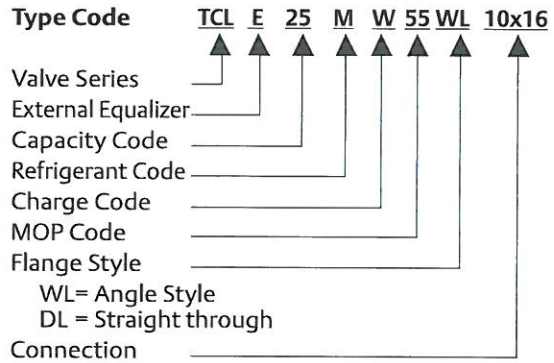


# Thermo™-Expansion Valve Series T

Exchangeable Power Assemblies and Orifices

## Features

- Modular design for economical logistics and easy assembly and servicing
- Very good stability is attained because of the large forces generated by the large diaphragm diameter
- High-quality materials and processes for high reliability and long lifetime
- Superior partial load performance due to double seat orifice design (TJRE, TERE, TIRE & THRE)
- Biflow capability for applications in heat pumps
- Capillary tube length 1.5 m (TCLE, TJRE) and 3m (TERE, TIRE & THRE)
- PS: 46 / 31 bar with XB / XC power assembly.
- TS: -45 ... +65°C
- No CE marking according art. 3.3 PED 97/23 EC



## Selection Chart for Orifices

Series	R134a		R404A/R507		R407C		R407A/R407F			R410A		Orifice
	Type	Nom. Cap. kW	Type	Nom. Cap. kW	Type	Nom. Cap. kW	Type	Nom. Cap. kW (407A)	Nom. Cap. kW (407F)	Type	Nom. Cap. kW	
TCLE	25 MW	1.5	25 SW	1.3	50 NW	2.1	50 NW/25 SW40	1.9	2.1	50ZW	2.2	X 22440-B1B
	75 MW	2.9	75 SW	2.6	100 NW	4.0	100 NW/75 SW40	3.6	4.1	100ZW	4.3	X 22440-B2B
	150 MW	6.1	150 SW	5.6	200 NW	8.5	200 NW / 150 SW40	7.8	8.8	250ZW	9.2	X 22440-B3B
	200 MW	9.3	200 SW	8.4	300 NW	12.9	300 NW / 200 SW40	11.7	13.3	400ZW	13.9	X 22440-B3.5B
	250 MW	13.5	250 SW	12.2	400 NW	18.7	400 NW / 250 SW40	17	19.3	600ZW	20.2	X 22440-B4B
	350 MW	17.3	400 SW	15.7	550 NW	24.0	550 NW / 400 SW40	21.9	24.8	750ZW	25.9	X 22440-B5B
	550 MW	23.6	600 SW	21.5	750 NW	32.9	750 NW / 600 SW40	29.9	34	1000ZW	35.5	X 22440-B6B
	750 MW	32.0	850 SW	29.0	1000 NW	44.4	1000 NW / 850 SW40	40.5	45.9	1400ZW	48.0	X 22440-B7B
	900 MW	37.2	1000 SW	33.8	1150 NW	51.7	1150 NW / 1000 SW40	47	53	1600ZW	55.8	X 22440-B8B
TJRE	11 MW	45	12 SW	40	14 NW	62	14 NW / 12 SW40	57	65	19ZW	67.7	X 11873-B4B
	13 MW	57	14 SW	51	17 NW	80	17 NW / 14 SW40	73	83	25ZW	86.4	X 11873-B5B
TERE	16 MW	71	18 SW	63	21 NW	99	21 NW / 18 SW40	90	102	-	-	X 91117-B6B
	19 MW	81	20 SW	72	25 NW	112	25 NW / 20 SW40	102	116	-	-	X 91117-B7B
	25 MW	112	27 SW	99	33 NW	155	33 NW / 27 SW40	141	160	-	-	X 91117-B8B
	31 MW	135	34 SW	120	42 NW	188	42 NW / 34 SW40	171	194	-	-	X 91117-B9B
TIRE	45 MW	174	47 SW	154	52 NW	241	52 NW / 47 SW40	219	249	-	-	X 9166-B10B
THRE	55 MW	197	61 SW	174	71 NW	273	71 NW / 61 SW40	249	283	-	-	X 9144-B11B
	68 MW	236	77 SW	209	94 NW	327	94 NW / 77 SW40	297	338	-	-	X 9144-B13B

MOP		Evaporating Temperature Range °C				
Code	bar	R134a MW	R404A SW	R407C NW	R507 SW	R410 ZW
35	2.4	-45 .. 0				
40	2.8		-45 .. -18		-45 .. -18	
55	3.8	-45 .. 11	-45 .. -10		-45 .. -10	
65	4.5					
75	5.2		-45 .. -2		-45 .. -2	
80	5.5		-45 .. 0		-45 .. 0	
100	6.9			-45 .. 14		
175	12.1					-45 .. 16

Nominal capacity ( $Q_n$ ) is based on the following conditions:

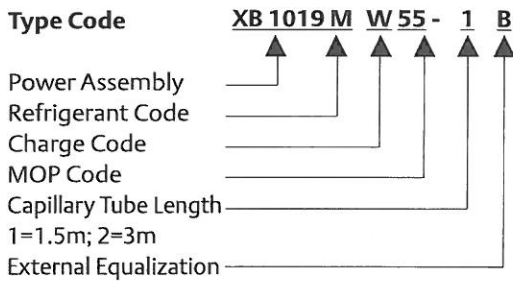
Refrigerant	Evaporating temperature	Condensing temperature	Subcooling
R407C	+4°C dew point	+38°C bubble point +43°C dew point	1K
R134a, R410A	+4°C	+38°C	1K

Valve selection for other operating conditions see "Correction Tables for Thermo-Expansion Valves Series TI, TX3, TX6, T and L" or use the "Controls Navigator" selection tool (download from [www.emersonclimate.eu](http://www.emersonclimate.eu)).

**Available upon special request:**

- Power assembly with solder connection for external pressure equalization
- Non-standard MOPs
- Non-standard charges
- Non-standard connection sizes. See last page of this chapter

**Type Code**



**Selection Chart for Power Assemblies and Recommended Flanges**

Orifice	Connection Standard-Flange. Angle (see last page of this chapter) Solder/ODF		Power Assembly
	mm	inch	
X 22440-B1B	C 501 - 5 mm 10 x 16	C 501 - 5 3/8 x 3/8	XB1019...1B
X 22440-B2B			
X 22440-B3B			
X 22440-B3.5B			
X 22440-B4B			
X 22440-B5B	C 501 - 7 mm 12 x 16	C 501 - 7 1/2 x 5/8	
X 22440-B6B			
X 22440-B7B	A 576 mm 16 x 22 (22 x 28 ODM)	A 576 3/8 x 3/8 (3/8 x 1 1/8 ODM)	
X 22440-B8B			
X 11873-B4B	10331 22 x 22	10331 3/8 x 3/8 (1 1/8 x 1 1/8 ODM)	
X 11873-B5B			
X 9117-B6B	9153 mm 22 x 22	9153 3/8 x 3/8 (1 1/8 x 1 1/8 ODM)	XC726...2B
X 9117-B7B			
X 9117-B8B			
X 9117-B9B			
X 9166-B10B			
X 9144-B11B	9149 22 x 22	9149 3/8 x 3/8 (1 1/8 x 1 1/8 ODM)	
X 9144-B13B			

**Spare Parts**

	Type	Part No.
Gasket Set for T Series Valves	X 13455 -1	027 579
Service Tool for T Series Valves	X 99999	800 005
Steel screws for following flange types: C501, 9761, 6346, A576 9148, 9149, 9152, 9153, 10331, 10332	Screw ST 32 Screw ST 48	803 573 803 574

# Correction Tables for Thermo™-Expansion Valves Series TI, TX3, TX6, T and L

Valve selection for operating conditions other than nominal conditions:

$$Q_n = Q_o \times K_t \times K_{\Delta p}$$

$Q_n$ : Nominal valve capacity

$K_t$ : Correction factor for evaporating and liquid temperature

$Q_o$ : Required cooling capacity

$K_{\Delta p}$ : Correction factor for pressure drop at valve

Liquid Temperature entering Valve °C	R410A				Correction Factor $k_t$ Evaporating Temperature (°C)											
	+20	+15	+10	+5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45		
+65	1.75	1.76	1.78	1.80	1.83	1.86	1.89	2.18	2.55	3.05	3.69	4.49	5.46	6.62		
+60	1.49	1.50	1.51	1.53	1.54	1.57	1.59	1.83	2.14	2.55	3.08	3.73	4.52	5.45		
+55	1.31	1.32	1.33	1.35	1.36	1.38	1.40	1.61	1.87	2.23	2.68	3.25	3.92	4.72		
+50	1.19	1.20	1.20	1.21	1.23	1.24	1.26	1.44	1.68	2.00	2.40	2.90	3.49	4.20		
+45	1.01	1.09	1.10	1.11	1.12	1.13	1.15	1.32	1.53	1.82	2.18	2.63	3.17	3.80		
+40	0.94	1.01	1.02	1.03	1.04	1.05	1.06	1.21	1.41	1.67	2.01	2.41	2.90	3.48		
+35	0.88	0.94	0.95	0.96	0.97	0.98	0.99	1.13	1.31	1.55	1.86	2.24	2.69	3.21		
+30	0.83	0.89	0.89	0.90	0.91	0.91	0.92	1.06	1.22	1.45	1.74	2.09	2.50	2.99		
+25		0.84	0.84	0.85	0.85	0.86	0.87	0.99	1.15	1.36	1.63	1.96	2.35	2.80		
+20		0.79	0.80	0.80	0.81	0.81	0.82	0.94	1.09	1.29	1.54	1.84	2.21	2.64		
	Correction Factor $k_{\Delta p}$															
$\Delta p$ (bar)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
$K_{\Delta p}$	3.74	2.65	2.16	1.87	1.67	1.53	1.41	1.32	1.25	1.18	1.13	1.08	1.04	1.00	0.97	0.94
$\Delta p$ (bar)	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
$K_{\Delta p}$	0.91	0.88	0.86	0.84	0.82	0.80	0.78	0.76	0.75	0.73	0.72	0.71	0.69	0.68	0.67	0.66
Liquid Temperature entering Valve °C	R134a				Correction Factor $k_t$ Evaporating Temperature (°C)											
	+30	+25	+20	+15	+10	+5	0	-5	-10	-15	-20	-25	-30			
+60	1.22	1.25	1.27	1.30	1.33	1.36	1.40	1.44	1.48	1.75	2.08	2.46	2.94			
+55	1.14	1.16	1.18	1.21	1.23	1.26	1.29	1.33	1.36	1.60	1.90	2.25	2.68			
+50	1.07	1.08	1.10	1.13	1.15	1.17	1.20	1.23	1.26	1.48	1.76	2.07	2.46			
+45	1.00	1.02	1.04	1.06	1.08	1.10	1.12	1.15	1.17	1.38	1.63	1.92	2.28			
+40	0.93	0.96	0.98	0.99	1.01	1.03	1.05	1.08	1.10	1.29	1.52	1.79	2.12			
+35	0.90	0.91	0.92	0.94	0.96	0.97	0.99	1.01	1.03	1.21	1.43	1.68	1.99			
+30	0.85	0.86	0.88	0.89	0.91	0.92	0.94	0.96	0.98	1.14	1.35	1.58	1.87			
+25		0.82	0.83	0.85	0.86	0.87	0.89	0.91	0.92	1.08	1.27	1.49	1.76			
+20			0.80	0.81	0.82	0.83	0.85	0.89	0.88	1.02	1.21	1.41	1.67			
+15				0.77	0.78	0.79	0.81	0.82	0.84	0.97	1.15	1.34	1.58			
+10					0.75	0.76	0.77	0.78	0.80	0.93	1.09	1.28	1.51			
+5						0.73	0.74	0.75	0.76	0.89	1.04	1.22	1.44			
0							0.71	0.72	0.73	0.85	1.00	1.17	1.37			
-5								0.69	0.70	0.82	0.96	1.12	1.31			
-10									0.68	0.79	0.92	1.07	1.26			
	Correction Factor $k_{\Delta p}$															
$\Delta p$ (bar)	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0
$K_{\Delta p}$	3.50	2.48	2.02	1.75	1.57	1.43	1.32	1.24	1.17	1.11	1.06	1.01	0.97	0.94	0.90	0.88
$\Delta p$ (bar)	8.5	9.0	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0	13.5	14.0	14.5	15.0	15.5	16.0
$K_{\Delta p}$	0.85	0.83	0.80	0.78	0.76	0.75	0.73	0.72	0.69	0.66	0.64	0.62	0.60	0.58	0.57	0.55

In cases of subcooling of more than 15K please additionally use the correction factors on first page of this chapter.

Liquid Temperature entering Valve °C	R404A				Correction Factor $k_t$ Evaporating Temperature (°C)											
	+30	+25	+20	+15	+10	+5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
+60	1.56	1.59	1.64	1.69	1.74	1.81	1.88	1.96	2.06	2.43	2.95	3.56	4.37	5.38	6.71	8.47
+55	1.32	1.35	1.38	1.42	1.46	1.50	1.55	1.61	1.68	1.96	2.36	2.83	3.43	4.16	5.12	6.34
+50	1.16	1.18	1.20	1.23	1.26	1.30	1.34	1.38	1.43	1.67	1.99	2.37	2.85	3.43	4.18	5.14
+45	1.04	1.05	1.07	1.10	1.12	1.15	1.18	1.22	1.26	1.46	1.74	2.05	2.46	2.95	3.57	4.35
+40	0.94	0.96	0.97	0.99	1.02	1.04	1.07	1.09	1.13	1.30	1.55	1.82	2.17	2.59	3.13	3.80
+35	0.87	0.88	0.90	0.91	0.93	0.95	0.97	1.00	1.02	1.18	1.40	1.64	1.96	2.33	2.80	3.38
+30	0.81	0.82	0.83	0.84	0.86	0.88	0.90	0.92	0.94	1.08	1.28	1.50	1.78	2.11	2.53	3.05
+25		0.76	0.77	0.79	0.80	0.82	0.83	0.85	0.87	1.00	1.18	1.39	1.64	1.94	2.32	2.79
+20			0.73	0.74	0.75	0.77	0.78	0.80	0.81	0.94	1.10	1.29	1.52	1.80	2.15	2.58
+15				0.70	0.71	0.72	0.73	0.75	0.76	0.88	1.03	1.21	1.42	1.68	2.00	2.40
+10					0.67	0.68	0.69	0.71	0.72	0.83	0.97	1.13	1.34	1.58	1.88	2.25
+5						0.65	0.66	0.67	0.68	0.78	0.92	1.07	1.26	1.49	1.77	2.11
0							0.63	0.64	0.65	0.75	0.88	1.02	1.20	1.41	1.67	2.00
-5								0.61	0.62	0.71	0.83	0.97	1.14	1.34	1.59	1.90
-10									0.60	0.68	0.80	0.93	1.09	1.28	1.52	1.81
	Correction Factor $k_{\Delta p}$															
$\Delta p$ (bar)	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	8.0	9.0
$K_{\Delta p}$	4.55	3.21	2.62	2.27	2.03	1.86	1.72	1.61	1.52	1.44	1.37	1.31	1.26	1.21	1.14	1.07
$\Delta p$ (bar)	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0
$K_{\Delta p}$	1.02	0.97	0.93	0.89	0.86	0.83	0.80	0.78	0.76	0.74	0.72	0.70	0.69	0.67	0.66	0.64

In cases of subcooling of more than 15K please additionally use the correction factors on first page of this chapter.

Liquid Temperature entering Valve °C	R407C				Correction Factor $k_t$ Evaporating Temperature (°C)											
	+30	+25	+20	+15	+10	+5	0	-5	-10	-15	-20	-25				
+55	1.20	1.21	1.23	1.26	1.28	1.31	1.34	1.37	1.40	1.63	1.98	2.42				
+50	1.10	1.11	1.13	1.15	1.17	1.19	1.22	1.24	1.27	1.48	1.79	2.18				
+45	1.02	1.03	1.05	1.06	1.08	1.10	1.12	1.14	1.17	1.35	1.64	2.00				
+40	0.95	0.96	0.98	0.99	1.01	1.02	1.04	1.06	1.08	1.25	1.52	1.84				
+35	0.89	0.90	0.92	0.93	0.94	0.96	0.98	0.99	1.01	1.17	1.41	1.71				
+30	0.85	0.85	0.87	0.88	0.89	0.90	0.92	0.93	0.95	1.10	1.32	1.60				
+25		0.81	0.82	0.83	0.84	0.85	0.87	0.88	0.90	1.03	1.25	1.51				
+20			0.78	0.79	0.80	0.81	0.82	0.84	0.85	0.98	1.18	1.43				
+15				0.75	0.76	0.77	0.78	0.80	0.81	0.93	1.12	1.35				
+10					0.73	0.74	0.75	0.76	0.77	0.89	1.07	1.29				
+5						0.71	0.72	0.73	0.74	0.85	1.02	1.23				
0							0.69	0.70	0.71	0.81	0.98	1.18				
-5								0.67	0.68	0.78	0.94	1.13				
-10									0.65	0.75	0.90	1.08				
Correction Factor $k_{\Delta p}$																
$\Delta p$ (bar)	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	8.0	9.0
$K_{\Delta p}$	4.78	3.33	2.72	2.36	2.11	1.92	1.78	1.67	1.57	1.49	1.42	1.36	1.31	1.26	1.18	1.11
$\Delta p$ (bar)	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0
$K_{\Delta p}$	1.05	1.01	0.96	0.92	0.89	0.86	0.83	0.81	0.79	0.76	0.75	0.73	0.71	0.70	0.68	0.67

Liquid Temperature entering Valve °C	R507				Correction Factor $k_t$ Evaporating Temperature (°C)											
	+30	+25	+20	+15	+10	+5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
+60	1.54	1.57	1.61	1.65	1.71	1.76	1.83	1.90	1.98	2.36	2.84	3.44	4.23	5.25	6.61	8.45
+55	1.30	1.33	1.36	1.39	1.43	1.47	1.52	1.57	1.62	1.92	2.29	2.75	3.35	4.11	5.11	6.44
+50	1.15	1.17	1.19	1.22	1.24	1.28	1.31	1.35	1.40	1.64	1.95	2.33	2.81	3.43	4.23	5.29
+45	1.03	1.05	1.07	1.09	1.11	1.14	1.17	1.20	1.23	1.45	1.71	2.04	2.45	2.97	3.64	4.53
+40	0.94	0.96	0.97	0.99	1.01	1.03	1.06	1.08	1.11	1.30	1.53	1.82	2.18	2.63	3.22	3.98
+35	0.87	0.88	0.90	0.91	0.93	0.95	0.97	0.99	1.01	1.18	1.39	1.65	1.97	2.37	2.89	3.56
+30	0.81	0.82	0.83	0.85	0.86	0.88	0.89	0.91	0.93	1.09	1.28	1.51	1.80	2.17	2.63	3.23
+25		0.77	0.78	0.79	0.80	0.82	0.83	0.85	0.87	1.01	1.18	1.40	1.66	1.99	2.42	2.97
+20			0.73	0.74	0.75	0.77	0.78	0.79	0.81	0.94	1.10	1.30	1.54	1.85	2.24	2.74
+15				0.70	0.71	0.72	0.73	0.75	0.76	0.88	1.03	1.21	1.44	1.73	2.09	2.55
+10					0.67	0.68	0.69	0.70	0.72	0.83	0.97	1.14	1.35	1.62	1.95	2.38
+5						0.64	0.65	0.67	0.68	0.78	0.92	1.07	1.27	1.52	1.83	2.23
0							0.62	0.63	0.64	0.74	0.87	1.02	1.20	1.43	1.73	2.10
-5								0.60	0.61	0.70	0.82	0.96	1.14	1.35	1.63	1.98
-10									0.58	0.67	0.78	0.91	1.08	1.28	1.54	1.87
Correction Factor $k_{\Delta p}$																
$\Delta p$ (bar)	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	8.0	9.0
$K_{\Delta p}$	4.63	3.27	2.67	2.31	2.07	1.89	1.75	1.64	1.54	1.46	1.40	1.34	1.28	1.24	1.16	1.09
$\Delta p$ (bar)	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0
$K_{\Delta p}$	1.03	0.99	0.94	0.91	0.87	0.85	0.82	0.79	0.77	0.75	0.73	0.71	0.70	0.68	0.67	0.65

In cases of subcooling of more than 15K please additionally use the correction factors on first page of this chapter.

Liquid Temperature entering Valve °C	R407F				Correction Factor $k_t$ Evaporating Temperature (°C)									
	+20	+15	+10	+5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
+65	1.51	1.53	1.55	1.58	1.61	1.64	1.68	1.90	2.24	2.68	3.22	3.86	4.63	5.52
+60	1.35	1.37	1.39	1.41	1.43	1.46	1.49	1.68	1.98	2.36	2.83	3.39	4.04	4.81
+55	1.23	1.25	1.26	1.28	1.30	1.32	1.35	1.52	1.79	2.13	2.54	3.04	3.62	4.30
+50	1.14	1.15	1.16	1.18	1.20	1.22	1.24	1.39	1.64	1.95	2.32	2.77	3.29	3.90
+45	1.06	1.07	1.08	1.10	1.11	1.13	1.14	1.29	1.51	1.79	2.14	2.55	3.02	3.57
+40	0.99	1.00	1.01	1.02	1.04	1.05	1.07	1.20	1.41	1.67	1.98	2.36	2.80	3.31
+35	0.93	0.94	0.95	0.96	0.97	0.99	1.00	1.12	1.32	1.56	1.85	2.20	2.61	3.08
+30	0.88	0.89	0.90	0.91	0.92	0.93	0.94	1.06	1.24	1.47	1.74	2.07	2.44	2.88
+25	0.83	0.84	0.85	0.86	0.87	0.88	0.89	1.00	1.17	1.38	1.64	1.95	2.30	2.71
+20	0.79	0.80	0.81	0.82	0.82	0.83	0.84	0.95	1.11	1.31	1.55	1.84	2.17	2.56
+15	0.76	0.76	0.77	0.78	0.78	0.79	0.80	0.90	1.05	1.24	1.47	1.74	2.06	2.42
+10	0.72	0.73	0.74	0.74	0.75	0.76	0.77	0.86	1.00	1.18	1.40	1.66	1.96	2.30
+5	0.69	0.70	0.70	0.71	0.72	0.72	0.73	0.82	0.96	1.13	1.34	1.58	1.87	2.19
0	0.66	0.67	0.68	0.68	0.69	0.69	0.70	0.79	0.92	1.08	1.28	1.51	1.78	2.09
-5	0.64	0.64	0.65	0.65	0.66	0.67	0.67	0.75	0.88	1.04	1.23	1.45	1.71	2.00
-10	0.62	0.62	0.62	0.63	0.63	0.64	0.65	0.72	0.84	1.00	1.18	1.39	1.64	1.92
	Correction Factors ( $k_{\Delta P}$ )													
$\Delta P$ (bar)	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5
$k_{\Delta P}$	3.51	2.87	2.48	2.22	2.03	1.88	1.76	1.66	1.57	1.5	1.43	1.38	1.33	1.28
$\Delta P$ (bar)	8	9	10	11	12	13	14	15	16	17	18	19	20	21
$k_{\Delta P}$	1.24	1.17	1.11	1.06	1.01	0.97	0.94	0.91	0.88	0.85	0.83	0.81	0.79	0.77

In cases of subcooling of more than 15K please additionally use the correction factors on first page of this chapter.

Superheat adjustment guidelines when TI Valves TI/TIE/TIS/TISE/TILE-NW, designed for R407C are used in applications with R407F

Standard charge (refrigerant)	Alternative refrigerant	Evaporating temperature °C				
		-40	-30	-20	-10	0
		Number of turns				
NW (R407C)	R407F	-3/4	-1	-1 1/2	-2 1/4	-3

Minus means counterclockwise