

Technical brochure

Thermostatic expansion valves type TE5 to TE55



The TE series expansion valve regulate the injection of refrigerant into evaporators. It controls the refrigerant flow based on the superheat. The exchangeable power element is produced with the well known Danfoss laser welding technology for extended lifetime capability. The TE series is available with a wide range of orifices which will cover a wide range of applications.

Features

- Large operating range:
N-range -40°C to +10°C /
B-range -60°C to -25°C
- Interchangeable orifice assembly.
- Stainless steel power element, capillary tube and bulb.
- Wide capacity range.
- MOP function is available.
- Superior charge performance.
- Patented bulb strap design.
- MWP (maximum working pressure) 28 bar.
- Wide capacity range to minimize capacity gap and overlap.
- TE55 has balanced orifice design.

Technical data

Max. temperature

Bulb, when valve is assembled: 100°C
Complete valve when not assembled: 70°C

Min. temperature: -60°C
Max. test pressure: 32 bar

Maximum working pressure: 28 bar

MOP-points

Refrigerant	Range N - 40 → +10°C	Range NM - 40 → - 5°C	Range NL - 40 → - 15°C	Range B - 60 → - 25°C
	MOP-point in evaporating temperature t_e and evaporating pressure p_e			
	+15°C/+60°F	0°C/+32°F	- 10°C/+15°F	- 20°C/- 4°F
R22	6.9 bar / 100 psig	4.0 bar / 55 psig	2.6 bar / 35 psig	1.5 bar / 20 psig
R134a	3.9 bar / 55 psig	2.0 bar / 30 psig	1.0 bar / 15 psig	0.3 bar / 5 psig
R404A/R507	8.6 bar / 125 psig	5.1 bar / 75 psig	3.4 bar / 50 psig	2.0 bar / 30 psig
R407C	6.6 bar / 95 psig	3.6 bar / 50 psig	2.2 bar / 30 psig	1.1 bar / 15 psig

MOP = Max. Operating Pressure

Superheat

SS = static superheat
OS = opening superheat
SH = SS + OS = total superheat
 Q_{nom} = rated capacity
 Q_{max} = maximum capacity

Example
Static superheat SS = 4 K
Opening superheat OS = 4 K
Total superheat SH = 4 + 4 = 8 K

Static superheat SS can be adjusted with setting spindle.
The standard factory superheat setting SS is 4 K.
The opening superheat OS is 4 K from when opening begins to where the valve reaches its rated capacity Q_{nom} .

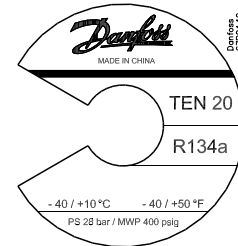
Using orifice with range B element, please check superheat under running conditions and re-adjust superheat setting, if necessary.

Identification

The thermostatic element is fitted with a label (on top of the diaphragm). The code refers to the refrigerant for which the valve is designed:

- X = R22
- N = R134a
- S = R404A/R507
- Z = R407C

The label holds information like valve type, evaporating temperature range, MOP point, refrigerant, and max. test pressure, PS.



Element label

Orifice assembly for TE5, TE12, 20 and 55

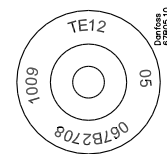
The orifice assembly is marked on top of the spring cup, e.g. as shown in the figure.
For a given size of valve, the same orifice assembly can be used for valves with ranges N and B.

TE12 = For valve type

05 = Orifice no.

067B2708 = Orifice code no. for sales order

1009 = Production date (Week, Year)



Orifice assembly marking for TE5 to TE55

Capillary tube tag for TE5 to TE55

The label gives the orifice size (04). A new label always accompanies a new orifice assembly.



Capillary tube tag TE5 to TE55

Design/Function

General

All TE valves have an interchangeable orifice assembly.

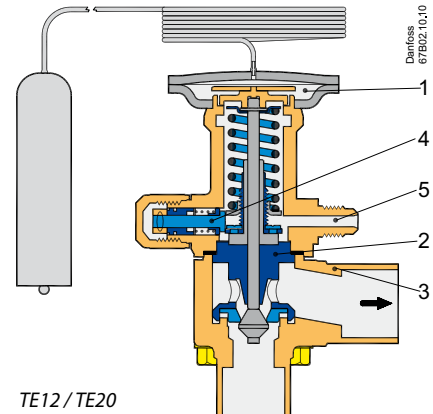
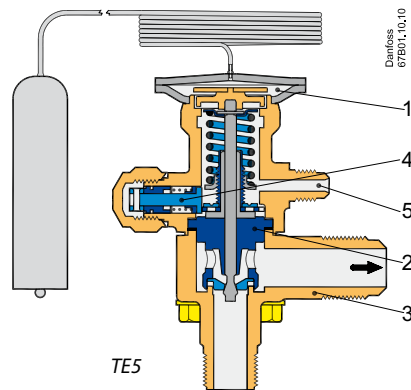
TE5 to TE55 valves are built up of three main components:

- 1 - Thermostatic element
- 2 - Orifice assembly
- 3 - Valve body with connections

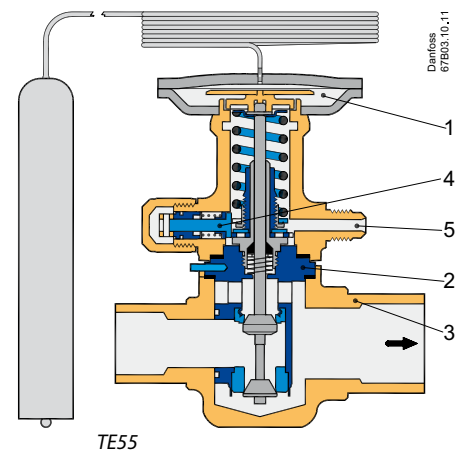
The orifice is refrigerant and range independent.

All valves are equipped with external pressure equalization.

To ensure long operating life, the valve cone and seat are made of a special alloy with particularly good wear properties.



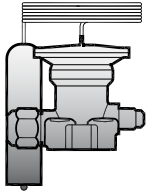
1. Thermostatic element (diaphragm)
2. Interchangeable orifice assembly
3. Valve body
4. Superheat setting spindle (see instructions)
5. External pressure equalizing connection with 1/4 in./6 mm flare nut



Ordering

R134a

Thermostatic element - including bulb strap



Valve type	Pressure equalization	Capillary tube	Code no.		
			Range N -40 to +10°C		Range NM -40 to -5°C
			Without MOP	MOP +15°C	MOP 0°C
	1/4 in. / 6 mm	m			
TE5	External	3	067B3297	067B3298	067B3360
TE12	External	3	067B3232	067B3233	
TE12	External	5	067B3363		
TE20	External	3	067B3292	067B3293	
TE20	External	5	067B3370		
TE55	External	3	067G3222	067G3223	
TE55	External	5	067G3230		

R404A/R507

Thermostatic element - including bulb strap

Valve type	Pressure equalization	Capillary tube	Code no.					
			Range -40 to +10°C		Range NM -40 to -5°C	Range NL -40 to -15°C	Range B -60 to -25°C	
			Without MOP	MOP +15°C	MOP 0°C	MOP -10°C	Without MOP	MOP -20°C
	1/4 in. / 6 mm	m						
TE5	External	3	067B3342		067B3357	067B3358	067B3344	067B3343
TE12	External	3	067B3347		067B3345	067B3348		067B3349
TE12	External	5	067B3346					067B3350
TE20	External	3	067B3352		067B3351	067B3353		067B3354
TE20	External	5	067B3356					067B3355
TE55	External	3	067G3302		067G3303	067G3304		067G3305
TE55	External	5	067G3301					067G3306

R407C

Thermostatic element - including bulb strap

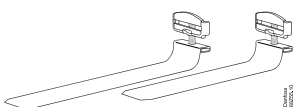
Valve type	Pressure equalization	Capillary tube	Code no.	
			Range N -40 to +10°C	
			Without MOP	MOP +15°C
	1/4 in. / 6 mm	m		
TE5	External	3	067B3278	067B3277
TE12	External	3	067B3366	067B3367
TE20	External	5	067B3371	067B3372
TE55	External	5	067G3240	067G3241

R22/R407C

Thermostatic element - including bulb strap

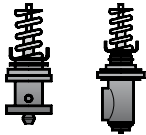
Valve type	Pressure equalization	Capillary tube	Code no.					
			Range N -40°C to +10°C		Range NM -40 to -5°C	Range NL -40 to -15°C	Range B -60 to -25°C	
			Without MOP	MOP +15°C	MOP 0°C	MOP -10°C	Without MOP	MOP -20°C
	1/4 in. / 6 mm	m						
TE5	External	3	067B3250	067B3267	067B3249	067B3253	067B3263	067B3251
TE12	External	3	067B3210	067B3227	067B3207	067B3213		067B3211
TE12	External	5	067B3209					067B3212
TE20	External	3	067B3274	067B3286	067B3273	067B3275		067B3276
TE20	External	5	067B3290					067B3287
TE55	External	3	067G3205	067G3220	067G3206			067G3207
TE55	External	5	067G3209					067G3217

Bulb strap for TE5 to TE55 delivered with the element



Type	Length	Max. tube diameter	Code no.
TE5 / TE12	225 mm	2 1/8 in / 53 mm	067N0558
TE20/TE55	350 mm	3 1/8 in / 78 mm	067N0559

Ordering
(continued)



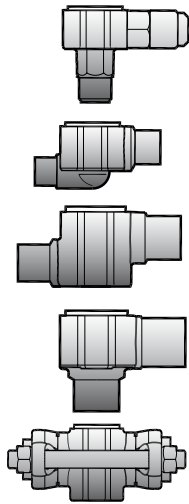
Orifice assembly

Valve type	Nominal capacity Range N: -40°C to 10°C								Orifice no.	Code no.
	R134a		R404A/507		R407C		R22			
	kW	TR	kW	TR	kW	TR	kW	TR		
TE5	6.68	1.91	8.17	2.33	10.70	3.06	10.40	2.97	0.5	067B2788
TE5	12.20	3.49	14.90	4.26	19.60	5.60	19.10	5.46	1	067B2789
TE5	17.00	4.86	20.50	5.86	27.20	7.77	26.30	7.51	2	067B2790
TE5	21.80	6.23	26.30	7.51	34.80	9.94	33.80	9.66	3	067B2791
TE5	29.70	8.49	35.70	10.20	47.40	13.50	46.00	13.10	4	067B2792
TE12	37.70	10.80	50.70	14.50	55.80	15.90	57.20	16.30	5	067B2708
TE12	50.10	14.30	64.00	18.30	73.90	21.10	76.30	21.80	6	067B2709
TE12	65.70	18.80	81.30	23.20	94.30	26.90	97.80	27.90	7	067B2710
TE20	77.80	22.20	87.10	24.90	118.00	33.70	128.00	36.60	8	067B2771
TE20	92.30	26.40	102.00	29.10	136.00	38.90	150.00	42.90	9	067B2773
TE55	77.18	21.95	84.81	24.12	112.00	31.74	113.00	32.23	9B	067G2705
TE55	111.00	31.70	128.00	36.60	161.00	46.00	169.00	48.30	10	067G2701
TE55	122.00	34.90	138.00	39.40	175.00	50.00	184.00	52.60	11	067G2704
TE55	134.00	38.30	152.00	43.40	191.00	54.60	202.00	57.70	12	067G2707
TE55	166.00	47.40	182.00	52.00	232.00	66.30	245.00	70.00	13	067G2710

The nominal capacity is based on:

Evaporating temperature $t_e = +4.4^\circ\text{C}$
 Condensing temperature $t_c = +38^\circ\text{C}$
 Refrigerant temperature ahead of valve $t_1 = +37^\circ\text{C}$

Valve body



Type	Connection Inlet x Outlet		Code no.			
	in.	mm	Flare angleway	Solder angleway	Solder straightway	Solder flanges
TE5	$1/2 \times 5/8$		067B4013	067B4009 ¹⁾	067B4007 ¹⁾	
	$1/2 \times 7/8$			067B4010 ¹⁾	067B4008 ¹⁾	
	$5/8 \times 7/8$			067B4011 ¹⁾	067B4032 ¹⁾	
	$7/8 \times 1 1/8$			067B4034 ²⁾	067B4033 ²⁾	
TE5		12 x 16	067B4013	067B4004 ¹⁾	067B4002 ¹⁾	
		12 x 22		067B4005 ¹⁾	067B4003 ¹⁾	
		16 x 22		067B4012 ¹⁾	067B4035 ¹⁾	
		22 x 28		067B4037 ²⁾	067B4036 ²⁾	
TE12	$5/8 \times 7/8$					067B4025 ¹⁾
	$7/8 \times 1$					067B4026 ¹⁾
	$7/8 \times 1 1/8$			067B4023 ²⁾	067B4021 ²⁾	
TE12		16 x 22				067B4027 ¹⁾
		22 x 25				067B4015 ¹⁾
		22 x 28		067B4017 ²⁾	067B4016 ²⁾	
TE20	$7/8 \times 1 1/8$			067B4023 ²⁾	067B4021 ²⁾	
		22 x 28		067B4017 ²⁾	067B4016 ²⁾	
TE55	$1 1/8 \times 1 3/8$			067G4004 ³⁾	067G4003 ³⁾	
		28 x 35		067G4002 ³⁾	067G4001 ³⁾	

¹⁾ ODF x ODF
²⁾ ODF x ODM
³⁾ ODM x ODM
 ODF = Internal diameter
 ODM = External diameter

How to select a valve:

Q (capacity) = 45kW

Q (capacity) = 45kW

Example:

Tcon (condensing temperature) = 25°C

fsub (subcooling correction factor) = 1.09

Tevap (evaporator temperature) = -30°C

fp (distribution correction factor) = 0.85

Tsub (subcooling temperature) = 10K

Dpd (distributer pressure drop) = 2 bar

$$\frac{Q}{f_{sub} \times f_p} = \text{Selected capacity}$$

$$\frac{45}{1.09 \times 0.85} = 48.6 \text{ kW}$$

The selection will be:

TE55 orifice 10 (52.70 kW > 48.6 kW)

Subcooling correction factor 'fsub'

Subcooling [K]	2	4	10	15
Correction factor	0.97	1.00	1.09	1.16

Distributer correction factor 'fp'

Evaporating temperature [°C]	Δp	-40	-35	-30
"Pressure drop [bar]"	0.00	1.00	1.00	1.00
	1.00	0.93	0.93	0.93
	2.00	0.86	0.86	0.85

Capacity in kW, range N, -40°C to +10°C, opening superheat sh= 4 K

Cond. temp.	Evaporating [°C]				Valve	Orifice
	-40	-35	-30	-25		
25°C	34.80	39.80	45.40	51.50	TE20	9
	40.00	46.10	52.70	60.00	TE55	10
	44.60	51.30	58.70	66.70	TE55	11

Capacity in kW, range N, -40°C to +10°C, opening superheat sh= 4 K

R134a

Condensing temperature	Evaporating [°C]											Valve type	Orifice
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10		
25°C	2.59	2.94	3.33	3.73	4.16	4.58	5.00	5.37	5.65	5.79	5.72	TE5	0.5
	4.76	5.42	6.12	6.87	7.65	8.43	9.18	9.84	10.34	10.59	10.44	TE5	1
	6.69	7.61	8.60	9.64	10.72	11.79	12.81	13.70	14.36	14.64	14.37	TE5	2
	8.55	9.73	11.01	12.36	13.76	15.18	16.53	17.72	18.60	19.00	18.69	TE5	3
	11.53	13.16	14.92	16.79	18.73	20.68	22.54	24.16	25.36	25.86	25.36	TE5	4
	15.16	17.14	19.30	21.63	24.08	26.59	29.04	31.20	33.00	33.90	33.60	TE12	5
	19.65	22.28	25.17	28.29	31.60	35.00	38.40	41.40	43.90	45.20	44.80	TE12	6
	26.32	29.88	33.80	38.10	42.60	47.30	51.90	56.10	59.50	61.30	60.80	TE12	7
	30.20	34.50	39.10	44.00	49.30	54.60	59.80	64.40	67.80	69.40	68.30	TE20	8
	34.80	39.80	45.40	51.50	58.00	64.80	72.00	78.00	82.00	85.00	84.00	TE20	9
	40.00	46.10	52.70	60.00	67.70	76.00	84.00	92.00	98.00	102.00	102.00	TE55	10
	44.60	51.30	58.70	66.70	75.00	84.00	93.00	102.00	109.00	113.00	113.00	TE55	11
48.50	55.90	64.00	73.00	83.00	93.00	103.00	113.00	121.00	126.00	127.00	TE55	12	
60.60	70.00	80.00	92.00	104.00	117.00	130.00	142.00	152.00	157.00	156.00	TE55	13	

Capacity in kW, range N, -40°C to +10°C, opening superheat sh= 4 K

R134a

Condensing temperature	Evaporating [°C]											Valve type	Orifice
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10		
35°C	2.65	3.02	3.42	3.87	4.34	4.85	5.36	5.87	6.35	6.76	7.03	TE5	0.5
	4.86	5.54	6.29	7.11	7.98	8.90	9.85	10.78	11.64	12.36	12.84	TE5	1
	6.81	7.78	8.83	9.98	11.19	12.47	13.77	15.03	16.19	17.13	17.72	TE5	2
	8.70	9.92	11.26	12.72	14.29	15.94	17.64	19.31	20.84	22.10	22.91	TE5	3
	11.63	13.31	15.16	17.17	19.34	21.63	23.98	26.28	28.39	30.10	31.10	TE5	4
	15.31	17.28	19.47	21.88	24.52	27.34	30.30	33.30	36.10	38.50	40.20	TE12	5
	19.62	22.23	25.14	28.38	31.90	35.80	39.80	43.90	47.80	51.20	53.60	TE12	6
	26.12	29.49	33.30	37.50	42.10	47.10	52.50	57.90	63.20	67.80	71.00	TE12	7
	30.30	34.50	39.20	44.30	50.00	56.00	62.30	68.60	74.00	79.00	82.00	TE20	8
	34.10	39.00	44.40	50.50	57.30	64.70	73.00	81.00	88.00	95.00	99.00	TE20	9
	38.20	44.20	51.00	58.50	66.80	76.00	85.00	95.00	105.00	114.00	121.00	TE55	10
	42.20	48.90	56.40	64.70	74.00	84.00	94.00	105.00	116.00	126.00	133.00	TE55	11
45.60	52.90	61.00	70.00	80.00	91.00	103.00	116.00	128.00	139.00	148.00	TE55	12	
56.00	65.10	75.00	87.00	99.00	113.00	128.00	144.00	159.00	172.00	182.00	TE55	13	

R134a

Capacity in kW. range N. -40°C to +10°C. opening superheat sh= 4 K

Condensing temperature	Evaporating [°C]											Valve type	Orifice
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10		
45°C	2.64	3.01	3.42	3.87	4.37	4.92	5.49	6.10	6.70	7.28	7.80	TE5	0.5
	4.83	5.52	6.28	7.12	8.04	9.04	10.10	11.20	12.30	13.36	14.28	TE5	1
	6.75	7.72	8.80	9.99	11.28	12.67	14.14	15.66	17.17	18.58	19.78	TE5	2
	8.62	9.83	11.17	12.66	14.29	16.06	17.94	19.91	21.88	23.75	25.36	TE5	3
	11.41	13.07	14.92	16.97	19.23	21.69	24.32	27.06	29.79	32.40	34.50	TE5	4
	15.04	16.90	18.99	21.33	23.95	26.83	29.96	33.30	36.70	40.10	43.20	TE12	5
	19.04	21.51	24.29	27.43	30.90	34.90	39.10	43.70	48.50	53.20	57.50	TE12	6
	25.22	28.24	31.70	35.50	39.90	44.80	50.10	56.00	62.10	68.20	74.00	TE12	7
	29.52	33.50	38.00	43.10	48.70	54.90	61.60	68.80	76.00	83.00	89.00	TE20	8
	32.60	37.10	42.10	47.90	54.40	61.70	69.70	79.00	88.00	97.00	105.00	TE20	9
	35.10	40.90	47.40	54.80	63.10	72.00	83.00	94.00	105.00	117.00	127.00	TE55	10
	38.60	45.00	52.20	60.30	69.40	79.00	91.00	103.00	115.00	128.00	139.00	TE55	11
	41.40	48.20	56.00	64.70	75.00	86.00	98.00	111.00	126.00	140.00	153.00	TE55	12
49.80	58.20	67.80	79.00	91.00	105.00	120.00	137.00	154.00	171.00	188.00	TE55	13	

R134a

Capacity in kW. range N. -40°C to +10°C. opening superheat sh= 4 K

Condensing temperature	Evaporating [°C]											Valve type	Orifice
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10		
55°C	2.56	2.92	3.32	3.77	4.27	4.81	5.41	6.05	6.72	7.40	8.06	TE5	0.5
	4.68	5.35	6.09	6.92	7.84	8.85	9.95	11.13	12.36	13.60	14.80	TE5	1
	6.52	7.48	8.54	9.71	11.01	12.43	13.97	15.61	17.31	19.01	20.62	TE5	2
	8.34	9.49	10.78	12.22	13.82	15.59	17.52	19.60	21.78	24.00	26.12	TE5	3
	10.91	12.49	14.27	16.26	18.49	20.96	23.66	26.58	29.64	32.70	35.70	TE5	4
	14.44	16.12	18.02	20.17	22.60	25.32	28.34	31.70	35.20	39.00	42.70	TE12	5
	18.03	20.27	22.81	25.69	28.96	32.70	36.80	41.40	46.40	51.60	56.90	TE12	6
	23.84	26.43	29.38	32.70	36.50	40.90	45.80	51.20	57.30	63.70	70.00	TE12	7
	28.12	31.80	35.90	40.60	45.90	51.80	58.40	65.70	73.00	81.00	89.00	TE20	8
	30.50	34.40	38.90	44.10	49.90	56.60	64.20	73.00	82.00	92.00	102.00	TE20	9
	31.20	36.50	42.60	49.50	57.30	66.20	76.00	87.00	99.00	112.00	125.00	TE55	10
	34.00	39.90	46.50	54.00	62.60	72.00	83.00	95.00	108.00	122.00	136.00	TE55	11
	36.10	42.30	49.40	57.50	66.70	77.00	89.00	102.00	117.00	132.00	148.00	TE55	12
42.70	50.20	58.70	68.60	80.00	93.00	107.00	123.00	141.00	160.00	179.00	TE55	13	

Subcooling correction factor 'fsub'

'fsub' = saturated condensing temp. - liquid temp. at valve inlet

Subcooling [K]	2	4	10	15	20	25	30	35	40	45	50
Correction factor	0.97	1.00	1.09	1.16	1.23	1.30	1.37	1.44	1.51	1.58	1.65

Distributer correction factor 'fp' *

'fp' * = pressure drop from evaporator inlet to outlet

Evaporating temperature [°C]	Δp	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10
Pressure drop [bar]	0.0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	1.0	0.93	0.93	0.93	0.93	0.92	0.92	0.92	0.91	0.90	0.89	0.87
	1.5	0.90	0.89	0.89	0.89	0.88	0.88	0.87	0.86	0.84	0.82	0.79
	2.0	0.86	0.86	0.85	0.85	0.84	0.83	0.82	0.81	0.79	0.76	0.71

*calculated at 35°C condensing temperature

How to select a valve:

Q (capacity) = 45kW

Q (capacity) = 45kW

Example:

Tcon (condensing temperature) = 25°C

fsub (subcooling correction factor) = 1.10

Tevap (evaporator temperature) = -30°C

fp (distribution correction factor) = 0.92

Tsub (subcooling temperature) = 10K

Dpd (distributer pressure drop) = 2 bar

$$\frac{Q}{f_{sub} \times f_p} = \text{Selected capacity}$$

$$\frac{45}{1.10 \times 0.92} = 44.5 \text{ kW}$$

The selection will be:

TE20 orifice 8 (48.4 kW > 44.5 kW)

Subcooling correction factor 'fsub'

Subcooling [K]	2	4	10	15
Correction factor	0.97	1.00	1.10	1.19

Distributer correction factor 'fp'

Evaporating temperature [°C]	Δp	-40	-35	-30
Pressure drop [bar]	0.0	1.00	1.00	1.00
	1.0	0.96	0.96	0.96
	1.5	0.94	0.94	0.94
	2.0	0.92	0.92	0.92

Capacity in kW, range N, -40°C to +10°C, opening superheat sh= 4 K

Cond. temp.	Evaporating [°C]				Valve	Orifice
	-40	-35	-30	-25		
25 °C	24.92	29.31	34.10	39.20	TE12	6
	32.50	37.90	43.90	50.60	TE12	7
	35.70	41.80	48.40	55.20	TE20	8

Capacity in kW. range N. -40°C to +10°C. opening superheat sh = 4 K

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Condensing temperature	Evaporating [°C]											Valve type	Orifice
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10		
25°C	3.68	4.21	4.77	5.34	5.91	6.45	6.93	7.31	7.54	7.55	7.30	TE5	0.5
	6.76	7.74	8.76	9.80	10.84	11.82	12.68	13.35	13.73	13.72	13.21	TE5	1
	9.49	10.86	12.28	13.71	15.12	16.43	17.55	18.39	18.81	18.68	17.88	TE5	2
	11.99	13.76	15.60	17.49	19.35	21.11	22.64	23.79	24.40	24.29	23.28	TE5	3
	16.09	18.54	21.09	23.70	26.28	28.70	30.80	32.30	33.10	32.80	31.20	TE5	4
	20.72	24.17	27.90	31.90	36.00	40.10	43.90	47.00	48.90	49.10	47.20	TE12	5
	24.92	29.31	34.10	39.20	44.50	49.90	54.90	59.10	61.70	62.10	59.60	TE12	6
	32.50	37.90	43.90	50.60	57.60	64.90	72.00	78.00	81.00	82.00	78.00	TE12	7
	35.70	41.80	48.40	55.20	62.20	69.10	75.00	80.00	83.00	83.00	80.00	TE20	8
	39.50	46.50	54.20	62.50	71.00	80.00	88.00	95.00	100.00	101.00	97.00	TE20	9
	46.50	55.30	64.90	75.00	86.00	97.00	108.00	117.00	124.00	127.00	125.00	TE55	10
	51.10	60.70	71.00	83.00	94.00	107.00	118.00	128.00	136.00	139.00	135.00	TE55	11
54.80	65.30	77.00	89.00	103.00	116.00	130.00	142.00	151.00	155.00	152.00	TE55	12	
66.50	79.00	94.00	109.00	126.00	143.00	159.00	173.00	183.00	187.00	181.00	TE55	13	

Capacity in kW. range N. -40°C to +10°C. opening superheat sh = 4 K

R404A/R507

Condensing temperature	Evaporating [°C]											Valve type	Orifice
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10		
35°C	3.45	3.98	4.55	5.15	5.78	6.42	7.05	7.63	8.12	8.46	8.61	TE5	0.5
	6.34	7.32	8.37	9.48	10.63	11.80	12.93	13.98	14.84	15.43	15.64	TE5	1
	8.90	10.28	11.75	13.29	14.88	16.47	17.99	19.35	20.44	21.12	21.27	TE5	2
	11.14	12.88	14.76	16.74	18.80	20.89	22.92	24.76	26.25	27.22	27.49	TE5	3
	14.85	17.27	19.87	22.63	25.50	28.40	31.20	33.70	35.70	36.90	37.10	TE5	4
	18.65	21.82	25.33	29.17	33.30	37.80	42.30	46.70	50.50	53.30	54.40	TE12	5
	22.27	26.29	30.70	35.70	41.00	46.80	52.70	58.50	63.60	67.30	68.70	TE12	6
	27.84	32.60	37.90	44.00	50.70	58.10	66.00	74.00	81.00	87.00	89.00	TE12	7
	32.40	38.00	44.30	51.10	58.30	66.00	74.00	81.00	87.00	91.00	93.00	TE20	8
	34.90	41.10	48.20	56.00	64.60	74.00	84.00	93.00	101.00	108.00	110.00	TE20	9
	40.60	48.70	57.70	67.70	79.00	90.00	103.00	115.00	126.00	136.00	141.00	TE55	10
	44.20	53.10	62.90	74.00	86.00	98.00	112.00	125.00	137.00	147.00	153.00	TE55	11
	47.10	56.60	67.20	79.00	92.00	106.00	121.00	136.00	150.00	162.00	170.00	TE55	12
	56.00	67.50	80.00	95.00	111.00	128.00	146.00	165.00	181.00	195.00	202.00	TE55	13

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Capacity in kW. range N. -40°C to +10°C. opening superheat sh= 4 K

Condensing temperature	Evaporating [°C]											Valve type	Orifice
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10		
45°C	3.08	3.57	4.11	4.70	5.32	5.99	6.67	7.36	8.02	8.60	9.05	TE5	0.5
	5.65	6.57	7.57	8.65	9.81	11.03	12.29	13.54	14.73	15.76	16.53	TE5	1
	7.94	9.25	10.66	12.18	13.79	15.47	17.19	18.88	20.43	21.74	22.65	TE5	2
	9.85	11.46	13.22	15.12	17.17	19.33	21.57	23.80	25.89	27.68	28.97	TE5	3
	13.04	15.28	17.72	20.38	23.25	26.28	29.41	32.50	35.40	37.70	39.30	TE5	4
	16.09	18.84	21.89	25.29	29.07	33.20	37.80	42.60	47.40	51.80	55.30	TE12	5
	19.05	22.51	26.38	30.70	35.60	41.00	46.90	53.20	59.60	65.50	70.00	TE12	6
	23.11	26.97	31.30	36.30	42.00	48.40	55.70	63.60	72.00	80.00	87.00	TE12	7
	28.01	32.90	38.40	44.50	51.30	58.70	66.60	75.00	83.00	90.00	95.00	TE20	8
	29.49	34.80	40.70	47.40	55.00	63.60	73.00	83.00	93.00	103.00	110.00	TE20	9
	33.40	40.50	48.50	57.40	67.40	79.00	91.00	104.00	117.00	129.00	140.00	TE55	10
	36.20	43.90	52.50	62.10	73.00	85.00	98.00	112.00	126.00	139.00	151.00	TE55	11
	38.20	46.40	55.50	65.90	78.00	91.00	105.00	120.00	136.00	151.00	165.00	TE55	12
44.60	54.30	65.30	78.00	92.00	107.00	125.00	143.00	162.00	181.00	196.00	TE55	13	

R404A/R507

Capacity in kW. range N. -40°C to +10°C. opening superheat sh= 4 K

Condensing temperature	Evaporating [°C]											Valve type	Orifice
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10		
55°C	2.60	3.03	3.50	4.01	4.57	5.18	5.83	6.51	7.20	7.88	8.50	TE5	0.5
	4.76	5.57	6.44	7.40	8.45	9.57	10.77	12.03	13.31	14.54	15.65	TE5	1
	6.69	7.85	9.10	10.46	11.94	13.52	15.19	16.91	18.64	20.27	21.68	TE5	2
	8.24	9.62	11.14	12.80	14.61	16.58	18.69	20.92	23.18	25.36	27.31	TE5	3
	10.79	12.72	14.85	17.19	19.75	22.55	25.55	28.69	31.90	34.90	37.50	TE5	4
	13.26	15.49	17.95	20.69	23.76	27.20	31.10	35.30	39.90	44.80	49.40	TE12	5
	15.48	18.28	21.41	24.92	28.88	33.40	38.40	44.10	50.30	56.80	63.10	TE12	6
	18.58	21.56	24.89	28.67	33.00	37.80	43.40	49.80	56.90	64.60	72.00	TE12	7
	23.07	27.07	31.50	36.50	42.10	48.40	55.40	63.00	71.00	79.00	87.00	TE20	8
	23.80	27.92	32.60	37.90	43.90	50.80	58.60	67.50	77.00	87.00	97.00	TE20	9
	25.71	31.50	38.10	45.50	53.80	63.20	74.00	85.00	98.00	111.00	123.00	TE55	10
	27.67	33.90	40.90	48.90	57.80	67.80	79.00	91.00	105.00	118.00	132.00	TE55	11
	28.94	35.50	42.90	51.30	60.80	72.00	84.00	97.00	112.00	127.00	142.00	TE55	12
33.10	40.90	49.60	59.50	71.00	84.00	98.00	114.00	131.00	150.00	168.00	TE55	13	

Subcooling correction factor 'fsub'

'fsub' = saturated condensing temp. - liquid temp. at valve inlet

Subcooling [K]	2	4	10	15	20	25	30	35	40	45	50
Correction factor	0.97	1.00	1.10	1.19	1.27	1.35	1.43	1.52	1.60	1.68	1.76

Distributer correction factor 'fp'*

'fp' * = pressure drop from evaporator inlet to outlet

Evaporating temperature [°C]	Δp	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10
Pressure drop [bar]	0.0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	1.0	0.96	0.96	0.96	0.96	0.96	0.96	0.95	0.95	0.94	0.94	0.92
	1.5	0.94	0.94	0.94	0.94	0.94	0.94	0.93	0.93	0.92	0.91	0.90
	2.0	0.92	0.92	0.92	0.92	0.92	0.91	0.91	0.90	0.89	0.88	0.87

*calculated at 35°C condensing temperature

Capacity in kW. range B. -60°C to -25°C. opening superheat sh= 4 K

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Condensing temperature	Evaporating [°C]								Valve type	Orifice
	-60	-55	-50	-45	-40	-35	-30	-25		
20°C	2.01	2.41	2.87	3.37	3.92	4.51	5.12	5.73	TE5	0.5
	3.66	4.41	5.25	6.19	7.21	8.29	9.41	10.50	TE5	1
	5.09	6.14	7.33	8.66	10.10	11.60	13.20	14.70	TE5	2
	6.38	7.70	9.22	10.90	12.80	14.70	16.80	18.80	TE5	3
	8.32	10.10	12.20	14.50	17.10	19.90	22.80	25.60	TE5	4
	10.30	12.30	14.70	17.50	20.50	23.80	27.30	30.80	TE12	5
	12.80	15.50	18.60	22.20	26.20	30.70	35.50	40.50	TE12	6
	16.50	19.90	24.00	28.60	33.90	39.70	46.10	52.60	TE12	7
	24.63	29.62	35.20	41.36	47.95	54.79	61.55	67.80	TE20	8
	25.90	31.44	37.79	44.96	52.89	61.37	70.05	78.35	TE20	9
	20.60	24.60	29.20	34.40	40.10	46.10	52.40	58.50	TE55	9B
	24.10	29.00	34.70	41.40	49.00	57.50	66.80	76.60	TE55	10
	26.60	32.00	38.40	45.70	54.10	63.50	73.80	84.60	TE55	11
28.60	34.50	41.30	49.30	58.50	68.80	80.20	92.30	TE55	12	
34.70	42.00	50.50	60.50	71.90	84.90	99.20	114.00	TE55	13	

Capacity in kW. range B. -60°C to -25°C. opening superheat sh= 4 K

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Condensing temperature	Evaporating [°C]								Valve type	Orifice
	-60	-55	-50	-45	-40	-35	-30	-25		
30°C	1.88	2.27	2.72	3.23	3.79	4.40	5.04	5.72	TE5	0.5
	3.42	4.14	4.97	5.92	6.96	8.09	9.29	10.50	TE5	1
	4.72	5.75	6.93	8.27	9.76	11.40	13.10	14.80	TE5	2
	5.87	7.15	8.63	10.30	12.20	14.30	16.50	18.70	TE5	3
	7.54	9.25	11.30	13.60	16.20	19.20	22.30	25.50	TE5	4
	9.33	11.30	13.60	16.30	19.30	22.70	26.30	30.20	TE12	5
	11.40	13.90	16.90	20.40	24.40	28.90	33.90	39.30	TE12	6
	14.40	17.60	21.30	25.70	30.80	36.60	43.00	49.90	TE12	7
	22.01	26.74	32.13	38.19	44.87	52.02	59.39	66.59	TE20	8
	22.21	27.24	33.08	39.81	47.45	55.91	64.95	74.14	TE20	9
	18.50	22.30	26.60	31.70	37.30	43.40	50.00	56.60	TE55	9B
	21.10	25.60	31.00	37.20	44.30	52.50	61.70	71.70	TE55	10
	23.20	28.10	34.00	40.80	48.70	57.70	67.70	78.60	TE55	11
24.80	30.10	36.30	43.60	52.10	61.90	72.80	84.80	TE55	12	
29.50	36.00	43.50	52.50	62.90	75.00	88.60	104.00	TE55	13	

Subcooling correction factor 'fsub'

'fsub' = saturated condensing temp. - liquid temp. at valve inlet

Subcooling [K]	2	4	10	15	20	25	30	35	40	45	50
Correction factor	0.96	1.00	1.11	1.20	1.28	1.37	1.46	1.54	1.63	1.72	1.80

Distributer correction factor 'fp' *

fp' * = pressure drop from evaporator inlet to outlet

Evaporating temperature [°C]	Δp	-60	-55	-50	-45	-40	-35	-30	-25
Pressure drop [bar]	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	1.0	0.97	0.96	0.96	0.96	0.96	0.96	0.96	0.96
	1.5	0.95	0.95	0.95	0.94	0.94	0.94	0.94	0.94
	2.0	0.93	0.93	0.93	0.93	0.92	0.92	0.92	0.92

*calculated at 35°C condensing temperature

R404A/R507

Capacity in kW. range B. -60°C to -25°C. opening superheat sh= 4 K

Condensing temperature	Evaporating [°C]								Valve type	Orifice
	-60	-55	-50	-45	-40	-35	-30	-25		
40°C	1.69	2.06	2.48	2.97	3.51	4.11	4.75	5.43	TE5	0.5
	3.06	3.74	4.53	5.43	6.44	7.55	8.76	10.00	TE5	1
	4.21	5.17	6.29	7.58	9.03	10.60	12.30	14.10	TE5	2
	5.17	6.35	7.75	9.36	11.20	13.20	15.40	17.70	TE5	3
	6.52	8.08	9.96	12.20	14.70	17.60	20.80	24.10	TE5	4
	8.10	9.91	12.00	14.50	17.40	20.60	24.20	28.00	TE12	5
	9.70	12.00	14.60	17.80	21.50	25.80	30.70	36.00	TE12	6
	12.00	14.80	18.10	22.00	26.60	31.90	37.90	44.60	TE12	7
	18.74	23.01	27.94	33.58	39.91	46.85	54.23	61.72	TE20	8
	18.04	22.38	27.47	33.41	40.28	48.06	56.65	65.75	TE20	9
	15.80	19.10	23.10	27.70	33.00	38.80	45.10	51.80	TE55	9B
	17.60	21.60	26.20	31.70	38.20	45.60	54.00	63.30	TE55	10
	19.20	23.50	28.60	34.60	41.60	49.70	58.80	68.90	TE55	11
20.40	24.90	30.30	36.70	44.20	52.80	62.70	73.60	TE55	12	
23.80	29.20	35.70	43.30	52.30	62.80	74.80	88.30	TE55	13	

R404A/R507

Capacity in kW. range B. -60°C to -25°C. opening superheat sh= 4 K

Condensing temperature	Evaporating [°C]								Valve type	Orifice
	-60	-55	-50	-45	-40	-35	-30	-25		
50°C	1.47	1.80	2.18	2.63	3.13	3.69	4.29	4.95	TE5	0.5
	2.64	3.25	3.97	4.79	5.73	6.78	7.92	9.15	TE5	1
	3.61	4.47	5.50	6.68	8.04	9.55	11.20	13.00	TE5	2
	4.36	5.41	6.66	8.13	9.81	11.70	13.80	16.00	TE5	3
	5.35	6.72	8.39	10.40	12.70	15.40	18.40	21.70	TE5	4
	6.68	8.26	10.10	12.40	14.90	17.90	21.10	24.80	TE12	5
	7.75	9.68	12.00	14.80	18.10	21.90	26.30	31.20	TE12	6
	9.28	11.60	14.40	17.70	21.60	26.20	31.40	37.40	TE12	7
	15.05	18.72	23.00	27.94	33.57	39.87	46.71	53.86	TE20	8
	13.65	17.20	21.39	26.33	32.09	38.74	46.23	54.42	TE20	9
	12.70	15.50	18.90	22.90	27.50	32.70	38.50	44.60	TE55	9B
	13.80	17.10	21.00	25.60	31.10	37.40	44.70	52.80	TE55	10
	14.90	18.50	22.70	27.70	33.60	40.50	48.30	57.00	TE55	11
15.60	19.40	23.80	29.10	35.40	42.60	51.00	60.30	TE55	12	
17.80	22.20	27.40	33.60	41.00	49.60	59.50	70.80	TE55	13	

Subcooling correction factor 'fsub'

'fsub' = saturated condensing temp. - liquid temp. at valve inlet

Subcooling [K]	2	4	10	15	20	25	30	35	40	45	50
Correction factor	0.96	1.00	1.11	1.20	1.28	1.37	1.46	1.54	1.63	1.72	1.80

Distributer correction factor 'fp'*

fp' * = pressure drop from evaporator inlet to outlet

Evaporating temperature [°C]	Δp	-60	-55	-50	-45	-40	-35	-30	-25
Pressure drop [bar]	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	1.0	0.97	0.96	0.96	0.96	0.96	0.96	0.96	0.96
	1.5	0.95	0.95	0.95	0.94	0.94	0.94	0.94	0.94
	2.0	0.93	0.93	0.93	0.93	0.92	0.92	0.92	0.92

*calculated at 35°C condensing temperature

How to select a valve:

Q (capacity) = 45kW

Q (capacity) = 45kW

Tcon (condensing temperature) = 25°C

fsub (subcooling correction factor) = 1.08

Example:

Tevap (evaporator temperature) = -30°C

fp (distribution correction factor) = 0.92

Tsub (subcooling temperature) = 10K

Dpd (distributer pressure drop) = 2 bar

$$\frac{Q}{f_{sub} \times f_p} = \text{Selected capacity}$$

$$\frac{45}{1.08 \times 0.92} = 45.3 \text{ kW}$$

The selection will be:

TE12 orifice 7 (46.5 kW > 45.3 kW)

Subcooling correction factor 'fsub'

Subcooling [K]	2	4	10	15
Correction factor	0.97	1.00	1.08	1.15

Distributer correction factor 'fp'

Evaporating temperature [°C]	Δp	-40	-35	-30
Pressure drop [bar]	0.0	1.00	1.00	1.00
	1.0	0.96	0.96	0.96
	1.5	0.94	0.94	0.94
	2.0	0.92	0.92	0.92

Capacity in kW, range N, -40°C to +10°C, opening superheat sh= 4 K

Cond. temp.	Evaporating [°C]				Valve	Orifice
	-40	-35	-30	-25		
25°C	20.92	24.22	27.89	31.90	TE12	5
	26.60	30.90	35.80	41.10	TE12	6
	34.50	40.10	46.50	53.60	TE12	7

Capacity in kW. range N. -40°C to +10°C. opening superheat sh= 4 K

R407C

Condensing temperature	Evaporating [°C]											Valve type	Orifice
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10		
25°C	4.62	5.20	5.82	6.49	7.18	7.88	8.56	9.17	9.66	9.96	10.01	TE5	0.5
	8.48	9.55	10.70	11.92	13.19	14.46	15.69	16.78	17.65	18.17	18.21	TE5	1
	11.89	13.40	15.00	16.70	18.44	20.18	21.83	23.27	24.37	24.96	24.87	TE5	2
	15.02	16.95	19.04	21.25	23.56	25.87	28.09	30.00	31.60	32.40	32.40	TE5	3
	20.08	22.75	25.64	28.72	31.90	35.10	38.20	40.90	42.90	44.00	43.70	TE5	4
	20.92	24.22	27.89	31.90	36.20	40.70	45.10	49.20	52.70	55.10	55.90	TE12	5
	26.60	30.90	35.80	41.10	46.90	53.00	59.10	64.90	69.80	73.00	75.00	TE12	6
	34.50	40.10	46.50	53.60	61.40	69.70	78.00	86.00	93.00	98.00	100.00	TE12	7
	49.30	55.90	63.20	71.00	79.00	88.00	96.00	104.00	110.00	113.00	113.00	TE20	8
	54.30	62.00	71.00	80.00	90.00	101.00	112.00	123.00	131.00	137.00	137.00	TE20	9
	63.60	72.00	82.00	93.00	105.00	117.00	130.00	142.00	153.00	162.00	166.00	TE55	10
	70.00	80.00	91.00	102.00	115.00	129.00	143.00	156.00	168.00	177.00	181.00	TE55	11
	75.00	86.00	98.00	111.00	125.00	140.00	156.00	172.00	186.00	197.00	202.00	TE55	12
92.00	105.00	120.00	136.00	154.00	173.00	192.00	211.00	228.00	241.00	246.00	TE55	13	

Capacity in kW. range N. -40°C to +10°C. opening superheat sh= 4 K

R407C

Condensing temperature	Evaporating [°C]											Valve type	Orifice
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10		
35°C	4.54	5.13	5.77	6.47	7.22	8.01	8.82	9.62	10.36	10.99	11.45	TE5	0.5
	8.34	9.42	10.60	11.89	13.27	14.73	16.21	17.66	19.00	20.11	20.89	TE5	1
	11.69	13.22	14.89	16.70	18.62	20.62	22.65	24.60	26.36	27.78	28.69	TE5	2
	14.66	16.58	18.69	21.00	23.48	26.10	28.77	31.40	33.80	35.70	37.00	TE5	3
	19.43	22.09	25.03	28.25	31.70	35.40	39.10	42.70	46.00	48.60	50.20	TE5	4
	20.20	23.23	26.65	30.50	34.70	39.30	44.20	49.20	54.00	58.30	61.60	TE12	5
	25.38	29.35	33.90	38.90	44.60	50.90	57.60	64.50	71.00	77.00	82.00	TE12	6
	32.20	37.10	42.60	49.00	56.30	64.40	73.00	82.00	92.00	100.00	107.00	TE12	7
	47.00	53.30	60.30	68.10	77.00	86.00	96.00	105.00	114.00	122.00	127.00	TE20	8
	50.50	57.50	65.40	74.00	84.00	96.00	108.00	120.00	132.00	143.00	151.00	TE20	9
	58.30	66.80	76.00	87.00	99.00	112.00	126.00	141.00	155.00	169.00	180.00	TE55	10
	63.90	73.00	83.00	95.00	108.00	122.00	138.00	153.00	169.00	184.00	196.00	TE55	11
	68.20	78.00	89.00	102.00	116.00	132.00	149.00	167.00	185.00	202.00	216.00	TE55	12
82.00	94.00	108.00	123.00	141.00	160.00	181.00	203.00	225.00	245.00	262.00	TE55	13	

R407C

Capacity in kW. range N. -40°C to +10°C. opening superheat sh= 4 K

Condensing temperature	Evaporating [°C]											Valve type	Orifice
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10		
45°C	4.34	4.90	5.52	6.21	6.96	7.78	8.65	9.54	10.43	11.28	12.02	TE5	0.5
	7.96	8.99	10.15	11.43	12.82	14.33	15.93	17.58	19.21	20.74	22.06	TE5	1
	11.14	12.63	14.27	16.08	18.05	20.16	22.38	24.64	26.84	28.86	30.50	TE5	2
	13.88	15.70	17.72	19.96	22.44	25.12	27.97	30.90	33.90	36.60	38.90	TE5	3
	18.22	20.74	23.56	26.71	30.20	34.00	38.00	42.20	46.30	50.10	53.10	TE5	4
	19.01	21.63	24.62	28.03	31.90	36.20	40.90	46.00	51.30	56.50	61.40	TE12	5
	23.58	27.03	31.00	35.50	40.70	46.50	53.00	60.00	67.40	75.00	82.00	TE12	6
	29.67	33.60	38.20	43.50	49.60	56.60	64.50	73.00	83.00	92.00	102.00	TE12	7
	43.60	49.20	55.50	62.70	71.00	80.00	90.00	100.00	111.00	121.00	130.00	TE20	8
	45.80	51.80	58.70	66.50	76.00	86.00	97.00	110.00	123.00	137.00	149.00	TE20	9
	51.50	59.20	67.90	78.00	89.00	102.00	116.00	131.00	147.00	164.00	179.00	TE55	10
	56.00	64.40	74.00	85.00	97.00	111.00	126.00	142.00	160.00	177.00	194.00	TE55	11
	59.30	68.20	78.00	90.00	103.00	118.00	135.00	153.00	172.00	192.00	211.00	TE55	12
69.80	80.00	93.00	107.00	123.00	141.00	161.00	183.00	207.00	231.00	253.00	TE55	13	

R407C

Capacity in kW. range N. -40°C to +10°C. opening superheat sh= 4 K

Condensing temperature	Evaporating [°C]											Valve type	Orifice
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10		
55°C	4.04	4.55	5.12	5.75	6.46	7.24	8.08	8.98	9.91	10.84	11.73	TE5	0.5
	7.38	8.34	9.40	10.59	11.91	13.36	14.93	16.60	18.33	20.04	21.67	TE5	1
	10.32	11.70	13.23	14.94	16.82	18.88	21.09	23.43	25.81	28.14	30.30	TE5	2
	12.80	14.43	16.26	18.31	20.59	23.12	25.88	28.84	31.90	35.00	37.90	TE5	3
	16.60	18.87	21.43	24.32	27.57	31.20	35.10	39.40	43.80	48.20	52.20	TE5	4
	17.54	19.70	22.17	25.01	28.24	31.90	36.00	40.60	45.60	50.90	56.20	TE12	5
	21.44	24.30	27.59	31.40	35.70	40.70	46.40	52.70	59.70	67.20	75.00	TE12	6
	27.12	30.20	33.70	37.80	42.60	48.10	54.50	61.80	69.90	79.00	88.00	TE12	7
	39.40	44.10	49.60	55.80	62.80	71.00	80.00	90.00	100.00	112.00	122.00	TE20	8
	40.60	45.50	51.20	57.70	65.20	74.00	84.00	95.00	108.00	121.00	135.00	TE20	9
	43.50	50.20	57.90	66.70	77.00	88.00	101.00	116.00	132.00	148.00	165.00	TE55	10
	47.00	54.20	62.50	72.00	83.00	95.00	109.00	125.00	142.00	159.00	178.00	TE55	11
	49.30	56.90	65.70	76.00	87.00	101.00	116.00	132.00	151.00	170.00	191.00	TE55	12
56.80	65.90	76.00	88.00	102.00	118.00	136.00	156.00	178.00	202.00	227.00	TE55	13	

Subcooling correction factor 'fsub'

'fsub' = saturated condensing temp. - liquid temp. at valve inlet

Subcooling [K]	2	4	10	15	20	25	30	35	40	45	50
Correction factor	0.97	1.00	1.08	1.15	1.22	1.29	1.36	1.43	1.50	1.57	1.64

Distributer correction factor*

fp' * = pressure drop from evaporator inlet to outlet

Evaporating temperature [°C]	Δp	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10
Pressure drop [bar]	0.0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	1.0	0.96	0.96	0.96	0.96	0.96	0.96	0.95	0.95	0.95	0.94	0.93
	1.5	0.94	0.94	0.94	0.94	0.94	0.94	0.93	0.93	0.93	0.92	0.91
	2.0	0.92	0.92	0.92	0.92	0.92	0.91	0.91	0.91	0.90	0.89	0.88

*calculated at 35°C condensing temperature

How to select a valve

Q (capacity) = 45kW

Q (capacity) = 45kW

Tcon (condensing temperature) = 25°C

fsub (subcooling correction factor) = 1.07

Example:

Tevap (evaporator temperature) = -30°C

fp (distribution correction factor) = 0.90

Tsub (subcooling temperature) = 10K

Dpd (distributer pressure drop) = 2 bar

$$\frac{Q}{f_{sub} \times f_p} = \text{Selected capacity}$$

$$\frac{45}{1.07 \times 0.90} = 46.7 \text{ kW}$$

The selection will be:

TE12 orifice 7 (53.1 kW > 46.7 kW)

Subcooling correction factor 'fsub'

Subcooling [K]	2	4	10	15
Correction factor	0.98	1.00	1.07	1.13

Distributer correction factor 'fp'

Evaporating temperature [°C]	Δp	-40	-35	-30
Pressure drop [bar]	0.00	1.00	1.00	1.00
	1.00	0.96	0.95	0.95
	1.50	0.93	0.93	0.93
	2.00	0.91	0.91	0.90

Capacity in kW, range N, -40°C to +10°C, opening superheat sh= 4 K

Cond. temp.	Evaporating [°C]				Valve	Orifice
	-40	-35	-30	-25		
25°C	31.40	35.80	40.50	45.60	TE12	6
	41.20	46.90	53.10	59.90	TE12	7
	54.50	62.50	71.00	80.00	TE20	8

Capacity in kW, range N, -40°C to +10°C, opening superheat sh= 4 K

R22

Condensing temperature	Evaporating [°C]											Valve type	Orifice
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10		
25°C	4.53	5.12	5.73	6.37	7.00	7.62	8.17	8.61	8.87	8.89	8.56	TE5	0.5
	8.33	9.40	10.54	11.70	12.87	13.98	14.97	15.75	16.20	16.18	15.53	TE5	1
	11.68	13.20	14.78	16.40	17.99	19.50	20.81	21.79	22.30	22.16	21.15	TE5	2
	14.83	16.77	18.82	20.94	23.05	25.07	26.84	28.21	28.94	28.81	27.53	TE5	3
	19.91	22.61	25.47	28.42	31.40	34.10	36.60	38.40	39.30	38.90	37.00	TE5	4
	24.44	27.70	31.20	34.90	38.80	42.50	46.00	48.90	50.70	51.10	49.40	TE12	5
	31.40	35.80	40.50	45.60	50.80	56.00	60.90	64.90	67.50	68.00	65.70	TE12	6
	41.20	46.90	53.10	59.90	67.00	74.00	81.00	87.00	90.00	91.00	88.00	TE12	7
	54.50	62.50	71.00	80.00	89.00	97.00	105.00	110.00	113.00	112.00	106.00	TE20	8
	60.10	69.50	80.00	91.00	102.00	113.00	123.00	131.00	136.00	135.00	128.00	TE20	9
	65.50	75.00	86.00	98.00	110.00	122.00	133.00	143.00	150.00	153.00	149.00	TE55	10
	72.00	83.00	95.00	108.00	121.00	134.00	147.00	157.00	165.00	167.00	163.00	TE55	11
78.00	90.00	103.00	117.00	132.00	147.00	161.00	174.00	183.00	187.00	183.00	TE55	12	
96.00	111.00	127.00	145.00	163.00	182.00	199.00	214.00	225.00	228.00	220.00	TE55	13	

Capacity in kW, range N, -40°C to +10°C, opening superheat sh= 4 K

R22

Condensing temperature	Evaporating [°C]											Valve type	Orifice
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10		
35°C	4.67	5.27	5.93	6.62	7.34	8.08	8.80	9.47	10.04	10.45	10.63	TE5	0.5
	8.56	9.69	10.90	12.18	13.51	14.85	16.16	17.36	18.37	19.07	19.34	TE5	1
	11.99	13.59	15.30	17.09	18.93	20.78	22.55	24.13	25.42	26.24	26.45	TE5	2
	15.15	17.14	19.30	21.59	23.98	26.40	28.76	30.90	32.70	33.90	34.20	TE5	3
	20.14	22.93	25.95	29.17	32.50	35.90	39.20	42.10	44.50	45.90	46.20	TE5	4
	24.56	27.70	31.20	34.90	39.00	43.20	47.50	51.70	55.30	58.10	59.50	TE12	5
	31.20	35.40	40.10	45.20	50.80	56.70	62.70	68.50	74.00	77.00	79.00	TE12	6
	40.30	45.50	51.30	57.70	64.70	72.00	80.00	88.00	95.00	101.00	104.00	TE12	7
	54.10	61.80	70.00	79.00	89.00	99.00	109.00	117.00	125.00	129.00	130.00	TE20	8
	58.00	66.70	76.00	87.00	99.00	111.00	124.00	136.00	146.00	153.00	155.00	TE20	9
	62.50	72.00	83.00	95.00	108.00	122.00	136.00	149.00	162.00	172.00	178.00	TE55	10
	68.60	79.00	91.00	105.00	119.00	133.00	149.00	163.00	177.00	187.00	194.00	TE55	11
	73.00	85.00	98.00	113.00	128.00	145.00	162.00	179.00	194.00	207.00	215.00	TE55	12
88.00	103.00	119.00	137.00	156.00	176.00	197.00	218.00	237.00	251.00	260.00	TE55	13	

Capacity in kW. range N. -40°C to +10°C. opening superheat sh= 4 K

R22

Condensing temperature	Evaporating [°C]											Valve type	Orifice
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10		
45°C	4.71	5.32	5.98	6.70	7.45	8.25	9.06	9.87	10.63	11.30	11.83	TE5	0.5
	8.62	9.76	10.99	12.32	13.72	15.19	16.68	18.15	19.53	20.72	21.64	TE5	1
	12.06	13.69	15.44	17.31	19.29	21.33	23.38	25.36	27.18	28.70	29.78	TE5	2
	15.15	17.13	19.28	21.62	24.11	26.72	29.39	32.00	34.50	36.60	38.10	TE5	3
	19.95	22.71	25.74	29.04	32.60	36.30	40.10	43.70	47.10	49.90	51.80	TE5	4
	24.18	27.08	30.30	33.90	37.80	42.10	46.60	51.20	55.80	60.10	63.70	TE12	5
	30.30	34.20	38.60	43.50	48.90	54.80	61.10	67.70	74.00	80.00	85.00	TE12	6
	38.80	43.30	48.30	54.00	60.40	67.40	75.00	83.00	92.00	100.00	107.00	TE12	7
	52.60	59.80	67.80	76.00	86.00	96.00	107.00	117.00	127.00	136.00	142.00	TE20	8
	55.00	62.80	71.00	81.00	92.00	104.00	117.00	130.00	144.00	156.00	165.00	TE20	9
	58.00	67.50	78.00	90.00	103.00	117.00	132.00	147.00	163.00	177.00	189.00	TE55	10
	63.20	74.00	85.00	98.00	112.00	127.00	143.00	160.00	176.00	192.00	205.00	TE55	11
	67.00	78.00	90.00	104.00	119.00	136.00	154.00	173.00	191.00	209.00	225.00	TE55	12
79.00	93.00	108.00	124.00	143.00	163.00	185.00	208.00	231.00	252.00	270.00	TE55	13	

Capacity in kW. range N. -40°C to +10°C. opening superheat sh= 4 K

R22

Condensing temperature	Evaporating [°C]											Valve type	Orifice
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10		
55°C	4.68	5.27	5.92	6.62	7.38	8.18	9.02	9.88	10.74	11.56	12.30	TE5	0.5
	8.55	9.66	10.87	12.18	13.59	15.09	16.65	18.24	19.81	21.29	22.60	TE5	1
	11.94	13.54	15.27	17.15	19.15	21.26	23.44	25.63	27.75	29.70	31.40	TE5	2
	14.93	16.82	18.90	21.17	23.62	26.25	29.00	31.80	34.60	37.20	39.60	TE5	3
	19.44	22.09	25.02	28.25	31.80	35.50	39.50	43.50	47.50	51.10	54.20	TE5	4
	23.48	26.08	28.97	32.20	35.80	39.70	44.00	48.50	53.30	58.10	62.70	TE12	5
	29.08	32.60	36.50	40.90	45.90	51.40	57.40	63.80	71.00	78.00	84.00	TE12	6
	37.00	40.80	45.00	49.80	55.10	61.20	67.90	75.00	84.00	92.00	101.00	TE12	7
	50.50	57.00	64.30	72.00	81.00	91.00	101.00	112.00	123.00	134.00	143.00	TE20	8
	51.70	58.40	66.00	75.00	84.00	95.00	107.00	120.00	134.00	148.00	161.00	TE20	9
	52.50	61.30	71.00	82.00	94.00	108.00	123.00	138.00	155.00	171.00	187.00	TE55	10
	56.80	66.30	77.00	89.00	102.00	116.00	132.00	149.00	167.00	184.00	201.00	TE55	11
	59.70	69.70	81.00	94.00	108.00	124.00	141.00	159.00	179.00	199.00	218.00	TE55	12
69.10	81.00	95.00	110.00	127.00	146.00	167.00	189.00	213.00	237.00	260.00	TE55	13	

Subcooling correction factor 'fsub'

'fsub' = saturated condensing temp. - liquid temp. at valve inlet

Subcooling [K]	2	4	10	15	20	25	30	35	40	45	50
Correction factor	0.98	1.00	1.07	1.13	1.19	1.25	1.30	1.36	1.42	1.47	1.53

Distributer correction factor*

'fp' * = pressure drop from evaporator onlet to outlet

Evaporating temp. [°C]	Δp	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10
Pressure drop [bar]	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	1.00	0.96	0.95	0.95	0.95	0.95	0.95	0.94	0.94	0.93	0.92	0.91
	1.50	0.93	0.93	0.93	0.93	0.92	0.92	0.91	0.91	0.90	0.88	0.86
	2.00	0.91	0.91	0.90	0.90	0.90	0.89	0.88	0.87	0.86	0.84	0.81

*calculated at 35°C condensing temperature

Capacity in kW. range B. -60°C to -25°C. opening superheat sh= 4 K

R22

Condensing temperature	Evaporating [°C]								Valve type	Orifice
	-60	-55	-50	-45	-40	-35	-30	-25		
20°C	2.63	3.12	3.66	4.25	4.87	5.52	6.18	6.84	TE5	0.5
	4.80	5.71	6.71	7.80	8.95	10.10	11.40	12.60	TE5	1
	6.68	7.96	9.38	10.90	12.60	14.20	15.90	17.60	TE5	2
	8.39	10.00	11.80	13.80	15.90	18.10	20.30	22.50	TE5	3
	11.00	13.20	15.70	18.50	21.40	24.50	27.60	30.60	TE5	4
	12.20	14.40	16.90	19.60	22.50	25.60	28.80	32.00	TE12	5
	15.80	18.80	22.10	25.80	29.90	34.20	38.70	43.30	TE12	6
	20.80	24.60	29.00	33.90	39.20	45.00	51.10	57.30	TE12	7
	29.58	34.97	40.91	47.29	54.00	60.84	67.57	73.89	TE20	8
	32.19	38.33	45.22	52.83	61.06	69.70	78.43	86.81	TE20	9
	30.70	36.00	41.90	48.10	54.50	61.00	67.20	72.90	TE55	9B
	36.30	43.00	50.40	58.60	67.50	76.80	86.30	95.70	TE55	10
	40.20	47.60	55.90	65.00	74.90	85.30	95.90	106.00	TE55	11
43.30	51.40	60.40	70.50	81.40	92.90	105.00	117.00	TE55	12	
53.10	63.20	74.60	87.30	101.00	116.00	131.00	147.00	TE55	13	

Capacity in kW. range B. -60°C to -25°C. opening superheat sh= 4 K

R22

Condensing temperature	Evaporating [°C]								Valve type	Orifice
	-60	-55	-50	-45	-40	-35	-30	-25		
30°C	2.70	3.21	3.78	4.40	5.07	5.78	6.52	7.28	TE5	0.5
	4.90	5.85	6.90	8.06	9.30	10.60	12.00	13.40	TE5	1
	6.78	8.11	9.61	11.30	13.00	14.90	16.80	18.80	TE5	2
	8.43	10.10	12.00	14.10	16.40	18.80	21.30	23.80	TE5	3
	10.80	13.10	15.70	18.60	21.80	25.20	28.80	32.40	TE5	4
	12.10	14.40	16.90	19.70	22.80	26.10	29.70	33.40	TE12	5
	15.50	18.40	21.80	25.70	29.90	34.50	39.50	44.80	TE12	6
	19.90	23.70	28.00	33.00	38.60	44.70	51.20	58.10	TE12	7
	28.88	34.34	40.45	47.14	54.32	61.83	69.46	76.95	TE20	8
	30.27	36.27	43.11	50.80	59.29	68.44	78.02	87.66	TE20	9
	30.00	35.40	41.30	47.80	54.60	61.70	68.70	75.50	TE55	9B
	34.70	41.20	48.70	57.00	66.00	75.80	86.00	96.40	TE55	10
	38.10	45.40	53.60	62.80	72.80	83.60	95.00	107.00	TE55	11
40.80	48.60	57.50	67.50	78.40	90.30	103.00	116.00	TE55	12	
49.10	58.70	69.70	82.10	95.80	111.00	127.00	143.00	TE55	13	

Subcooling correction factor 'fsub'

'fsub' = saturated condensing temp. - liquid temp. at valve inlet

Subcooling [K]	2	4	10	15	20	25	30	35	40	45	50
Correction factor	0.98	1.00	1.07	1.14	1.20	1.26	1.31	1.37	1.43	1.49	1.55

Distributer correction factor*

'fp' * = pressure drop from evaporator inlet to outlet

Evaporating temperature [°C]	Δp	-60	-55	-50	-45	-40	-35	-30	-25
Pressure drop [bar]	0.0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	1.0	0.96	0.96	0.96	0.96	0.96	0.95	0.95	0.95
	1.5	0.94	0.94	0.93	0.93	0.93	0.93	0.93	0.93
	2.0	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.90

*calculated at 35°C condensing temperature

Capacity in kW. range B. -60°C to -25°C. opening superheat sh= 4 K

R22

Condensing temperature	Evaporating [°C]								Valve type	Orifice
	-60	-55	-50	-45	-40	-35	-30	-25		
40°C	2.72	3.24	3.82	4.46	5.16	5.91	6.70	7.53	TE5	0.5
	4.92	5.88	6.96	8.15	9.45	10.90	12.30	13.90	TE5	1
	6.76	8.12	9.66	11.40	13.20	15.20	17.30	19.50	TE5	2
	8.31	10.00	11.90	14.10	16.50	19.00	21.70	24.50	TE5	3
	10.50	12.70	15.30	18.30	21.60	25.30	29.10	33.10	TE5	4
	11.80	14.00	16.50	19.40	22.50	26.00	29.70	33.60	TE12	5
	14.80	17.70	21.00	24.80	29.10	33.90	39.10	44.60	TE12	6
	18.60	22.20	26.40	31.30	36.70	42.90	49.60	56.70	TE12	7
	27.57	32.93	39.00	45.74	53.10	60.94	69.09	77.32	TE20	8
	27.69	33.37	39.90	47.33	55.67	64.84	74.67	84.87	TE20	9
	28.60	33.90	39.80	46.30	53.20	60.50	67.90	75.30	TE55	9B
	32.30	38.60	45.80	53.80	62.70	72.40	82.70	93.50	TE55	10
	35.30	42.20	50.10	58.90	68.70	79.40	90.80	103.00	TE55	11
37.50	44.90	53.30	62.80	73.40	85.00	97.50	111.00	TE55	12	
44.20	53.10	63.30	74.90	88.00	102.00	118.00	135.00	TE55	13	

Capacity in kW. range B. -60°C to -25°C. opening superheat sh= 4 K

R22

Condensing temperature	Evaporating [°C]								Valve type	Orifice
	-60	-55	-50	-45	-40	-35	-30	-25		
50°C	2.71	3.23	3.81	4.46	5.17	5.93	6.75	7.62	TE5	0.5
	4.87	5.83	6.91	8.12	9.44	10.90	12.40	14.00	TE5	1
	6.65	8.01	9.55	11.30	13.20	15.30	17.50	19.80	TE5	2
	8.08	9.75	11.70	13.80	16.20	18.80	21.60	24.60	TE5	3
	9.94	12.10	14.70	17.70	21.00	24.70	28.80	33.00	TE5	4
	11.20	13.30	15.80	18.60	21.70	25.20	28.90	33.00	TE12	5
	13.80	16.60	19.80	23.50	27.70	32.40	37.60	43.30	TE12	6
	17.00	20.30	24.30	28.90	34.20	40.10	46.60	53.70	TE12	7
	25.83	30.97	36.83	43.42	50.69	58.55	66.87	75.45	TE20	8
	24.69	29.91	35.95	42.90	50.77	59.54	69.11	79.25	TE20	9
	26.90	31.90	37.60	43.80	50.60	57.90	65.40	73.00	TE55	9B
	29.60	35.40	42.10	49.70	58.10	67.40	77.40	88.00	TE55	10
	32.00	38.40	45.70	53.90	63.20	73.30	84.30	95.90	TE55	11
33.70	40.40	48.20	57.00	66.90	77.80	89.70	102.00	TE55	12	
38.80	46.80	56.10	66.60	78.60	92.00	107.00	122.00	TE55	13	

Subcooling correction factor 'fsub'

'fsub' = saturated condensing temp. - liquid temp. at valve inlet

Subcooling [K]	2	4	10	15	20	25	30	35	40	45	50
Correction factor	0.98	1.00	1.07	1.14	1.20	1.26	1.31	1.37	1.43	1.49	1.55

Distributor correction factor*

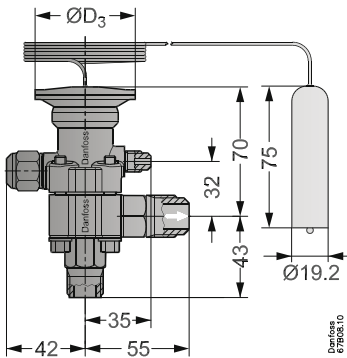
'fp' * = pressure drop from evaporator inlet to outlet

Evaporating temperature [°C]	Δp	-60	-55	-50	-45	-40	-35	-30	-25
Pressure drop [bar]	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	1.0	0.96	0.96	0.96	0.96	0.96	0.95	0.95	0.95
	1.5	0.94	0.94	0.93	0.93	0.93	0.93	0.93	0.93
	2.0	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.90

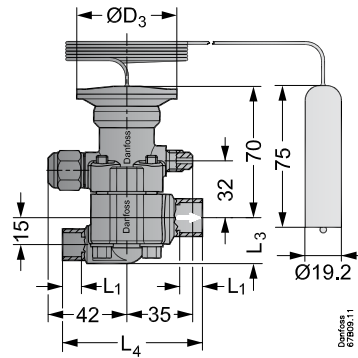
*calculated at 35°C condensing temperature

Dimensions and weights

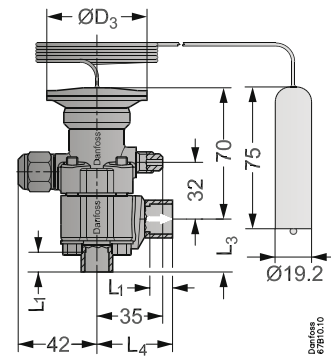
TE5



TE5 - Flare, angleway
Weight: 1.1 kg



TE5 - Solder, straightway
Weight: 1 kg



TE5 - Solder, angleway
Weight: 1 kg

TE5

Outlet side ØD ₁	L ₁ [mm]
½ in. / 12 mm ODF	10
¾ in. / 16 mm ODF	10
1 in. / 22 mm ODF	17

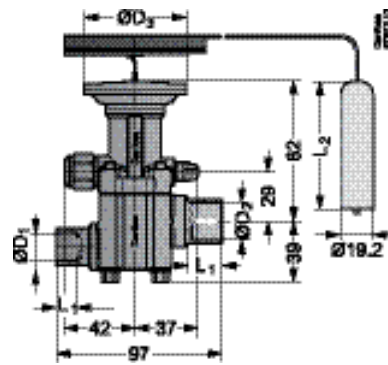
Outlet side ØD ₂	L ₁ [mm]
5/8 in. / 16 mm ODF	12
7/8 in. / 22 mm ODF	17
1 1/8 in. / 28 mm ODM	25

Element

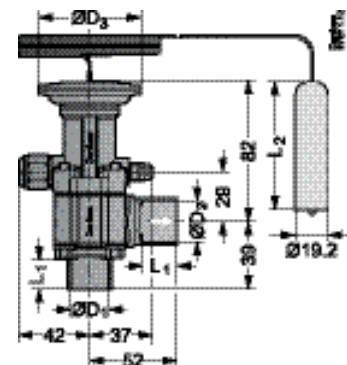
	ØD ₃ [mm]
Range N	53
Range B	60

	Valve body	L3	L4
Straight way	7/8 × 1 1/8	28	97
	22 X 28 mm		
	5/8 × 7/8		
	16 X 22 mm		
	Others	25	74
Angel way	7/8 × 1 1/8	39	52
	22 × 28 mm		
	Others	28	40

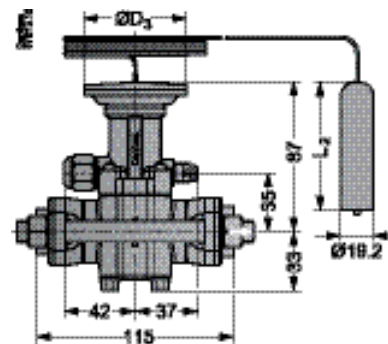
Dimensions and weights
(continued)



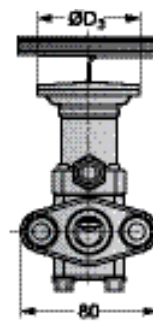
TE12 and 20 - Solder, straightway
Weight: TE12: 1.5 kg
TE20: 1.7 kg



TE12 and 20 - Solder, angleway
Weight: TE12: 1.5 kg
TE20: 1.6 kg



TE12 - Solder flanges, straightway
Weight: Without filter: 2.3 kg



TE12 and TE20

Inlet side ØD ₁	L ₁ mm
7/8 in. / 22 mm ODF	17

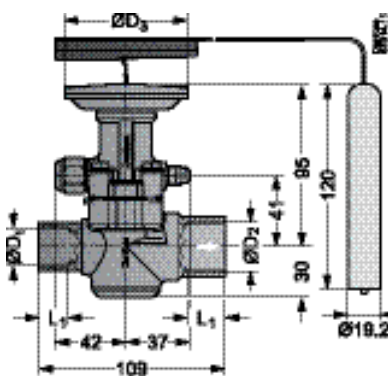
Outlet side ØD ₂	L ₁ [mm]
1 1/8 in. / 28 mm ODM	25

Bulb - TE12

	L ₂ mm	ØD ₃ mm
Range N	75.0	60
Range B	120.0	72

Bulb - TE20

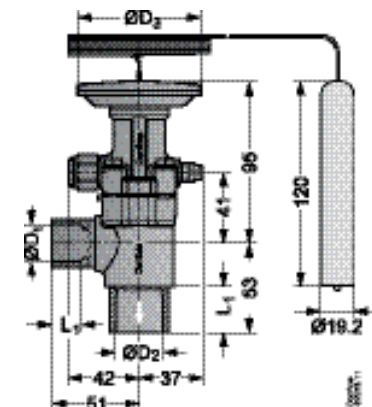
	L ₂ mm	ØD ₃ mm
Range N/B	120.0	72



TE55 - Solder, straightway
Weight: 1.7 kg

TE55

Inlet side ØD ₁	L ₁ [mm]
7/8 in. / 22 mm ODF	17
1 1/8 in. / 28 mm ODM	25



TE55 - Solder, angleway
Weight: 1.6 kg

Outlet side ØD ₂	L ₁ [mm]
1 1/8 in. / 28 mm ODF	22
1 3/8 in. / 35 mm ODM	27

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