

Cream Flow Rate (gal/min)	50
Cream Flow Rate (lbs/hr)	
Water Weight (lbs/gal)	8.34
Starting Temp (F)	60
Final Temp (F)	100
NEW Final Temp (F)	185
Specific Gravity Cream	0.91
Heat Capacity of Cream	0.49
Pressure Upstream P1	35
Pressure Downstream P2	30
Steam Latent Heat at P1	
Q is heat flow in BTU/hour	
Q existing	
Q total	
Q additional	
W is Steam flow rate lbs/hr	
W needed from additional	
Cv is unitless # to order valve	
Cv	

Complete the yellow highlighted cells with formulas to determine the Cv value that corresponds to the Flow coefficient chart to the right. The values from the student sheet are copied over to the given conditions. If your formulas are correct, your Cv value on the student sheet should match the Cv value in the excel template to the left. Use the template to answer each question below.

What valve would be needed if the Product Flow rate increased from 100 gal/min by 50%?

What is the maximum Product Flow rate in gal/min that would allow you to use the orginial designed control value?

What if the Dairy customer desired a higher rate of production and it is determined that a final cream temp of 185 degrees F would meet that demand. At the initial cream flow rate, would the Control Valve Size need to be increased?

What would be highest final temp we could raise the cream up to and not have to increase the size of the control valve?

Flow coefficients

Flow Characteristic

LV - Linear
 PV - Equal percentage
 MV - Modified parabolic
 1R, 2R, 3R, 4R - Low noise 1, 2, 3 and 4 stage
 1K, 2K, 3K – Anti-cavitation 1,2 and 3 stage

		Body size (inch)	Flow Coefficient - C _v			
			LV	PV	MV	1R
Flow coefficient - C _v Types 85-51 85-61 85-71	1"	19	17	11	18	
	1½"	38-23	34-22	20-12	18-33	
	2"	63-30	52-26	40-12	22-63	
	3"	130-88	118-57	120-32	38-125	
	4"	215-105	200-95	150-20	52-190	
	6"	410-155	390-140	310-64	350-104	
	8"	870-260	820-210	820-118	665-400	
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Specific Gravity Cream	0.91
Heat Capacity of Cream	0.49
Pressure Upstream P1	35
Pressure Downstream P2	30
Steam Latent Heat at P1	5
Q is heat flow in BTU/hour	
Q existing	501,564.00
Q total	
Q additional	1,567,387.50
W is Steam flow rate lbs/hr	
W needed from additional	1668.49851
Cv is unitless # to order valve	
Cv	44.07221194