About this document

This document contains screenshots of software available from Cheresources.com. You can find this title in our online store at:

http://www.cheresources.com/cheplusstore/catalogue.php

Clicking the above link should activate your default browser and launch the site.

We recommend using our search feature to find the title.

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Content Based
Chemical Engineering

ENLARGE - PIPING RESISTANCE IN TERMS OF THE LARGER DIAMETER

REFERENCES: **CRANE TECHNICAL PAPER 410, 25th Printing, Chapter 2, page 11**

LIMITATIONS: The value obtained is the resistance in terms of the **LARGER** pipe. Determine this K' value and input into Fanning or Darcy equations as additional K. This method allows accurate flow or pressure determination of multiple size, single line calculations.

NOTE: Always begin a new case by retrieving the original file. Direct entry of data in cells that originally contain table lookups could cause functions to be lost, or incorrect calculations. I format cells requiring entry colored **RED**; calculated values are black.

1.) Enter identification at [B4]
2.) Enter the smaller pipe ID at [C6], use [=], then go to pipe table, or directly enter the size if it is not in table.
3.) Enter straight smaller pipe length at [C7].
4.) Enter the larger pipe ID at [F6], use the pipe table as previously described. The ratio of diameters is calculated to the 4th power and shown at [F7].
5.) Enter the number of each type of valve & fitting just to their left.[A14]...[A21] and at [D14]...[D21].
6.) Enter additional entrance, exit, & miscellaneous K value at [C26..C28].
7.) The value ΣK_1 is calculated and shown at D34. This value is the sum of K for the small pipe as input. This value divided by beta to the fourth power is the resistance (K') of this segment in terms of the larger pipe.

Print out using direct Excel commands. This application is provided by Chemical Engineers Resource Website, cheresources.com for additional selections.

Print out using direct EXCEL commands.

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04/17/04

Enlarge - Piping Resistance In Terms Of The Larger Diameter

PIPE: RV DISCHARGE INCREASER FROM 8" TO 12"

small pipe ID =	7.981	in	large pipe ID =	12.000	in
length =	21.000	ft	β^4 =	0.196	

FITTING LOSSES - fitting friction factor, *f*t = 0.0140

Fittings and Valves, Entered are THE SMALLER DIAMETER

	Valves	K		fittings	K
0	gate valve	0.000	0	thru `T'	0.000
0	globe valve	0.000	0	branch`T'	0.000
0	angle valve	0.000	0	scrwd 90°	0.000
0	ball valve	0.000	0	scrwd 45°	0.000
0	plug valve	0.000	0	short rad 90°	0.000
0	diaphragm valve	0.000	0	short rad 45°	0.000
0	butterfly valve	0.000	0	long rad 90°	0.000
0	swing chk valve	0.000	0	long rad 45°	0.000

			small dia./ large dia.	
valves total =	0.000	dia.1 / dia.2 =	0.000	
fittings total =	0.000	K, due to increaser	0.000	
entrance =	0.000			
exit =	1.000	misc equiv len =	0.0	feet
misc. K =	0.000	final length l' =	21.0	feet
ΣK_1 =	1.442	pipe : 12 ·f ·l'/d =	0.442	

$$K_2 = \frac{K_1}{\beta^4} = 7.372$$

corrected K of smaller diameter in terms of the larger pipe size...

04/17/04

Enlarge - Piping Resistance In Terms Of The Larger Diameter

PIPE: RV DISCHARGE INCREASER FROM 200 mm TO 300 mm

small pipe ID =	202.740	millimeter	large pipe ID =	304.840	millimeter
length =	6.401	meter	β^4 =	0.196	

FITTING LOSSES - fitting friction factor, ft = 0.0140

Fittings and Valves, Entered are THE SMALLER DIAMETER

	Valves	K		fittings	K
0	gate valve	0.000	0	thru `T'	0.000
0	globe valve	0.000	0	branch`T'	0.000
0	angle valve	0.000	0	scrwd 90°	0.000
0	ball valve	0.000	0	scrwd 45°	0.000
0	plug valve	0.000	0	short rad 90°	0.000
0	diaphragm valve	0.000	0	short rad 45°	0.000
0	butterfly valve	0.000	0	long rad 90°	0.000
0	swing chk valve	0.000	0	long rad 45°	0.000

			small dia./ large dia.	
valves total =	0.000	dia.1 / dia.2 =	0.000	
fittings total =	0.000	K, due to increaser	0.000	
entrance =	0.000			
exit =	1.000	misc equiv len =	0.0	meter
misc. K =	0.000	final length l' =	6.4	meter
ΣK_1 =	1.442	pipe : f · l /d =	0.442	

$$K_2 = \frac{K_1}{\beta^4} = 7.370$$

corrected K of smaller diameter in terms of the larger pipe size...