (lbm/ft³), Specific Gravity of Gas, Mixture Density (lbm/ft³), Gas Viscosity (CP), and Compressibility, Z.
- Loop-2 ACE:** Contains fields for Gas Mass Flow (lbm/hr), Actual Flow (ft³/sec), Static Head, HA (ft), Pipe Coefficient, K, Area of Pipe (ft²), C Factor @ API 14E, Hazen Williams C Factor, Velocity in Pipe (ft/sec), Erosional Velocity (ft/sec), Vapor Fraction, Vapor Density @ STP (lbm/ft³), Vapor Density @ TP (lbm/ft³), Specific Gravity of Gas, Mixture Density (lbm/ft³), Gas Viscosity (CP), and Compressibility, Z.
- Loop-3 ADE:** Contains fields for Gas Mass Flow (lbm/hr), Actual Flow (ft³/sec), Static Head, HA (ft), Pipe Coefficient, K, Area of Pipe (ft²), C Factor @ API 14E, Hazen Williams C Factor, Velocity in Pipe (ft/sec), Erosional Velocity (ft/sec), Vapor Fraction, Vapor Density @ STP (lbm/ft³), Vapor Density @ TP (lbm/ft³), Specific Gravity of Gas, Mixture Density (lbm/ft³), Gas Viscosity (CP), and Compressibility, Z.
- Calculations:** Contains a 'Calculate' button and an 'Exit' button.

The 'Calculate' button is highlighted in blue. The 'Exit' button is highlighted in red. The 'Ok' button is highlighted in green.

70- NATURAL GAS HYDRATE

Natural gas hydrate application is a specialized application to model a very important phenomenon of hydrate formation in gas pipelines in oil and gas industry. Hydrate formation is critical phenomenon that must be prevented by managing the flow, temperature, pressure and injecting chemicals. This application allow users to accurately determine the scenario and further taken measures to prevent.

The application is simple to use where user needs to provide required information in input fields and results are obtained with simple pressing calculate button.

Users are cautioned about incorrect inputs and limitations during valve sizing and guide them to achieve the correct results.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

Natural Gas Hydrate Temperature and Water Contents - [Calculations]

File | About | <http://petrosf.com>

Natural Gas Water Content Models

- ☒ Sloan's Method
- ☐ Khaled's Method
- ☐ Alireza Bahadon's Method
- ☐ Zhu Lin's Method
- ☐ Behr's Method
- ☐ Kazim's Method
- ☐ Saturated Vapor Pressure (SVP) Model
- ☐ Modified Ideal Model (MDIM)
- ☐ Simplified Thermodynamic Model (STM)
- ☐ Bukacek's Method
- ☐ Modified Bukacek's Method

Natural Gas Hydrate Formation Models

- ☒ Berge's Correlation
- ☐ Motiee's Correlation
- ☐ Hammerschmidt's Correlation
- ☐ Towler and Mokhtab's Correlation
- ☐ Kidnay and Parish's Correlation
- ☐ Alireza Bahadon's Correlation

Inputs

System Characteristics ☒ Gas-Liquid Equilibrium ☐ Gas-Solids Equilibrium

Pressure, P (Psig) 185 Psig < P < 1987 Psig

Temperature, T (deg F) -40 F < T < 120 F

Gas specific gravity, SpG

Salt contents of gas, S

CO2 Mol%

H2S Mol%

Results

H2S equivalent conc., HEC (mol%)	5.400
Sour gas correction factor, F	1.021
Natural gas (Sweet) water contents, W (mg/m3)	3072.789
Natural gas (Sweet) water contents, W (lbm/MMSCF)	191.803
Natural gas (Sour) water contents, W (mg/m3)	3135.835
Natural gas (Sour) water contents, W (lbm/MMSCF)	195.738
Hydrate Formation Temperature, T (deg F)	0.344
Hydrate Formation Temperature, T (deg C)	-17.587

Calculate Exit Ok

71- PIPE EROSION MODEL

Pipe erosion model is a specialized application developed to model the erosion rate and assessment of the health of the piping components. The application is developed based on Norwegian piping erosion standard and determine highly accurate results of erosion rate calculation based on the process fluid.

The application is simple to use where user needs to provide required information in input fields and results are obtained with simple pressing calculate button.

Users are cautioned about incorrect inputs and limitations during valve sizing and guide them to achieve the correct results.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

The screenshot displays the 'Piping Erosion Model - [Erosion Calculations]' window. It is divided into several sections:

- Inputs:** Includes fields for Piping component (Elbow), Erosive agent (Quartz (Sand)), Components plane (Single Component), Pipe Material (Carbon Steel), Gas flow rate, Solids quantity, Partical density, Avg. partical size, Solids causing erosion, Molecular weight of gas, Pressure, Temperature, Liquid density, Liquid viscosity, Liquid fraction, CO2 Mol%, H2S Mol%, N2 Mol%, C7+ Mol%, Pipe, OD, Pipe thickness, Pipe radius of curvature, Service hours, and Allowable erosion rate.
- Fluid Properties:** Displays calculated values for Vapor density @ STP, Vapor density @ T, P, Gas compressibility, Gas viscosity, Total mass flow rate, Mixture density @ T, P, Mass flow rate of gas, Mass flow of liquid, Velocity of gas in pipe, Velocity of liquid in pipe, Partical impact velocity, Mixture viscosity, Mixture/partical density, Mass flow rate of solids, and Total mass of solids.
- Erosion results:** Shows a diagram of an elbow with the 'Area of erosion' highlighted. It includes the Impact angle of solids, Pipe area exposed to erosion, Relative surface thickness loss, Metal loss, and Metal erosion rate.
- Model Limitations:** Lists various parameters and their status relative to allowable limits, such as Partical diameter, Partical density, Pipe inner diameter, Bend Radius, Pipe material Density, Liquid Velocity, Gas Velocity, Liquid Density, Gas density, Liquid viscosity, Gas Viscosity, and Solids Conc.

Buttons for 'Calculate', 'Exit', and 'Ok' are visible at the bottom.

72- STEAM SYSTEM MODEL

Steam system model is a specialized and highly accurate application developed based on the water and steam standards IFPS 97 guidelines. The application covers entire range of steam and boiler system components including steam turbines and boiler house. The application is a suite of entire steam and boiler system design calculations.

The application is simple to use where user needs to provide required information in input fields and results are obtained with simple pressing calculate button.

Users are cautioned about incorrect inputs and limitations during valve sizing and guide them to achieve the correct results.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

The screenshot displays the 'Boiler Calculations' software interface. It features a 'Calculate' button and an 'Exit' button. The interface is divided into several sections for input and output data.

Inputs		Boiler Feed Water Balance		Steam Produced	
Deaerator Inputs		Pressure, bara	3.200	Pressure, bara	37.000
Deaerator pressure	3.2 bara	Temperature, deg C	135.758	Temperature, deg C	287.780
Select Boiler Fuel	Natural Gas	Mass Flow, kg/hr	20147.027	Mass Flow, kg/hr	118636.000
Fuel GCV, kJ/kg	52200	Sp. Enthalpy, kJ/kg	570.935	Sp. Enthalpy, kJ/kg	2937.712
Combustion efficiency (%)	68.5	Sp. Entropy, kJ/kg K	1.695	Sp. Entropy, kJ/kg K	6.354
Blowdown rate (%)	7.5	Energy Flow, kJ/hr	11502634.548	Energy Flow, kJ/hr	54747206.418
Steam Produced		Quality	Liquid	Quality	Steam
Steam mass flow	118636 kg/hr				
Pressure	37 bara				
Temperature	287.78 deg C				
Resulting units	Imperial SI				

Boiler Blowdown		Boiler Parameter	
Pressure, bara	37.000	Boiler Duty, kJ/hr	44854168.027
Temperature, deg C	245.754	Fuel Energy, kJ/hr	65480537.266
Mass Flow, kg/hr	1511.027	Fuel Consumption, kg/hr	1254.416
Sp. Enthalpy, kJ/kg	1065.233	Fuel Flow @ STP, m3/hr	1614.436
Sp. Entropy, kJ/kg K	2.755		
Energy Flow, kJ/hr	1609596.157		
Quality	Liquid		

The schematic diagram shows a boiler system with 'Feed Water' entering from the left, 'Steam' exiting from the top right, and 'Blowdown' exiting from the bottom right. The boiler is represented by a red box with a blue cylinder on top.

73- TANK VOLUME

Application of tank volume is developed to calculate the volume of all (12) design types of tanks used in oil and gas industry. The application is design with high accuracy to determine the total tank volume also, partial filled tank volume at various levels.

Highly accurate mathematical and differential equations are used within the application.

The application is simple to use where user needs to provide required information in input fields and results are obtained with simple pressing calculate button.

Users are cautioned about incorrect inputs and limitations during valve sizing and guide them to achieve the correct results.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

Tank Volume - [Elliptical Tank]

File | Types of Tanks | About www.petrosof.com

Inputs		Tank Volume @ Operating Level	
Tank Tag#		Actual Liquid Level, L (m)	5.00
Tank Width W (m)	5	Actual Liquid Volume, VL (m3)	196
Tank Length, L (m)	10	Tank Volume @ HLL	
Tank Height, H (m)	10	High Liquid Level, HLL (m)	9.50
level Instrument Range, R (m)	10	High Liquid Volume, VHLL (m3)	385
Operating Level in Tank, L (%)	50	Tank Volume @ LLL	
High Liquid Level, HLL (%)	95	Low Liquid Level, LLL (m)	1.00
Low Liquid Level, LLL (%)	10	Low Liquid Volume, VLLL (m3)	20
Density of Liquid, rho (Kg/m3)	1042		

Calculation

Working Capacity of Tank
Working Capacity, WC (m3) 365

Weight of Liquid in Tank, W (Kg) 204596

Tank Picture

74- TOTAL DYNAMIC HEAD OF PUMP

Total dynamic head of pump TDH is highly accurate and important application used by process engineers to model the dynamic head of the pump in service or design a new pump application in field.

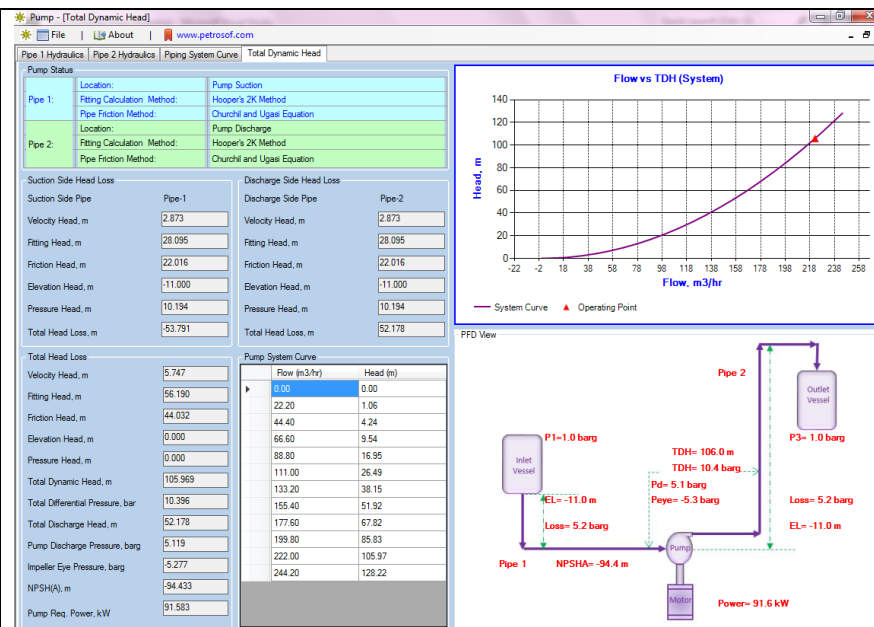
The application used highly accurate and most commonly used methods of friction factor calculations, resistance coefficients of the piping components. Application offers a complete analysis and provide detailed results of the entire pump system from suction side to discharge side. Also, a graphical presentation of the system resistance curve is plotted within the application.

The application is simple to use where user needs to provide required information in input fields and results are obtained with simple pressing calculate button.

Users are cautioned about incorrect inputs and limitations during valve sizing and guide them to achieve the correct results.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.



75- TURBO EXPANDER RE-COMPRESSOR

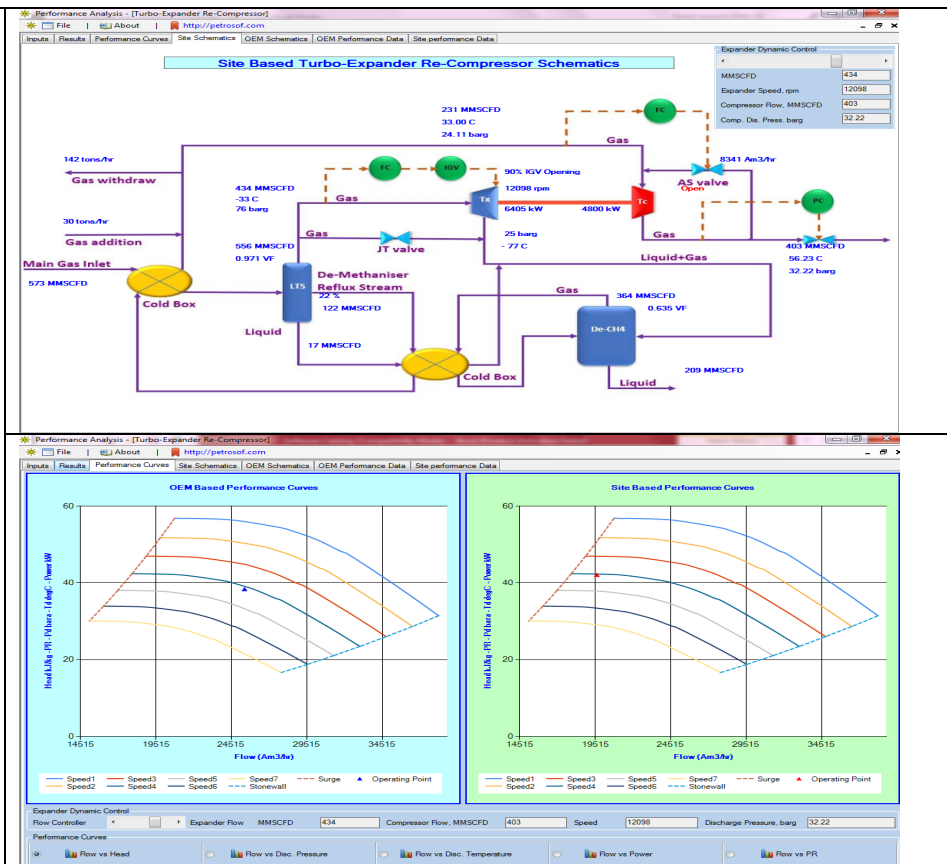
Turbo expander re-compressor is a highly specialized application developed to model the actual operation of turbo expander and associated re-compressor for natural gas system. Turbo expander is highly specialized equipment used in oil and gas industry in cryogenic system. Modeling of natural gas system, recovery and performance curve evaluation of compressor is highly demanding and a tedious manual calculation. The application uses accurate algorithm to model the machine and performance curves dynamically.

The application is simple to use where user needs to provide required information in input fields and results are obtained with simple pressing calculate button.

Users are cautioned about incorrect inputs and limitations during valve sizing and guide them to achieve the correct results.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.



76- PSYCHROMETER

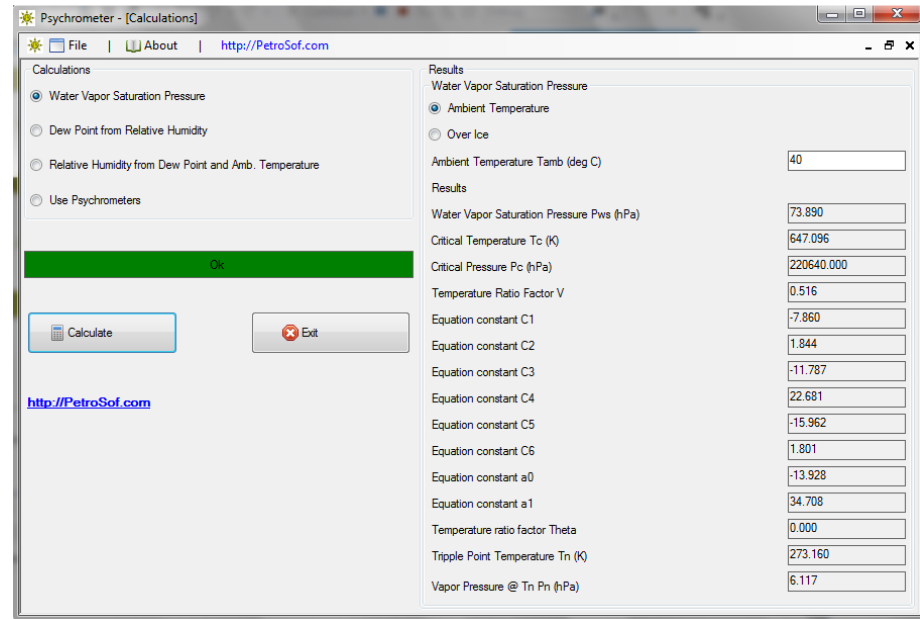
Psychrometer application is developed to determine the psychrometric calculations of water and air. By this application user can calculate water vapor saturation pressure, dew point, relative humidity and complete psychrometer evaluation. User need to select the options as desired from the calculation section and by providing basic information of temperature and pressure complete psychrometric properties can be determined. A simple yet comprehensive application for engineers to perform desk calculation.

The application is simple to use where user needs to provide required information in input fields and results are obtained with simple pressing calculate button.

Users are cautioned about incorrect inputs and limitations during valve sizing and guide them to achieve the correct results.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.



77- OIL SKIMMER DESIGN

In oil and gas plants produced water is often stored in large tanks after treatment however, still a significant quantity of oil is separated in the tanks due to large residence time. So, large tanks in oil and gas plant often comes with oil skimmers to collect the oil from the tanks. Therefore, this application is developed to size and design the appropriate skimmer. User can also evaluate the existing skimmer design to be adequate for the need. The application allows to perform both task of sizing and evaluation of existing design.

The application consist of three most common types of skimmer designs user can select and perform calculations with;

- Horizontal cylindrical skimmer
- Horizontal rectangular API skimmers
- Vertical skimmer

The application is simple to use where user needs to provide required information in input fields and results are obtained with simple pressing calculate button.

Users are cautioned about incorrect inputs and limitations during valve sizing and guide them to achieve the correct results.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

Oil Skimmer - [Design]

File | About | <http://petrosf.com>

Horizontal Cylindrical Skimmer | Horizontal Rectangular Cross Section (API) Skimmer | Vertical Cylindrical Skimmer

Inputs

Coalescer Design

☒ Coalescer size d/s skimmer required

Oil conc. in outflow, Co (ppm)

Actual Skimmer Rating

☒ Skimmer Rating

Diameter, D (ft)

Length, L (ft)

Produced water flow, Qw (BPD)

Oil contents of water, Qo (mg/L, PPM)

Oil droplet size, dm (mM)

Water sp. gravity

Water viscosity, (cP)

Oil specific gravity

Oil content reduction, Qo(red) (mg/L, PPM)

Desired retention time, Tw (min)

Turbulence factor, (%age)

Skimmer Rating

Oil rising time, To (min)

Water retention time, Tw cal. (min)

Skimmer capacity, Qpw (BPD)

Skimmer volume, Vpw (ft3)

Water retention time req. Twr (min)

Avg. water velocity, Uw (ft/sec)

Check **OK**

Coalescer Design

Oil conc. in Inflow, G (ppm)

Inflow oil droplet size, dmi (mM)

Outflow oil droplet size, dmo (mM)

Overall efficiency, E (%)

Efficiency of Sp packs, Esp (%)

Nos. of SP Packs required, N

Calculate Exit

	Diameter	Length	L/D ratio	Control	Oil droplet size (mM)	Oil rising time (min)	Avg water velocity (ft/sec)	Water retention time cal. (min)	Skimmer volume (ft3)	Skimmer capacity (BPD)	Water retention time req.	Check
▶	56.73	47.28	10.00	Retenti...	200.00	0.41	4.56	13.31	414.93	13847....	7.69	Ok
	61.11	40.74	8.00	Retenti...	200.00	0.44	5.29	13.31	414.93	12854....	8.29	Ok
	67.26	33.63	6.00	Retenti...	200.00	0.48	6.41	13.31	414.93	11679....	9.12	Ok
	77.00	25.67	4.00	Retenti...	200.00	0.55	8.40	13.31	414.93	10202....	10.44	Ok
	97.01	16.17	2.00	Retenti...	200.00	0.70	13.33	13.31	414.93	8097.81	13.15	Ok
	192.84	8.04	0.50	Settling...	200.00	1.39	52.68	26.13	814.87	8000.00	26.15	Ok
*												

Oil Skimmer - [Design]

File | About | <http://petrosf.com>

Horizontal Cylindrical Skimmer | Horizontal Rectangular Cross Section (API) Skimmer | Vertical Cylindrical Skimmer

Inputs

Coalescer Design

☒ Coalescer size d/s skimmer required

Oil conc. in outflow, Co (ppm)

Actual Skimmer Rating

☒ Skimmer Rating

Width, W (ft)

Height, H (ft)

Length, L (ft)

Produced water flow, Qw (BPD)

Oil contents of water, Qo (mg/L, PPM)

Oil droplet size, dm (mM)

Water sp. gravity

Water viscosity, (cP)

Oil specific gravity

Oil content reduction, Qo(red) (mg/L, PPM)

Desired retention time, Tw (min)

Turbulence factor, (%age)

Skimmer Rating

Oil rising time, To (min)

Water retention time, Tw cal. (min)

Skimmer capacity, Qpw (BPD)

Skimmer volume, Vpw (ft3)

Water retention time req. Twr (min)

Avg. water velocity, Uw (ft/sec)

Check **OK**

Coalescer Design

Oil conc. in Inflow, G (ppm)

Inflow oil droplet size, dmi (mM)

Outflow oil droplet size, dmo (mM)

Overall efficiency, E (%)

Efficiency of Sp packs, Esp (%)

Nos. of SP Packs required, N

Calculate Exit

	Width (ft)	Height (ft)	Length (ft)	L/D ratio	Control	Oil droplet size (mM)	Oil rising time (min)	Avg water velocity (ft/sec)	Water retention time cal.	Skimmer volume (ft3)	Skimmer capacity (BPD)	Water retention time req.	Check
▶	4.40	2.20	43.99	10.00	Reten...	200.00	0.38	0.05	13.66	425.60	15257...	6.97	Ok
	4.74	2.37	37.90	8.00	Reten...	200.00	0.41	0.05	13.66	425.60	14162...	7.51	Ok
	5.22	2.61	31.29	6.00	Reten...	200.00	0.45	0.04	13.66	425.60	12867...	8.27	Ok
	5.97	2.99	23.87	4.00	Reten...	200.00	0.51	0.03	13.66	425.60	11240...	9.47	Ok
	7.52	3.76	15.04	2.00	Reten...	200.00	0.65	0.02	13.66	425.60	8921.54	11.93	Ok
	14.24	7.12	7.12	0.50	Settlin...	200.00	1.23	0.01	23.19	722.64	8000.00	22.58	Ok
*													

78- SLUG CATCHER SIZING

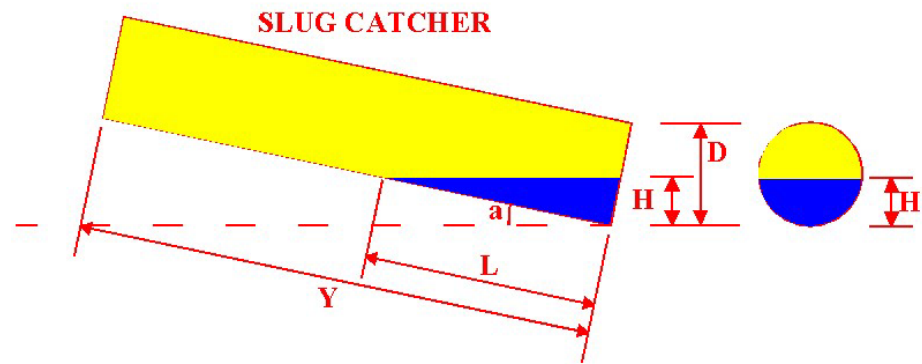
In oil and gas plants slug catcher is an important and often the very first three phase separator to receive the associated gas from offshore or onshore reservoir. The orientation of slug catcher is often makes a challenge for the engineers to determine the volume of liquid inventory inside. This application is specifically developed to determine the correct volume of slug catcher by simple field inputs given by user.

The application is simple to use where user needs to provide required information in input fields and results are obtained with simple pressing calculate button.

Users are cautioned about incorrect inputs and limitations during valve sizing and guide them to achieve the correct results.

An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.



79- HOT OIL SYSTEM

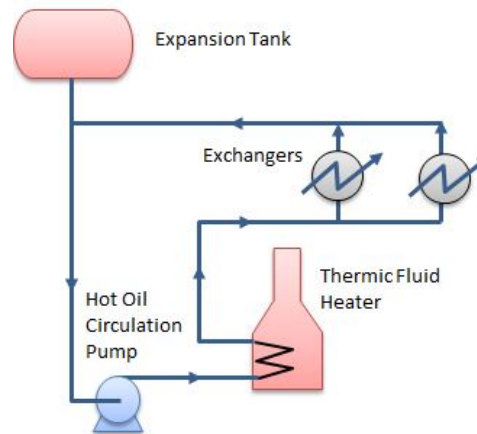
Hot oil is a vital element in oil and gas plants as heating media in process heat exchangers. Sizing of hot oil vessel for inventory management during start up and commissioning phases is an important task.

Process engineers often need to determine the fluid hydraulics of hot oil system and associated piping and vessel which can be a tedious task. this application offers an accurate and quick estimation of hot oil hydraulics to save time and effort.

In this application user's are required to provide basic process information in the input section and results are calculated and displayed in the result section by simply pressing "calculate" button.

Users are prompted about the limitations of the programs in the message bar on the screen. An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.



Inputs	
Cold oil density @ amb. T (kg/m ³)	1056
Hot oil density @ ops. T (kg/m ³)	761
Piping and Equipment Volume	
Volume of piping, V1 (m ³)	6.87
Volume of exchangers, V2 (m ³)	0.5
Volume of hot oil heater, V3 (m ³)	0.5
Volume of (misc. equipment), V4 (m ³)	0
Expansion Vessel	
<input checked="" type="checkbox"/> Expansion Vessel Sizing Required	
L/D ratio of tank	2.5
Diameter of vessel, D (m)	n/a
Min. level of oil at cold cond. (%)	10
Max. level of oil at hot cond. (%)	70

Results	
Volume of vessel required (min.), V (m ³)	5.436
Length of vessel (min.), L (m)	3.367
Diameter of vessel (min.), D (m)	n/a
Vessel length (actual), L (m)	n/a
Vessel diameter (actual), D (m)	1.347
Volume of vessel (actual), V (m ³)	5.436
Total system volume (m ³)	7.870
Min. volume at low level (m ³)	0.544
Hot oil inventory at startup (m ³)	8.414
Hot oil mass inventory at startup (kg)	8885
Hot oil volume on heating (m ³)	11.675
Expansion volume (m ³)	3.262
Actual level of oil at hot cond. (%)	70.0

80- CHEMICAL INJECTION

Chemical injection in process stream is essential part of the operation to control the quality and maintain the product specifications. Estimations of chemical injection in process stream, dilution and concentration and accurate injection rate management can be critical task.

This application is developed specifically to estimate the accurate injection rate, dilution and concentration of chemical and other critical parameter. This application is simple to use where user's need to provide basic information then application will calculate the required results quickly.

Users are prompted about the limitations of the programs in the message bar on the screen. An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

Process - [Chemical Dilution and Injection]

Concentrated Chemical

Volume of Solution, V1 (Ltr) 1

Conc., C1 (select units) w/w % 47

Molecular Weight, Mw 40

Density of solu., rho1 (gm/ml) 1.06

Mass of solu., (gm) 1060.00

Mass of solute, (gm) 498.20

Conc. of solute w/v % 49.82

Molarity of solu., M1 (gmol/Ltr) 12.46

Diluted Chemical

Dilution Factor 2

Final density of solu., rho2 (gm/ml) 1.28

Final volume of solu., V2 (Ltr) 2.00

Molarity of solu., M2 (gmol/Ltr) 6.23

Mass of solute, (gm/Ltr) 249.10

Total mass of solute, (gm/solu) 498.20

Conc. of solute, C2 (w/v %) 24.91

Mass of solu., (gm) 2560.00

Conc. of solute, C2 (w/w %) 19.46

Chemical Injection in Process

Process flowrate, (m3/hr) 28.3

Chem. conc. in process stream, (ppm) 290

Chem. inj. rate, (Ltr/hr) 25.74

Calculation

Calculate Exit

Flowsheet

VENDOR CHEMICAL → DILUTION → DAY TANK SOLUTION → INJECTION RATE → PROCESS VESSEL

Process - [Caustic Soda (NaOH) Dilution]

Conc. NaOH

Initial Con. of NaOH Sol. (A) Initial Con. of NaOH Sol. (A)

Mass Balance

Initial volume, V1 (m3/hr) 1

Initial temperature, T1 (deg C) 45

Initial conc., C1 (w/w %) 49

Initial density, d1 (kg/m3) 1498

Mass flow of NaOH, m1 (kg/hr) 1498

Energy Balance

Enthalphy, E1 (kJ/kg) 345

Heat contents, H1 (kJ/hr) 516889

Dilution of NaOH

Dilution Water (B) Dilution Water (B)

Mass Balance

Temperature of water, T3 (deg C) 40

Water flow rate, V3 (m3/hr) 2.45

Mass flow of water, m3 (kg/hr) 2446

Energy Balance

Enthalphy, E3 (kJ/kg) 167

Heat contents, H3 (kJ/hr) 409407

NaOH Heat Exchanger

Cooling Media Balance

Cooling media Fresh H2O

Cooling media inlet temp., T4 (deg C) 35

Cooling media outlet temp., T5 55

Req. mass flow rate, m4 (kg/hr) 3431

Req. volu. flow rate, V4 (m3/hr) 3.43

Sp. heat, spH (kJ/kg C) 4.184

Heat of diluted NaOH, (kJ/hr) 926296

Rise of temperature, (deg C) 19.03

Diluted NaOH temp, (deg C) 64.03

Heat liberated, (kJ/hr) 267082

Calculations

Calculate Exit

Flowsheet

Initial Conc. of NaOH Solution (A) → Mixer → NaOH Cooler → Final Conc. of NaOH Solution

Dilution Water (B) → Mixer

Cooling Water → NaOH Cooler

Final NaOH Solution

Mass Balance

NaOH Final temp., T2 (deg C) 45

NaOH Final con., C2 (w/w %) 18

NaOH Final density, d2 (kg/m3) 1183

NaOH Final volume, V2 (m3/hr) 3.45

Mass flow rate, m2 (kg/hr) 4078

Energy Balance

NaOH Final Enthalphy, E2 (kJ/kg) 157

NaOH heat content, H2 (kJ/hr) 639214

Sp. H of NaOH, (kJ/kg C) 3.699

81- CENTRIFUGAL PUMP MODELING

Centrifugal pump modeling is a specialized application developed with great care and accuracy for designing a new pump and its performance curves.

This applications is a unique type especially for pump manufacturers and designers. In this application engineer can define the boundaries and dimension of the pump for a system and determine the performance curves of the pump.

In this application users can select the basic design of the pump by selecting the given options in the application and at the end by pressing the calculate button a complete design configuration and performance curves of the pump will be determined. Users can simply alter the inputs to vary the results as wish to achieve the desire performance and then order the pump to vendors to supply the pump with matching characteristics.

Users are prompted about the limitations of the programs in the message bar on the screen. An introductory demonstration of this software is available online at www.petrosof.com

Software is compatible to install and run on Windows 95-2000, Windows XP, Windows 7 and Windows 8.

