Cv Calculation Sheet

No: 1 TAG NO: FV-3313 CASE: MAX

Flow rate:	13868	l/h	Fluid state:	FLASH	
Inlet Pressure:	25.5	barA	Model:	HTS	
Outlet pressure:	2.65	barA	Valve size:	1-1/2	inch
Diff. pressure		bar	Line size In/Out:	3 / 3	inch
Temperature:	-178.3	degC	Pipe Sch/ Thick:	10S / 3.05	mm
Sp.Gr. (liq.):	0.739	water=1	Saturated temp.:		degC
Sp.Gr. (gas,vapor):	1.25	air=1	KC:	0.9	
Viscosity:		cP			
Vapor pressure:		barA	Velocity:	3.38	m/s
Critical pressure:		barA	S.P.L.:	72	dBA
CP/CV , Z:			Calc. Cv:	3.309	
Flash:	5.04	%	Travel:	65	%

$$Cv(Liq) = \frac{11.56 \times 13.17m3/h \times Sqr(0.739)}{Sqr(2285kPa)} = 2.738$$

$$Cv(Gas) = \frac{339.3m3/h[S] \times Sqr(1.25 \times 94.8degK)}{2.538 \times 2550kPaA} = 0.5708$$

No: 1 TAG NO: FV-3313 CASE: NOR

Flow rate:	13497	l/h	Fluid state:	FLASH	
Inlet Pressure:	25.5	barA	Model:	HTS	
Outlet pressure:	2.65	barA	Valve size:	1-1/2	inch
Diff. pressure		bar	Line size In/Out:	3 / 3	inch
Temperature:	-178.3	degC	Pipe Sch/ Thick:	10S / 3.05	mm
Sp.Gr. (liq.):	0.739	water=1	Saturated temp.:		degC
Sp.Gr. (gas,vapor):	1.25	air=1	KC:	0.9	
Viscosity:		cP			
Vapor pressure:		barA	Velocity:	3.29	m/s
Critical pressure:		barA	S.P.L.:	72	dBA
CP/CV , Z:			Calc. Cv:	3.219	
Flash:	5.03	%	Travel:	65	%

$$Cv(Liq) = \frac{11.56 \times 12.82m3/h \times Sqr(0.739)}{Sqr(2285kPa)} = 2.665$$

$$Cv(Gas) = \frac{329.5m3/h[S] \times Sqr(1.25 \times 94.8degK)}{2.538 \times 2550kPaA} = 0.5544$$

No: 1 TAG NO: FV-3313 CASE: MIN

Flow rate:	8711	l/h	Fluid state:	FLASH	
Inlet Pressure:	25.5	barA	Model:	HTS	
Outlet pressure:	2.65	barA	Valve size:	1-1/2	inch
Diff. pressure		bar	Line size In/Out:	3 / 3	inch
Temperature:	-178.3	degC	Pipe Sch/ Thick:	10S / 3.05	mm
Sp.Gr. (liq.):	0.739	water=1	Saturated temp.:		degC
Sp.Gr. (gas,vapor):	1.25	air=1	KC:	0.9	
Viscosity:		cP			
Vapor pressure:		barA	Velocity:	2.12	m/s
Critical pressure:		barA	S.P.L.:	70	dBA
CP/CV , Z:			Calc. Cv:	2.078	
Flash:	5.04	%	Travel:	53	%

$$Cv(Liq) = \frac{11.56 \times 8.272m3/h \times Sqr(0.739)}{Sqr(2285kPa)} = 1.72$$

$$Cv(Gas) = \frac{213.1m3/h[S] \times Sqr(1.25 \times 94.8degK)}{2.538 \times 2550kPaA} = 0.3585$$

Cv Calculation Sheet

No: 2 TAG NO: FV-3314 CASE: MAX

Flow rate:	17208	l/h	Fluid state:	FLASH	
Inlet Pressure:	24.8	barA	Model:	HTS	
Outlet pressure:	2.65	barA	Valve size:	1-1/2	inch
Diff. pressure		bar	Line size In/Out:	3 / 3	inch
Temperature:	-178.3	degC	Pipe Sch/ Thick:	10S / 3.05	mm
Sp.Gr. (liq.):	0.739	water=1	Saturated temp.:		degC
Sp.Gr. (gas,vapor):	1.25	kg/m3[N]	KC:	0.89	
Viscosity:		cP			
Vapor pressure:		barA	Velocity:	4.19	m/s
Critical pressure:		barA	S.P.L.:	73	dBA
CP/CV , Z:			Calc. Cv:	4.278	
Flash:	5.04	%	Travel:	72	%

$$Cv(Liq) = \frac{11.56 \times 16.34 m^3/h \times \sqrt{0.739}}{\sqrt{2215 kPa}} = 3.45$$

$$Cv(Gas) = \frac{544.3 m^3/h[S] \times \sqrt{0.9667 \times 94.8 degK}}{2.538 \times 2480 kPaA} = 0.8281$$

No: 2 TAG NO: FV-3314 CASE: NOR

Flow rate:	15172	l/h	Fluid state:	FLASH	
Inlet Pressure:	24.8	barA	Model:	HTS	
Outlet pressure:	2.65	barA	Valve size:	1-1/2	inch
Diff. pressure		bar	Line size In/Out:	3 / 3	inch
Temperature:	-178.3	degC	Pipe Sch/ Thick:	10S / 3.05	mm
Sp.Gr. (liq.):	0.739	water=1	Saturated temp.:		degC
Sp.Gr. (gas,vapor):	1.25	kg/m3[N]	KC:	0.89	
Viscosity:		cP			
Vapor pressure:		barA	Velocity:	3.69	m/s
Critical pressure:		barA	S.P.L.:	72	dBA
CP/CV , Z:			Calc. Cv:	3.771	
Flash:	5.03	%	Travel:	68	%

$$Cv(Liq) = \frac{11.56 \times 14.41 m^3/h \times \sqrt{0.739}}{\sqrt{2215 kPa}} = 3.042$$

$$Cv(Gas) = \frac{478.9 m^3/h[S] \times \sqrt{0.9667 \times 94.8 degK}}{2.538 \times 2480 kPaA} = 0.7286$$

No: 2 TAG NO: FV-3314 CASE: MIN

Flow rate:	8297	l/h	Fluid state:	FLASH	
Inlet Pressure:	24.8	barA	Model:	HTS	
Outlet pressure:	2.65	barA	Valve size:	1-1/2	inch
Diff. pressure		bar	Line size In/Out:	3 / 3	inch
Temperature:	-178.3	degC	Pipe Sch/ Thick:	10S / 3.05	mm
Sp.Gr. (liq.):	0.739	water=1	Saturated temp.:		degC
Sp.Gr. (gas,vapor):	1.25	kg/m3[N]	KC:	0.89	
Viscosity:		cP			
Vapor pressure:		barA	Velocity:	2.02	m/s
Critical pressure:		barA	S.P.L.:	70	dBA
CP/CV , Z:			Calc. Cv:	2.063	
Flash:	5.04	%	Travel:	52	%

$$Cv(Liq) = \frac{11.56 \times 7.879 m^3/h \times \sqrt{0.739}}{\sqrt{2215 kPa}} = 1.664$$

$$Cv(Gas) = \frac{262.4 m^3/h[S] \times \sqrt{0.9667 \times 94.8 degK}}{2.538 \times 2480 kPaA} = 0.3993$$

Cv Calculation Sheet

No: 3	TAG NO:	FV-3331B	CASE:	MAX

Flow rate:	4738	m3/h[N]	Fluid state:	GAS		
Inlet Pressure:	27.33	barA	Model:	HTS		
Outlet pressure:	2.6	barA	Valve size:	2		inch
Diff. pressure		bar	Line size In/Out:	2	4	inch
Temperature:	11.6	degC	Pipe Sch/ Thick:	10S	3	mm
Sp.Gr. (liq.):		water=1	Saturated temp.:			degC
Sp.Gr. (gas,vapor):	1.25	kg/m3[N]	KC:		0.9	
Viscosity:		cP				
Vapor pressure:		barA	Velocity:	0.76		Mach
Critical pressure:		barA	S.P.L.:	97		dBA
CP/CV , Z:			Calc. Cv:	11.98		
Flash:	5.04	%	Travel:	76		%

$$Cv(Gas) = \frac{5008m3/h[S] \times Sqr(0.9667 \times 284.8degK) \times 1}{2.538 \times 2733kPaA} = 11.98$$

No: 3	TAG NO:	FV-3331B	CASE:	MIN

Flow rate:	460	m3/h[N]	Fluid state:	GAS		
Inlet Pressure:	27.33	barA	Model:	HTS		
Outlet pressure:	2.6	barA	Valve size:	2		inch
Diff. pressure		bar	Line size In/Out:	2	4	inch
Temperature:	5.5	degC	Pipe Sch/ Thick:	10S	3	mm
Sp.Gr. (liq.):		water=1	Saturated temp.:			degC
Sp.Gr. (gas,vapor):	1.25	kg/m3[N]	KC:		0.9	
Viscosity:		cP				
Vapor pressure:		barA	Velocity:	0.07		Mach
Critical pressure:		barA	S.P.L.:	78		dBA
CP/CV , Z:			Calc. Cv:	1.151		
Flash:	5.04	%	Travel:	19		%

$$Cv(Gas) = \frac{486.2m3/h[S] \times Sqr(0.9667 \times 278.7degK) \times 1}{2.538 \times 2733kPaA} = 1.151$$

No: 4	TAG NO:	FV-3350	CASE:	MAX

Flow rate:	2679	l/h	Fluid state:	LIQUID		
Inlet Pressure:	25.15	barA	Model:	HLS		
Outlet pressure:	4.19	barA	Valve size:	1		inch
Diff. pressure		bar	Line size In/Out:	1	1	inch
Temperature:	-144.7	degC	Pipe Sch/ Thick:	10S	2.77	mm
Sp.Gr. (liq.):	0.397	water=1	Saturated temp.:			degC
Sp.Gr. (gas,vapor):		kg/m3[N]	KC:		0.83	
Viscosity:		cP				
Vapor pressure:		barA	Velocity:	1.46		m/s
Critical pressure:		barA	S.P.L.:	72		dBA
CP/CV , Z:			Calc. Cv:	0.4262		
Flash:		%	Travel:	77		%

$$Cv(Liq) = \frac{11.56 \times 2.679m3/h \times Sqr(0.397) \times 1}{Sqr(2096kPa)} = 0.4262$$

Cv Calculation Sheet

No: 4	TAG NO:	FV-3350	CASE:	MIN

Flow rate:	1072	l/h	Fluid state:	LIQUID	
Inlet Pressure:	25.15	barA	Model:	HLS	
Outlet pressure:	4.19	barA	Valve size:	1	inch
Diff. pressure		bar	Line size In/Out:	1 / 1	inch
Temperature:	-144.7	degC	Pipe Sch/ Thick:	10S / 2.77	mm
Sp.Gr. (liq.):	0.397	water=1	Saturated temp.:		degC
Sp.Gr. (gas,vapor):		kg/m3[N]	KC:	0.83	
Viscosity:		cP			
Vapor pressure:		barA	Velocity:	0.58	m/s
Critical pressure:		barA	S.P.L.:	68	dBA
CP/CV , Z:			Calc. Cv:	0.1706	
Flash:		%	Travel:	52	%

$$Cv(Liq) = \frac{11.56 \times 1.072 m3/h \times Sqr(0.397) \times 1}{Sqr(2096 kPa)} = 0.1706$$

No: 5	TAG NO:	FV-3401	CASE:	MAX

Flow rate:	28343	l/h	Fluid state:	LIQUID	
Inlet Pressure:	24.7	barA	Model:	HTS	
Outlet pressure:	24.43	barA	Valve size:	3	inch
Diff. pressure		bar	Line size In/Out:	3 / 3	inch
Temperature:	-180	degC	Pipe Sch/ Thick:	10S / 3.05	mm
Sp.Gr. (liq.):	0.455	water=1	Saturated temp.:		degC
Sp.Gr. (gas,vapor):		kg/m3[N]	KC:	0.01	
Viscosity:		cP			
Vapor pressure:		barA	Velocity:	1.72	m/s
Critical pressure:		barA	S.P.L.:	49	dBA
CP/CV , Z:			Calc. Cv:	42.53	
Flash:		%	Travel:	72	%

$$Cv(Liq) = \frac{11.56 \times 28.34 m3/h \times Sqr(0.455) \times 1}{Sqr(27 kPa)} = 42.53$$

No: 5	TAG NO:	FV-3401	CASE:	NOR

Flow rate:	27477	l/h	Fluid state:	LIQUID	
Inlet Pressure:	24.7	barA	Model:	HTS	
Outlet pressure:	24.43	barA	Valve size:	3	inch
Diff. pressure		bar	Line size In/Out:	3 / 3	inch
Temperature:	-180	degC	Pipe Sch/ Thick:	10S / 3.05	mm
Sp.Gr. (liq.):	0.455	water=1	Saturated temp.:		degC
Sp.Gr. (gas,vapor):		kg/m3[N]	KC:	0.01	
Viscosity:		cP			
Vapor pressure:		barA	Velocity:	1.67	m/s
Critical pressure:		barA	S.P.L.:	49	dBA
CP/CV , Z:			Calc. Cv:	41.23	
Flash:		%	Travel:	71	%

$$Cv(Liq) = \frac{11.56 \times 27.48 m3/h \times Sqr(0.455) \times 1}{Sqr(27 kPa)} = 41.23$$

Cv Calculation Sheet

No: 5	TAG NO:	FV-3401	CASE:	MIN

Flow rate:	19840	l/h	Fluid state:	LIQUID	
Inlet Pressure:	24.7	barA	Model:	HTS	
Outlet pressure:	24.43	barA	Valve size:	3	inch
Diff. pressure		bar	Line size In/Out:	3 / 3	inch
Temperature:	-180	degC	Pipe Sch/ Thick:	10S / 3.05	mm
Sp.Gr. (liq.):	0.455	water=1	Saturated temp.:		degC
Sp.Gr. (gas,vapor):		kg/m3[N]	KC:	0.01	
Viscosity:		cP			
Vapor pressure:		barA	Velocity:	1.2	m/s
Critical pressure:		barA	S.P.L.:	47	dBA
CP/CV , Z:			Calc. Cv:	29.77	
Flash:		%	Travel:	63	%

$$Cv(Liq) = \frac{11.56 \times 19.84 m3/h \times Sqr(0.455) \times 1}{Sqr(27kPa)} = 29.77$$

No: 6	TAG NO:	FV-3503	CASE:	MAX

Flow rate:	2064	l/h	Fluid state:	FLASH	
Inlet Pressure:	25	barA	Model:	HLS	
Outlet pressure:	2.65	barA	Valve size:	1	inch
Diff. pressure		bar	Line size In/Out:	1-1/2 / 1-1/2	inch
Temperature:	-180	degC	Pipe Sch/ Thick:	10S / 2.77	mm
Sp.Gr. (liq.):	0.739	water=1	Saturated temp.:		degC
Sp.Gr. (gas,vapor):	1.25	kg/m3[N]	KC:	0.89	
Viscosity:		cP			
Vapor pressure:		barA	Velocity:	1.13	m/s
Critical pressure:		barA	S.P.L.:	65	dBA
CP/CV , Z:			Calc. Cv:	0.4812	
Flash:	3.15	%	Travel:	80	%

$$Cv(Liq) = \frac{11.56 \times 1.999 m3/h \times Sqr(0.739)}{Sqr(2235kPa)} = 0.4202$$

$$Cv(Gas) = \frac{40.8 m3/h[S] \times Sqr(0.9667 \times 93.1 degK)}{2.538 \times 2500 kPaA} = 0.06103$$

No: 6	TAG NO:	FV-3503	CASE:	MIN

Flow rate:	1274	l/h	Fluid state:	FLASH	
Inlet Pressure:	25	barA	Model:	HLS	
Outlet pressure:	2.65	barA	Valve size:	1	inch
Diff. pressure		bar	Line size In/Out:	1-1/2 / 1-1/2	inch
Temperature:	-180	degC	Pipe Sch/ Thick:	10S / 2.77	mm
Sp.Gr. (liq.):	0.739	water=1	Saturated temp.:		degC
Sp.Gr. (gas,vapor):	1.25	kg/m3[N]	KC:	0.89	
Viscosity:		cP			
Vapor pressure:		barA	Velocity:	0.69	m/s
Critical pressure:		barA	S.P.L.:	64	dBA
CP/CV , Z:			Calc. Cv:	0.2971	
Flash:	3.16	%	Travel:	67	%

$$Cv(Liq) = \frac{11.56 \times 1.234 m3/h \times Sqr(0.739)}{Sqr(2235kPa)} = 0.2593$$

$$Cv(Gas) = \frac{25.27 m3/h[S] \times Sqr(0.9667 \times 93.1 degK)}{2.538 \times 2500 kPaA} = 0.03779$$

Cv Calculation Sheet

No: 7	TAG NO:	FV-3535	CASE:	MAX

Flow rate:	11833	l/h	Fluid state:	LIQUID		
Inlet Pressure:	3.17	barA	Model:	HTS		
Outlet pressure:	3.05	barA	Valve size:	2		inch
Diff. pressure		bar	Line size In/Out:	3	3	inch
Temperature:	-182.2	degC	Pipe Sch/ Thick:	10S	3.05	mm
Sp.Gr. (liq.):	0.739	water=1	Saturated temp.:			degC
Sp.Gr. (gas,vapor):		kg/m3[N]	KC:	0.04		
Viscosity:		cP				
Vapor pressure:		barA	Velocity:	1.62		m/s
Critical pressure:		barA	S.P.L.:	48		dBA
CP/CV , Z:			Calc. Cv:	33.95		
Flash:		%	Travel:	90		%

$$Cv(Liq) = \frac{11.56 \times 11.83 m3/h \times Sqr(0.739) \times 1}{Sqr(12kPa)} = 33.95$$

No: 7	TAG NO:	FV-3535	CASE:	NOR

Flow rate:	10370	l/h	Fluid state:	LIQUID		
Inlet Pressure:	3.24	barA	Model:	HTS		
Outlet pressure:	3.05	barA	Valve size:	2		inch
Diff. pressure		bar	Line size In/Out:	3	3	inch
Temperature:	-182.2	degC	Pipe Sch/ Thick:	10S	3.05	mm
Sp.Gr. (liq.):	0.739	water=1	Saturated temp.:			degC
Sp.Gr. (gas,vapor):		kg/m3[N]	KC:	0.06		
Viscosity:		cP				
Vapor pressure:		barA	Velocity:	1.42		m/s
Critical pressure:		barA	S.P.L.:	49		dBA
CP/CV , Z:			Calc. Cv:	23.64		
Flash:		%	Travel:	78		%

$$Cv(Liq) = \frac{11.56 \times 10.37 m3/h \times Sqr(0.739) \times 1}{Sqr(19kPa)} = 23.64$$

No: 7	TAG NO:	FV-3535	CASE:	MIN

Flow rate:	7575	l/h	Fluid state:	LIQUID		
Inlet Pressure:	3.24	barA	Model:	HTS		
Outlet pressure:	3.05	barA	Valve size:	2		inch
Diff. pressure		bar	Line size In/Out:	3	3	inch
Temperature:	-182.2	degC	Pipe Sch/ Thick:	10S	3.05	mm
Sp.Gr. (liq.):	0.739	water=1	Saturated temp.:			degC
Sp.Gr. (gas,vapor):		kg/m3[N]	KC:	0.06		
Viscosity:		cP				
Vapor pressure:		barA	Velocity:	1.03		m/s
Critical pressure:		barA	S.P.L.:	48		dBA
CP/CV , Z:			Calc. Cv:	17.27		
Flash:		%	Travel:	69		%

$$Cv(Liq) = \frac{11.56 \times 7.575 m3/h \times Sqr(0.739) \times 1}{Sqr(19kPa)} = 17.27$$

Cv Calculation Sheet

No: 8 TAG NO: FV-3560 CASE: MAX

Flow rate:	14536	l/h	Fluid state:	LIQUID		
Inlet Pressure:	2.71	barA	Model:	HTS		
Outlet pressure:	2.65	barA	Valve size:	3		inch
Diff. pressure		bar	Line size In/Out:	3	3	inch
Temperature:	-148.3	degC	Pipe Sch/ Thick:	10S	3.05	mm
Sp.Gr. (liq.):	0.403	water=1	Saturated temp.:			degC
Sp.Gr. (gas,vapor):		kg/m3[N]	KC:	0.02		
Viscosity:		cP				
Vapor pressure:		barA	Velocity:	0.88		m/s
Critical pressure:		barA	S.P.L.:	45		dBA
CP/CV , Z:			Calc. Cv:	43.55		
Flash:		%	Travel:	73		%

$$Cv(Liq) = \frac{11.56 \times 14.54 m3/h \times Sqr(0.403) \times 1}{Sqr(6kPa)} = 43.55$$

No: 8 TAG NO: FV-3560 CASE: NOR

Flow rate:	9676	l/h	Fluid state:	LIQUID		
Inlet Pressure:	2.73	barA	Model:	HTS		
Outlet pressure:	2.63	barA	Valve size:	3		inch
Diff. pressure		bar	Line size In/Out:	3	3	inch
Temperature:	-148.3	degC	Pipe Sch/ Thick:	10S	3.05	mm
Sp.Gr. (liq.):	0.403	water=1	Saturated temp.:			degC
Sp.Gr. (gas,vapor):		kg/m3[N]	KC:	0.04		
Viscosity:		cP				
Vapor pressure:		barA	Velocity:	0.58		m/s
Critical pressure:		barA	S.P.L.:	45		dBA
CP/CV , Z:			Calc. Cv:	22.45		
Flash:		%	Travel:	55		%

$$Cv(Liq) = \frac{11.56 \times 9.676 m3/h \times Sqr(0.403) \times 1}{Sqr(10kPa)} = 22.45$$

No: 8 TAG NO: FV-3560 CASE: MIN

Flow rate:	2225	l/h	Fluid state:	LIQUID		
Inlet Pressure:	2.79	barA	Model:	HTS		
Outlet pressure:	2.67	barA	Valve size:	3		inch
Diff. pressure		bar	Line size In/Out:	3	3	inch
Temperature:	-148.3	degC	Pipe Sch/ Thick:	10S	3.05	mm
Sp.Gr. (liq.):	0.403	water=1	Saturated temp.:			degC
Sp.Gr. (gas,vapor):		kg/m3[N]	KC:	0.04		
Viscosity:		cP				
Vapor pressure:		barA	Velocity:	0.13		m/s
Critical pressure:		barA	S.P.L.:	40		dBA
CP/CV , Z:			Calc. Cv:	4.714		
Flash:		%	Travel:	18		%

$$Cv(Liq) = \frac{11.56 \times 2.225 m3/h \times Sqr(0.403) \times 1}{Sqr(12kPa)} = 4.714$$

Cv Calculation Sheet

No: 9 TAG NO: FV-3715 CASE: NOR

Flow rate:	15323	l/h	Fluid state:	LIQUID		
Inlet Pressure:	25.53	barA	Model:	HTS		
Outlet pressure:	2.68	barA	Valve size:	2		inch
Diff. pressure		bar	Line size In/Out:	4	4	inch
Temperature:	-144.7	degC	Pipe Sch/ Thick:	10S	3.05	mm
Sp.Gr. (liq.):	0.554	water=1	Saturated temp.:			degC
Sp.Gr. (gas,vapor):		kg/m3[N]	KC:	0.9		
Viscosity:		cP				
Vapor pressure:		barA	Velocity:	2.1		m/s
Critical pressure:		barA	S.P.L.:	81		dBA
CP/CV , Z:			Calc. Cv:	2.758		
Flash:		%	Travel:	61		%

$$Cv(Liq) = \frac{11.56 \times 15.32m3/h \times Sqr(0.554) \times 1}{Sqr(2285kPa)} = 2.758$$

No: 10 TAG NO: FV-3725 CASE: NOR

Flow rate:	15323	l/h	Fluid state:	LIQUID		
Inlet Pressure:	25.53	barA	Model:	HTS		
Outlet pressure:	2.68	barA	Valve size:	2		inch
Diff. pressure		bar	Line size In/Out:	4	4	inch
Temperature:	-144.7	degC	Pipe Sch/ Thick:	10S	3.05	mm
Sp.Gr. (liq.):	0.554	water=1	Saturated temp.:			degC
Sp.Gr. (gas,vapor):		kg/m3[N]	KC:	0.9		
Viscosity:		cP				
Vapor pressure:		barA	Velocity:	2.1		m/s
Critical pressure:		barA	S.P.L.:	81		dBA
CP/CV , Z:			Calc. Cv:	2.758		
Flash:		%	Travel:	61		%

$$Cv(Liq) = \frac{11.56 \times 15.32m3/h \times Sqr(0.554) \times 1}{Sqr(2285kPa)} = 2.758$$

No: 11 TAG NO: FV-3883 CASE: MAX

Flow rate:	13614	l/h	Fluid state:	FLASH		
Inlet Pressure:	25.4	barA	Model:	HTS		
Outlet pressure:	2.65	barA	Valve size:	1-1/2		inch
Diff. pressure		bar	Line size In/Out:	3	3	inch
Temperature:	-180	degC	Pipe Sch/ Thick:	10S	3.05	mm
Sp.Gr. (liq.):	0.739	water=1	Saturated temp.:			degC
Sp.Gr. (gas,vapor):	1.25	kg/m3[N]	KC:	0.9		
Viscosity:		cP				
Vapor pressure:		barA	Velocity:	3.31		m/s
Critical pressure:		barA	S.P.L.:	72		dBA
CP/CV , Z:			Calc. Cv:	3.143		
Flash:	3.15	%	Travel:	64		%

$$Cv(Liq) = \frac{11.56 \times 13.19m3/h \times Sqr(0.739)}{Sqr(2275kPa)} = 2.747$$

$$Cv(Gas) = \frac{269.1m3/h[S] \times Sqr(0.9667 \times 93.1degK)}{2.538 \times 2540kPaA} = 0.3962$$

Cv Calculation Sheet

No: 11 TAG NO: FV-3883 CASE: MIN

Flow rate:	10246	l/h	Fluid state:	FLASH		
Inlet Pressure:	25.4	barA	Model:	HTS		
Outlet pressure:	2.65	barA	Valve size:	1-1/2		inch
Diff. pressure		bar	Line size In/Out:	3	3	inch
Temperature:	-180	degC	Pipe Sch/ Thick:	10S	3.05	mm
Sp.Gr. (liq.):	0.739	water=1	Saturated temp.:			degC
Sp.Gr. (gas,vapor):	1.25	kg/m3[N]	KC:		0.9	
Viscosity:		cP				
Vapor pressure:		barA	Velocity:	2.49		m/s
Critical pressure:		barA	S.P.L.:	71		dBA
CP/CV , Z:			Calc. Cv:	2.366		
Flash:	3.16	%	Travel:	56		%

$$Cv(Liq) = \frac{11.56 \times 9.922 m^3/h \times \sqrt{0.739}}{\sqrt{2275 kPa}} = 2.067$$

$$Cv(Gas) = \frac{203.2 m^3/h[S] \times \sqrt{0.9667 \times 93.1 degK}}{2.538 \times 2540 kPaA} = 0.2991$$

No: 12 TAG NO: HV-3381 CASE: MAX

Flow rate:	6000	m3/h[N]	Fluid state:	GAS		
Inlet Pressure:	27.07	barA	Model:	HTS		
Outlet pressure:	2.85	barA	Valve size:	2		inch
Diff. pressure		bar	Line size In/Out:			inch
Temperature:	-139.5	degC	Pipe Sch/ Thick:	10S		mm
Sp.Gr. (liq.):		water=1	Saturated temp.:			degC
Sp.Gr. (gas,vapor):	1.25	kg/m3[N]	KC:		0.89	
Viscosity:		cP				
Vapor pressure:		barA	Velocity:	0.6		Mach
Critical pressure:		barA	S.P.L.:			dBA
CP/CV , Z:			Calc. Cv:	10.49		
Flash:	3.15	%	Travel:	72		%

$$Cv(Gas) = \frac{6342 m^3/h[S] \times \sqrt{0.9667 \times 133.7 degK} \times 1}{2.538 \times 2707 kPaA} = 10.49$$

No: 12 TAG NO: HV-3381 CASE: NOR

Flow rate:	3000	m3/h[N]	Fluid state:	GAS		
Inlet Pressure:	27.07	barA	Model:	HTS		
Outlet pressure:	2.85	barA	Valve size:	2		inch
Diff. pressure		bar	Line size In/Out:			inch
Temperature:	-139.5	degC	Pipe Sch/ Thick:	10S		mm
Sp.Gr. (liq.):		water=1	Saturated temp.:			degC
Sp.Gr. (gas,vapor):	1.25	kg/m3[N]	KC:		0.89	
Viscosity:		cP				
Vapor pressure:		barA	Velocity:	0.3		Mach
Critical pressure:		barA	S.P.L.:			dBA
CP/CV , Z:			Calc. Cv:	5.246		
Flash:		%	Travel:	54		%

$$Cv(Gas) = \frac{3171 m^3/h[S] \times \sqrt{0.9667 \times 133.7 degK} \times 1}{2.538 \times 2707 kPaA} = 5.246$$

Cv Calculation Sheet

No: 12	TAG NO:	HV-3381	CASE:	MIN

Flow rate:	900	m3/h[N]	Fluid state:	GAS	
Inlet Pressure:	27.07	barA	Model:	HTS	
Outlet pressure:	2.85	barA	Valve size:	2	inch
Diff. pressure		bar	Line size In/Out:		inch
Temperature:	-139.5	degC	Pipe Sch/ Thick:	10S	mm
Sp.Gr. (liq.):		water=1	Saturated temp.:		degC
Sp.Gr. (gas,vapor):	1.25	kg/m3[N]	KC:	0.89	
Viscosity:		cP			
Vapor pressure:		barA	Velocity:	0.09	Mach
Critical pressure:		barA	S.P.L.:		dBA
CP/CV , Z:			Calc. Cv:	1.574	
Flash:		%	Travel:	26	%

$$Cv(Gas) = \frac{951.3m3/h[S] \times Sqr(0.9667 \times 133.7degK) \times 1}{2.538 \times 2707kPaA} = 1.574$$

No: 13	TAG NO:	HV-3428	CASE:	MAX

Flow rate:	8062	l/h	Fluid state:	FLASH	
Inlet Pressure:	23.85	barA	Model:	HTS	
Outlet pressure:	8.11	barA	Valve size:	1-1/2	inch
Diff. pressure		bar	Line size In/Out:	3 1-1/2	inch
Temperature:	-180	degC	Pipe Sch/ Thick:	2.77	mm
Sp.Gr. (liq.):	0.627	water=1	Saturated temp.:		degC
Sp.Gr. (gas,vapor):	1	kg/m3[N]	KC:	0.66	
Viscosity:		cP			
Vapor pressure:		barA	Velocity:	1.96	m/s
Critical pressure:		barA	S.P.L.:	67	dBA
CP/CV , Z:			Calc. Cv:	2.032	
Flash:	3.04	%	Travel:	52	%

$$Cv(Liq) = \frac{11.56 \times 7.817m3/h \times Sqr(0.627)}{Sqr(1574kPa)} = 1.804$$

$$Cv(Gas) = \frac{163.1m3/h[S] \times Sqr(0.7734 \times 93.1degK)}{2.538 \times 2385kPaA} = 0.2287$$

No: 13	TAG NO:	HV-3428	CASE:	MIN

Flow rate:	1613	l/h	Fluid state:	FLASH	
Inlet Pressure:	23.85	barA	Model:	HTS	
Outlet pressure:	8.11	barA	Valve size:	1-1/2	inch
Diff. pressure		bar	Line size In/Out:	3 1-1/2	inch
Temperature:	-180	degC	Pipe Sch/ Thick:	2.77	mm
Sp.Gr. (liq.):	0.629	water=1	Saturated temp.:		degC
Sp.Gr. (gas,vapor):	1	kg/m3[N]	KC:	0.66	
Viscosity:		cP			
Vapor pressure:		barA	Velocity:	0.39	m/s
Critical pressure:		barA	S.P.L.:	62	dBA
CP/CV , Z:			Calc. Cv:	0.4134	
Flash:	3.57	%	Travel:	15	%

$$Cv(Liq) = \frac{11.56 \times 1.555m3/h \times Sqr(0.629)}{Sqr(1574kPa)} = 0.3594$$

$$Cv(Gas) = \frac{38.45m3/h[S] \times Sqr(0.7734 \times 93.1degK)}{2.538 \times 2385kPaA} = 0.05391$$

Cv Calculation Sheet

No: 14 TAG NO: HV-3540 CASE: NOR

Flow rate:	9578	l/h	Fluid state:	FLASH		
Inlet Pressure:	5.5	barA	Model:	HTS		
Outlet pressure:	4.2	barA	Valve size:	1-1/2		inch
Diff. pressure		bar	Line size In/Out:	1-1/2	1-1/2	inch
Temperature:	-178	degC	Pipe Sch/ Thick:	10S	2.77	mm
Sp.Gr. (liq.):	0.718	water=1	Saturated temp.:			degC
Sp.Gr. (gas,vapor):	1.25	kg/m3[N]	KC:	0.24		
Viscosity:		cP				
Vapor pressure:		barA	Velocity:	2.33		m/s
Critical pressure:		barA	S.P.L.:	52		dBA
CP/CV , Z:			Calc. Cv:	12.79		
Flash:	10	%	Travel:	64		%

$$Cv(Liq) = \frac{11.56 \times 8.62m3/h \times Sqr(0.718)}{Sqr(130kPa)} = 7.406$$

$$Cv(Gas) = \frac{584m3/h[S] \times Sqr(0.9667 \times 95.1degK)}{2.930 \times Sqr(130kPa \times (550kPaA + 420kPaA))} = 5.384$$

No: 15 TAG NO: LV-3316 CASE: MAX

Flow rate:	31890	l/h	Fluid state:	LIQUID		
Inlet Pressure:	3.73	barA	Model:	HTS		
Outlet pressure:	2.65	barA	Valve size:	3		inch
Diff. pressure		bar	Line size In/Out:	6	6	inch
Temperature:	-182.2	degC	Pipe Sch/ Thick:	10S	3.4	mm
Sp.Gr. (liq.):	0.739	water=1	Saturated temp.:			degC
Sp.Gr. (gas,vapor):		kg/m3[N]	KC:	0.29		
Viscosity:		cP				
Vapor pressure:		barA	Velocity:	1.94		m/s
Critical pressure:		barA	S.P.L.:	61		dBA
CP/CV , Z:			Calc. Cv:	30.49		
Flash:		%	Travel:	73		%

$$Cv(Liq) = \frac{11.56 \times 31.89m3/h \times Sqr(0.739) \times 1}{Sqr(108kPa)} = 30.49$$

No: 15 TAG NO: LV-3316 CASE: NOR

Flow rate:	29760	l/h	Fluid state:	LIQUID		
Inlet Pressure:	3.73	barA	Model:	HTS		
Outlet pressure:	2.65	barA	Valve size:	3		inch
Diff. pressure		bar	Line size In/Out:	6	6	inch
Temperature:	-182.2	degC	Pipe Sch/ Thick:	10S	3.4	mm
Sp.Gr. (liq.):	0.739	water=1	Saturated temp.:			degC
Sp.Gr. (gas,vapor):		kg/m3[N]	KC:	0.29		
Viscosity:		cP				
Vapor pressure:		barA	Velocity:	1.81		m/s
Critical pressure:		barA	S.P.L.:	61		dBA
CP/CV , Z:			Calc. Cv:	28.46		
Flash:		%	Travel:	71		%

$$Cv(Liq) = \frac{11.56 \times 29.76m3/h \times Sqr(0.739) \times 1}{Sqr(108kPa)} = 28.46$$

Cv Calculation Sheet

No: 15 TAG NO: LV-3316 CASE: MIN

Flow rate:	18331	l/h	Fluid state:	LIQUID		
Inlet Pressure:	3.73	barA	Model:	HTS		
Outlet pressure:	2.36	barA	Valve size:	3		inch
Diff. pressure		bar	Line size In/Out:	6	6	inch
Temperature:	-182.2	degC	Pipe Sch/ Thick:	10S	3.4	mm
Sp.Gr. (liq.):	0.739	water=1	Saturated temp.:			degC
Sp.Gr. (gas,vapor):		kg/m3[N]	KC:	0.37		
Viscosity:		cP				
Vapor pressure:		barA	Velocity:	1.11		m/s
Critical pressure:		barA	S.P.L.:	61		dBA
CP/CV , Z:			Calc. Cv:	15.56		
Flash:		%	Travel:	55		%

$$Cv(Liq) = \frac{11.56 \times 18.33 m3/h \times Sqr(0.739) \times 1}{Sqr(137 kPa)} = 15.56$$

No: 16 TAG NO: LV-3420 CASE: MAX

Flow rate:	32932	l/h	Fluid state:	FLASH		
Inlet Pressure:	23.85	barA	Model:	HTS		
Outlet pressure:	10.82	barA	Valve size:	3		inch
Diff. pressure		bar	Line size In/Out:	6	3	inch
Temperature:	-180	degC	Pipe Sch/ Thick:		3.05	mm
Sp.Gr. (liq.):	0.626	water=1	Saturated temp.:			degC
Sp.Gr. (gas,vapor):	1	kg/m3[N]	KC:	0.55		
Viscosity:		cP				
Vapor pressure:		barA	Velocity:	2		m/s
Critical pressure:		barA	S.P.L.:	71		dBA
CP/CV , Z:			Calc. Cv:	9.01		
Flash:	2.98	%	Travel:	78		%

$$Cv(Liq) = \frac{11.56 \times 31.95 m3/h \times Sqr(0.626)}{Sqr(1303 kPa)} = 8.096$$

$$Cv(Gas) = \frac{652.2 m3/h[S] \times Sqr(0.7734 \times 93.1 degK)}{2.538 \times 2385 kPaA} = 0.9145$$

No: 16 TAG NO: LV-3420 CASE: NOR

Flow rate:	26485	l/h	Fluid state:	FLASH		
Inlet Pressure:	23.86	barA	Model:	HTS		
Outlet pressure:	9.42	barA	Valve size:	3		inch
Diff. pressure		bar	Line size In/Out:	6	3	inch
Temperature:	-180	degC	Pipe Sch/ Thick:		3.05	mm
Sp.Gr. (liq.):	0.613	water=1	Saturated temp.:			degC
Sp.Gr. (gas,vapor):	0.98	kg/m3[N]	KC:	0.61		
Viscosity:		cP				
Vapor pressure:		barA	Velocity:	1.61		m/s
Critical pressure:		barA	S.P.L.:	71		dBA
CP/CV , Z:			Calc. Cv:	6.829		
Flash:	2.88	%	Travel:	70		%

$$Cv(Liq) = \frac{11.56 \times 25.72 m3/h \times Sqr(0.613)}{Sqr(1444 kPa)} = 6.127$$

$$Cv(Gas) = \frac{506.5 m3/h[S] \times Sqr(0.7579 \times 93.1 degK)}{2.538 \times 2386 kPaA} = 0.7028$$

Cv Calculation Sheet

No: 16 TAG NO: LV-3420 CASE: MIN

Flow rate:	6571	l/h	Fluid state:	FLASH		
Inlet Pressure:	23.85	barA	Model:	HTS		
Outlet pressure:	7.22	barA	Valve size:	3		inch
Diff. pressure		bar	Line size In/Out:	6	3	inch
Temperature:	-180	degC	Pipe Sch/ Thick:		3.05	mm
Sp.Gr. (liq.):	0.630	water=1	Saturated temp.:			degC
Sp.Gr. (gas,vapor):	1	kg/m3[N]	KC:	0.7		
Viscosity:		cP				
Vapor pressure:		barA	Velocity:	0.4		m/s
Critical pressure:		barA	S.P.L.:	67		dBA
CP/CV , Z:			Calc. Cv:	1.642		
Flash:	3.5	%	Travel:	36		%

$$Cv(Liq) = \frac{11.56 \times 6.341 m3/h \times Sqr(0.63)}{Sqr(1663 kPa)} = 1.427$$

$$Cv(Gas) = \frac{153.8 m3/h[S] \times Sqr(0.7734 \times 93.1 degK)}{2.538 \times 2385 kPaA} = 0.2157$$

No: 17 TAG NO: LV-3421 CASE: MAX

Flow rate:	40971	l/h	Fluid state:	FLASH		
Inlet Pressure:	24.11	barA	Model:	HTS		
Outlet pressure:	10.18	barA	Valve size:	3		inch
Diff. pressure		bar	Line size In/Out:	6	4	inch
Temperature:	-177.1	degC	Pipe Sch/ Thick:		3.05	mm
Sp.Gr. (liq.):	0.536	water=1	Saturated temp.:			degC
Sp.Gr. (gas,vapor):	0.85	kg/m3[N]	KC:	0.58		
Viscosity:		cP				
Vapor pressure:		barA	Velocity:	2.49		m/s
Critical pressure:		barA	S.P.L.:	72		dBA
CP/CV , Z:			Calc. Cv:	9.864		
Flash:	2.18	%	Travel:	71		%

$$Cv(Liq) = \frac{11.56 \times 40.08 m3/h \times Sqr(0.536)}{Sqr(1393 kPa)} = 9.088$$

$$Cv(Gas) = \frac{597.9 m3/h[S] \times Sqr(0.6574 \times 96 degK)}{2.538 \times 2411 kPaA} = 0.7764$$

No: 17 TAG NO: LV-3421 CASE: NOR

Flow rate:	40382	l/h	Fluid state:	FLASH		
Inlet Pressure:	24.11	barA	Model:	HTS		
Outlet pressure:	9.18	barA	Valve size:	3		inch
Diff. pressure		bar	Line size In/Out:	6	4	inch
Temperature:	-176.9	degC	Pipe Sch/ Thick:		3.05	mm
Sp.Gr. (liq.):	0.539	water=1	Saturated temp.:			degC
Sp.Gr. (gas,vapor):	0.86	kg/m3[N]	KC:	0.62		
Viscosity:		cP				
Vapor pressure:		barA	Velocity:	2.46		m/s
Critical pressure:		barA	S.P.L.:	72		dBA
CP/CV , Z:			Calc. Cv:	9.458		
Flash:	2.24	%	Travel:	70		%

$$Cv(Liq) = \frac{11.56 \times 39.48 m3/h \times Sqr(0.539)}{Sqr(1493 kPa)} = 8.671$$

$$Cv(Gas) = \frac{601.8 m3/h[S] \times Sqr(0.6651 \times 96.3 degK)}{2.538 \times 2411 kPaA} = 0.7869$$

Cv Calculation Sheet

No: 17 TAG NO: LV-3421 CASE: MIN

Flow rate:	26422	l/h	Fluid state:	FLASH	
Inlet Pressure:	24.13	barA	Model:	HTS	
Outlet pressure:	6.97	barA	Valve size:	3	inch
Diff. pressure		bar	Line size In/Out:	6 / 4	inch
Temperature:	-174.8	degC	Pipe Sch/ Thick:	3.05	mm
Sp.Gr. (liq.):	0.51	water=1	Saturated temp.:		degC
Sp.Gr. (gas,vapor):	0.82	kg/m3[N]	KC:	0.71	
Viscosity:		cP			
Vapor pressure:		barA	Velocity:	1.61	m/s
Critical pressure:		barA	S.P.L.:	71	dBA
CP/CV , Z:			Calc. Cv:	5.66	
Flash:	2.29	%	Travel:	55	%

$$Cv(Liq) = \frac{11.56 \times 25.82m3/h \times Sqr(0.51)}{Sqr(1716kPa)} = 5.145$$

$$Cv(Gas) = \frac{399.5m3/h[S] \times Sqr(0.6342 \times 98.3degK)}{2.538 \times 2413kPaA} = 0.5152$$

No: 18 TAG NO: LV-3422 CASE: MAX

Flow rate:	7829	l/h	Fluid state:	FLASH	
Inlet Pressure:	25.6	barA	Model:	HTS	
Outlet pressure:	2.65	barA	Valve size:	1-1/2	inch
Diff. pressure		bar	Line size In/Out:	2 / 3	inch
Temperature:	-178.3	degC	Pipe Sch/ Thick:	10S / 3.05	mm
Sp.Gr. (liq.):	0.739	water=1	Saturated temp.:		degC
Sp.Gr. (gas,vapor):	0.966	kg/m3[N]	KC:	0.9	
Viscosity:		cP			
Vapor pressure:		barA	Velocity:	1.9	m/s
Critical pressure:		barA	S.P.L.:	70	dBA
CP/CV , Z:			Calc. Cv:	1.957	
Flash:	5.04	%	Travel:	51	%

$$Cv(Liq) = \frac{11.56 \times 7.434m3/h \times Sqr(0.739)}{Sqr(2295kPa)} = 1.542$$

$$Cv(Gas) = \frac{320.4m3/h[S] \times Sqr(0.7471 \times 94.8degK)}{2.538 \times 2560kPaA} = 0.4152$$

No: 18 TAG NO: LV-3422 CASE: NOR

Flow rate:	7974	l/h	Fluid state:	FLASH	
Inlet Pressure:	25.6	barA	Model:	HTS	
Outlet pressure:	2.65	barA	Valve size:	1-1/2	inch
Diff. pressure		bar	Line size In/Out:	2 / 3	inch
Temperature:	-178.3	degC	Pipe Sch/ Thick:	10S / 3.05	mm
Sp.Gr. (liq.):	0.739	water=1	Saturated temp.:		degC
Sp.Gr. (gas,vapor):	0.966	kg/m3[N]	KC:	0.9	
Viscosity:		cP			
Vapor pressure:		barA	Velocity:	1.94	m/s
Critical pressure:		barA	S.P.L.:	70	dBA
CP/CV , Z:			Calc. Cv:	1.993	
Flash:	5.03	%	Travel:	52	%

$$Cv(Liq) = \frac{11.56 \times 7.573m3/h \times Sqr(0.739)}{Sqr(2295kPa)} = 1.571$$

$$Cv(Gas) = \frac{325.7m3/h[S] \times Sqr(0.7471 \times 94.8degK)}{2.538 \times 2560kPaA} = 0.422$$

Cv Calculation Sheet

No: 18	TAG NO:	LV-3422	CASE:	MIN

Flow rate:	3733	l/h	Fluid state:	FLASH		
Inlet Pressure:	25.6	barA	Model:	HTS		
Outlet pressure:	2.65	barA	Valve size:	1-1/2		inch
Diff. pressure		bar	Line size In/Out:	2	3	inch
Temperature:	-178.3	degC	Pipe Sch/ Thick:	10S	3.05	mm
Sp.Gr. (liq.):	0.739	water=1	Saturated temp.:			degC
Sp.Gr. (gas,vapor):	0.966	kg/m3[N]	KC:	0.9		
Viscosity:		cP				
Vapor pressure:		barA	Velocity:	0.91		m/s
Critical pressure:		barA	S.P.L.:	68		dBA
CP/CV , Z:			Calc. Cv:	0.9333		
Flash:	5.04	%	Travel:	35		%

$$Cv(Liq) = \frac{11.56 \times 3.545m3/h \times Sqr(0.739)}{Sqr(2295kPa)} = 0.7353$$

$$Cv(Gas) = \frac{152.8m3/h[S] \times Sqr(0.7471 \times 94.8degK)}{2.538 \times 2560kPaA} = 0.198$$

No: 19	TAG NO:	LV-3423A	CASE:	MAX

Flow rate:	44056	l/h	Fluid state:	LIQUID		
Inlet Pressure:	7.1	barA	Model:	HTS		
Outlet pressure:	2.65	barA	Valve size:	3		inch
Diff. pressure		bar	Line size In/Out:	6	6	inch
Temperature:	-180	degC	Pipe Sch/ Thick:		3.4	mm
Sp.Gr. (liq.):	0.572	water=1	Saturated temp.:			degC
Sp.Gr. (gas,vapor):		kg/m3[N]	KC:	0.63		
Viscosity:		cP				
Vapor pressure:		barA	Velocity:	2.68		m/s
Critical pressure:		barA	S.P.L.:	80		dBA
CP/CV , Z:			Calc. Cv:	18.26		
Flash:		%	Travel:	71		%

$$Cv(Liq) = \frac{11.56 \times 44.06m3/h \times Sqr(0.572) \times 1}{Sqr(445kPa)} = 18.26$$

No: 19	TAG NO:	LV-3423A	CASE:	NOR

Flow rate:	41845	l/h	Fluid state:	LIQUID		
Inlet Pressure:	8.09	barA	Model:	HTS		
Outlet pressure:	2.65	barA	Valve size:	3		inch
Diff. pressure		bar	Line size In/Out:	6	6	inch
Temperature:	-180	degC	Pipe Sch/ Thick:		3.4	mm
Sp.Gr. (liq.):	0.577	water=1	Saturated temp.:			degC
Sp.Gr. (gas,vapor):		kg/m3[N]	KC:	0.67		
Viscosity:		cP				
Vapor pressure:		barA	Velocity:	2.55		m/s
Critical pressure:		barA	S.P.L.:	81		dBA
CP/CV , Z:			Calc. Cv:	15.75		
Flash:		%	Travel:	67		%

$$Cv(Liq) = \frac{11.56 \times 41.85m3/h \times Sqr(0.577) \times 1}{Sqr(544kPa)} = 15.75$$

Cv Calculation Sheet

No: 19	TAG NO:	LV-3423A	CASE:	MIN

Flow rate:	22339	l/h	Fluid state:	LIQUID		
Inlet Pressure:	7.94	barA	Model:	HTS		
Outlet pressure:	2.65	barA	Valve size:	3		inch
Diff. pressure		bar	Line size In/Out:	6	6	inch
Temperature:	-180	degC	Pipe Sch/ Thick:		3.4	mm
Sp.Gr. (liq.):	0.55	water=1	Saturated temp.:			degC
Sp.Gr. (gas,vapor):		kg/m3[N]	KC:	0.67		
Viscosity:		cP				
Vapor pressure:		barA	Velocity:	1.36		m/s
Critical pressure:		barA	S.P.L.:	78		dBA
CP/CV , Z:			Calc. Cv:	8.327		
Flash:		%	Travel:	51		%

$$Cv(Liq) = \frac{11.56 \times 22.34 m3/h \times Sqr(0.55) \times 1}{Sqr(529kPa)} = 8.327$$

No: 20	TAG NO:	LV-3423B	CASE:	MAX

Flow rate:	27190	l/h	Fluid state:	LIQUID		
Inlet Pressure:	7.99	barA	Model:	HTS		
Outlet pressure:	2.8	barA	Valve size:	2		inch
Diff. pressure		bar	Line size In/Out:	3	3	inch
Temperature:	-180	degC	Pipe Sch/ Thick:		3.05	mm
Sp.Gr. (liq.):	0.594	water=1	Saturated temp.:			degC
Sp.Gr. (gas,vapor):		kg/m3[N]	KC:	0.65		
Viscosity:		cP				
Vapor pressure:		barA	Velocity:	3.72		m/s
Critical pressure:		barA	S.P.L.:	79		dBA
CP/CV , Z:			Calc. Cv:	10.63		
Flash:		%	Travel:	73		%

$$Cv(Liq) = \frac{11.56 \times 27.19 m3/h \times Sqr(0.594) \times 1}{Sqr(519kPa)} = 10.63$$

No: 20	TAG NO:	LV-3423B	CASE:	NOR

Flow rate:	22583	l/h	Fluid state:	LIQUID		
Inlet Pressure:	8.6	barA	Model:	HTS		
Outlet pressure:	2.8	barA	Valve size:	2		inch
Diff. pressure		bar	Line size In/Out:	3	3	inch
Temperature:	-180	degC	Pipe Sch/ Thick:		3.05	mm
Sp.Gr. (liq.):	0.577	water=1	Saturated temp.:			degC
Sp.Gr. (gas,vapor):		kg/m3[N]	KC:	0.67		
Viscosity:		cP				
Vapor pressure:		barA	Velocity:	3.09		m/s
Critical pressure:		barA	S.P.L.:	78		dBA
CP/CV , Z:			Calc. Cv:	8.234		
Flash:		%	Travel:	66		%

$$Cv(Liq) = \frac{11.56 \times 22.58 m3/h \times Sqr(0.577) \times 1}{Sqr(580kPa)} = 8.234$$

Cv Calculation Sheet

No: 20	TAG NO:	LV-3423B	CASE:	MIN

Flow rate:	10794	l/h	Fluid state:	LIQUID		
Inlet Pressure:	8.42	barA	Model:	HTS		
Outlet pressure:	2.8	barA	Valve size:	2		inch
Diff. pressure		bar	Line size In/Out:	3	3	inch
Temperature:	-180	degC	Pipe Sch/ Thick:		3.05	mm
Sp.Gr. (liq.):	0.55	water=1	Saturated temp.:			degC
Sp.Gr. (gas,vapor):		kg/m3[N]	KC:	0.67		
Viscosity:		cP				
Vapor pressure:		barA	Velocity:	1.48		m/s
Critical pressure:		barA	S.P.L.:	75		dBA
CP/CV , Z:			Calc. Cv:	3.903		
Flash:		%	Travel:	48		%

$$Cv(Liq) = \frac{11.56 \times 10.79m3/h \times Sqr(0.55) \times 1}{Sqr(562kPa)} = 3.903$$

No: 21	TAG NO:	PV-3406A	CASE:	MAX

Flow rate:	1680	m3/h[N]	Fluid state:	GAS		
Inlet Pressure:	8.5	barA	Model:	HLS		
Outlet pressure:	2.71	barA	Valve size:	1		inch
Diff. pressure		bar	Line size In/Out:	2	2	inch
Temperature:	-176.5	degC	Pipe Sch/ Thick:		2.77	mm
Sp.Gr. (liq.):		water=1	Saturated temp.:			degC
Sp.Gr. (gas,vapor):	0.35	kg/m3[N]	KC:	0.68		
Viscosity:		cP				
Vapor pressure:		barA	Velocity:	0.32		Mach
Critical pressure:		barA	S.P.L.:	70		dBA
CP/CV , Z:			Calc. Cv:	4.21		
Flash:		%	Travel:	76		%

$$Cv(Gas) = \frac{1776m3/h[S] \times Sqr(0.2707 \times 96.6degK) \times 1}{2.538 \times 850kPaA} = 4.21$$

No: 21	TAG NO:	PV-3406A	CASE:	NOR

Flow rate:	1509	m3/h[N]	Fluid state:	GAS		
Inlet Pressure:	9.1	barA	Model:	HLS		
Outlet pressure:	2.71	barA	Valve size:	1		inch
Diff. pressure		bar	Line size In/Out:	2	2	inch
Temperature:	-176.5	degC	Pipe Sch/ Thick:		2.77	mm
Sp.Gr. (liq.):		water=1	Saturated temp.:			degC
Sp.Gr. (gas,vapor):	0.34	kg/m3[N]	KC:	0.7		
Viscosity:		cP				
Vapor pressure:		barA	Velocity:	0.28		Mach
Critical pressure:		barA	S.P.L.:	69		dBA
CP/CV , Z:			Calc. Cv:	3.482		
Flash:		%	Travel:	71		%

$$Cv(Gas) = \frac{1595m3/h[S] \times Sqr(0.263 \times 96.6degK) \times 1}{2.538 \times 910kPaA} = 3.482$$

Cv Calculation Sheet

No: 21	TAG NO:	PV-3406A	CASE:	MIN

Flow rate:	741	m3/h[N]	Fluid state:	GAS		
Inlet Pressure:	8.9	barA	Model:	HLS		
Outlet pressure:	2.71	barA	Valve size:	1		inch
Diff. pressure		bar	Line size In/Out:	2	2	inch
Temperature:	-174.3	degC	Pipe Sch/ Thick:		2.77	mm
Sp.Gr. (liq.):		water=1	Saturated temp.:			degC
Sp.Gr. (gas,vapor):	0.35	kg/m3[N]	KC:	0.7		
Viscosity:		cP				
Vapor pressure:		barA	Velocity:	0.14		Mach
Critical pressure:		barA	S.P.L.:	63		dBA
CP/CV , Z:			Calc. Cv:	1.794		
Flash:		%	Travel:	53		%

$$Cv(Gas) = \frac{783.2 m3/h[S] \times Sqr(0.2707 \times 98.8 degK) \times 1}{2.538 \times 890 kPaA} = 1.794$$

No: 22	TAG NO:	PV-3406B	CASE:	NOR

Flow rate:	15593	m3/h[N]	Fluid state:	GAS		
Inlet Pressure:	12	barA	Model:	HTS		
Outlet pressure:	1.2	barA	Valve size:	4		inch
Diff. pressure		bar	Line size In/Out:	4	6	inch
Temperature:	-166.6	degC	Pipe Sch/ Thick:		3.4	mm
Sp.Gr. (liq.):		water=1	Saturated temp.:			degC
Sp.Gr. (gas,vapor):	1.25	kg/m3[N]	KC:	0.9		
Viscosity:		cP				
Vapor pressure:		barA	Velocity:	0.83		Mach
Critical pressure:		barA	S.P.L.:	104		dBA
CP/CV , Z:			Calc. Cv:	54.92		
Flash:		%	Travel:	64		%

$$Cv(Gas) = \frac{16482 m3/h[S] \times Sqr(0.9667 \times 106.5 degK) \times 1}{2.538 \times 1200 kPaA} = 54.92$$

No: 23	TAG NO:	PV-3531A	CASE:	MAX

Flow rate:	16899	m3/h[N]	Fluid state:	GAS		
Inlet Pressure:	4	barA	Model:	HTS		
Outlet pressure:	1.2	barA	Valve size:	6		inch
Diff. pressure		bar	Line size In/Out:	6	10	inch
Temperature:	-150	degC	Pipe Sch/ Thick:	10S	4	mm
Sp.Gr. (liq.):		water=1	Saturated temp.:			degC
Sp.Gr. (gas,vapor):	0.96	kg/m3[N]	KC:	0.7		
Viscosity:		cP				
Vapor pressure:		barA	Velocity:	0.38		Mach
Critical pressure:		barA	S.P.L.:	102		dBA
CP/CV , Z:			Calc. Cv:	168.2		
Flash:		%	Travel:	83		%

$$Cv(Gas) = \frac{17862 m3/h[S] \times Sqr(0.7425 \times 123.1 degK) \times 1}{2.538 \times 400 kPaA} = 168.2$$

Cv Calculation Sheet

No: 23	TAG NO:	PV-3531A	CASE:	NOR

Flow rate:	14088	m3/h[N]	Fluid state:	GAS		
Inlet Pressure:	4	barA	Model:	HTS		
Outlet pressure:	1.2	barA	Valve size:	6		inch
Diff. pressure		bar	Line size In/Out:	6	10	inch
Temperature:	-150	degC	Pipe Sch/ Thick:	10S	4	mm
Sp.Gr. (liq.):		water=1	Saturated temp.:			degC
Sp.Gr. (gas,vapor):	0.93	kg/m3[N]	KC:	0.7		
Viscosity:		cP				
Vapor pressure:		barA	Velocity:	0.31		Mach
Critical pressure:		barA	S.P.L.:	100		dBA
CP/CV , Z:			Calc. Cv:	138		
Flash:		%	Travel:	76		%

$$Cv(Gas) = \frac{14891 m3/h[S] \times Sqr(0.7193 \times 123.1 degK) \times 1}{2.538 \times 400 kPaA} = 138$$

No: 23	TAG NO:	PV-3531A	CASE:	MIN

Flow rate:	6765	m3/h[N]	Fluid state:	GAS		
Inlet Pressure:	4	barA	Model:	HTS		
Outlet pressure:	1.2	barA	Valve size:	6		inch
Diff. pressure		bar	Line size In/Out:	6	10	inch
Temperature:	-150	degC	Pipe Sch/ Thick:	10S	4	mm
Sp.Gr. (liq.):		water=1	Saturated temp.:			degC
Sp.Gr. (gas,vapor):	0.88	kg/m3[N]	KC:	0.7		
Viscosity:		cP				
Vapor pressure:		barA	Velocity:	0.14		Mach
Critical pressure:		barA	S.P.L.:	94		dBA
CP/CV , Z:			Calc. Cv:	64.48		
Flash:		%	Travel:	55		%

$$Cv(Gas) = \frac{7151 m3/h[S] \times Sqr(0.6806 \times 123.1 degK) \times 1}{2.538 \times 400 kPaA} = 64.48$$

No: 24	TAG NO:	SV-3640	CASE:	MAX

Flow rate:	4738	m3/h[N]	Fluid state:	GAS		
Inlet Pressure:	27.33	barA	Model:	HTS		
Outlet pressure:	27.14	barA	Valve size:	3		inch
Diff. pressure		bar	Line size In/Out:	3	3	inch
Temperature:	11.6	degC	Pipe Sch/ Thick:	10S	3	mm
Sp.Gr. (liq.):		water=1	Saturated temp.:			degC
Sp.Gr. (gas,vapor):	1.25	kg/m3[N]	KC:	0.01		
Viscosity:		cP				
Vapor pressure:		barA	Velocity:	0.03		Mach
Critical pressure:		barA	S.P.L.:	59		dBA
CP/CV , Z:			Calc. Cv:	88.15		
Flash:		%	Travel:	81		%

$$Cv(Gas) = \frac{5008 m3/h[S] \times Sqr(0.9667 \times 284.8 degK) \times 1}{2.930 \times Sqr(19 kPa \times (2733 kPaA + 2714 kPaA))} = 88.15$$

Cv Calculation Sheet

No: 24	TAG NO:	SV-3640	CASE:	NOR

Flow rate:	3635	m3/h[N]	Fluid state:	GAS		
Inlet Pressure:	27.33	barA	Model:	HTS		
Outlet pressure:	20.26	barA	Valve size:	3		inch
Diff. pressure		bar	Line size In/Out:	3	3	inch
Temperature:	-5.8	degC	Pipe Sch/ Thick:	10S	3	mm
Sp.Gr. (liq.):		water=1	Saturated temp.:			degC
Sp.Gr. (gas,vapor):	1.25	kg/m3[N]	KC:		0.26	
Viscosity:		cP				
Vapor pressure:		barA	Velocity:	0.03		Mach
Critical pressure:		barA	S.P.L.:	74		dBA
CP/CV , Z:			Calc. Cv:	11.49		
Flash:		%	Travel:	25		%

$$Cv(Gas) = \frac{3842m3/h[S] \times Sqr(0.9667 \times 267.3degK) \times 1}{2.930 \times Sqr(707kPa \times (2733kPaA + 2026kPaA))} = 11.49$$

No: 24	TAG NO:	SV-3640	CASE:	MIN

Flow rate:	2850	m3/h[N]	Fluid state:	GAS		
Inlet Pressure:	27.33	barA	Model:	HTS		
Outlet pressure:	16.2	barA	Valve size:	3		inch
Diff. pressure		bar	Line size In/Out:	3	3	inch
Temperature:	5.5	degC	Pipe Sch/ Thick:	10S	3	mm
Sp.Gr. (liq.):		water=1	Saturated temp.:			degC
Sp.Gr. (gas,vapor):	1.25	kg/m3[N]	KC:		0.41	
Viscosity:		cP				
Vapor pressure:		barA	Velocity:	0.03		Mach
Critical pressure:		barA	S.P.L.:	78		dBA
CP/CV , Z:			Calc. Cv:	7.666		
Flash:		%	Travel:	20		%

$$Cv(Gas) = \frac{3012m3/h[S] \times Sqr(0.9667 \times 278.7degK) \times 1}{2.930 \times Sqr(1113kPa \times (2733kPaA + 1620kPaA))} = 7.666$$

No: 25	TAG NO:	TDV-3510	CASE:	MAX

Flow rate:	1400	m3/h[N]	Fluid state:	GAS		
Inlet Pressure:	5.5	barA	Model:	HTS		
Outlet pressure:	1.27	barA	Valve size:	1-1/2		inch
Diff. pressure		bar	Line size In/Out:	1-1/2	1-1/2	inch
Temperature:	-178	degC	Pipe Sch/ Thick:	10S	2.8	mm
Sp.Gr. (liq.):		water=1	Saturated temp.:			degC
Sp.Gr. (gas,vapor):	1.25	kg/m3[N]	KC:		0.77	
Viscosity:		cP				
Vapor pressure:		barA	Velocity:	0.47		Mach
Critical pressure:		barA	S.P.L.:	72		dBA
CP/CV , Z:			Calc. Cv:	10.17		
Flash:		%	Travel:	82		%

$$Cv(Gas) = \frac{1480m3/h[S] \times Sqr(0.9667 \times 95.1degK) \times 1}{2.538 \times 550kPaA} = 10.17$$

Cv Calculation Sheet

No: 25 TAG NO: TDV-3510(FLASH CV Calcuration) CASE: MAX

Flow rate:	2435	l/h	Fluid state:	FLASH	
Inlet Pressure:	5.5	barA	Model:	HTS	
Outlet pressure:	1.27	barA	Valve size:	1-1/2	inch
Diff. pressure		bar	Line size In/Out:		inch
Temperature:	-178	degC	Pipe Sch/ Thick:		mm
Sp.Gr. (liq.):	0.803	water=1	Saturated temp.:		degC
Sp.Gr. (gas,vapor):	1.25	kg/m3[N]	KC:	0.77	
Viscosity:		cP			
Vapor pressure:		barA	Velocity:	0.59	m/s
Critical pressure:		barA	S.P.L.:	57	dBA
CP/CV , Z:			Calc. Cv:	3.069	
Flash:	18.1	%	Travel:	50	%

$$Cv(Liq) = \frac{11.56 \times 1.994\text{m3/h} \times \text{Sqr}(0.803)}{\text{Sqr}(423\text{kPa})} = 1.004$$

$$Cv(Gas) = \frac{300.6\text{m3/h[S]} \times \text{Sqr}(0.9667 \times 95.1\text{degK})}{2.538 \times 550\text{kPaA}} = 2.065$$