

Data sheet

# Solenoid valves

## Type EVUL



EVUL solenoid valves are designed to fit into compact refrigeration systems. Available in servo operated versions they can be applied in liquid, suction, and hot gas lines.

EVUL solenoid valves can be used in many different refrigeration systems and are specially designed for:

- Commercial refrigeration systems
- Refrigeration appliances
- Liquid coolers
- Ice cube machines
- Mobile refrigeration systems
- Heat pump systems
- Air conditioning units

### Features

- Compact and light weight.
- Fully hermetic construction in stainless steel.
- Laser welded bimetal connections.
- High vibration resistance
- Excellent leak integrity
- Bimetal connections for fast soldering.
- No need of wet cloth / heat sink by soldering.
- Servo operated mini piston, sturdy and compact solenoid valve.
- Universal application for – liquid, suction, and hot gas applications.
- Minimum power consumption.
- Simple and fast mounting of coil.
- Encapsulated coils provide long life time even under extreme conditions.
- High MOPD capacity – up to 36 bar (522 psi)
- Build in filter in the inlet.

### Approvals

- UL Recognized Component (Canadian and US)
- Pressure Equipment Directive (PED) 2014/68/EU
- Low Voltage Directive (LVD) 2014/35/EU
- RoHS II



**Technical data**
**Refrigerants**

R744, R22/R407C, R404A/R507, R410A, R134a, R407A, R23, R290, R407F, R448A, R449A, R450A, and R452A.

For complete list of approved refrigerants, visit [www.products.danfoss.com](http://www.products.danfoss.com) and search for individual code numbers, where refrigerants are listed as part of technical data.


**Special note for R290:**

The EVUL is validated in accordance to ATEX, ISO 5149, IEC 60335, and UL. Ignition risk is evaluated in accordance to ISO 5149 and IEC 60335.

See safety note at the bottom of this page.

**Max. working pressure**

90 bar / 1305 psig

**Media temperature**

-40 °C / -40 °F – 105 °C / 221 °F , Max.130°C / 265°F during defrosting (~10 minutes)

**Ambient temperature**

-40 °C / -40 °F – 50 °C / 122 °F

**MOPD operating range**

EVUL 1 – 8: 0.02 - 36 bar / 0.29 - 522 psi

MOPD is measured with highest media and ambient temperature and 15% below nominal voltage.

MOPD (Max. Opening Pressure Differential) for media in gas form is approximately 0.97 bar greater.

$K_v$  value is the water flow in  $m^3 / \text{hour}$  at a pressure drop across valve  $\Delta p = 1 \text{ bar}$ ,  $\rho = 1000 \text{ Kg} / m^3$ .

$C_v$  value is the water flow in  $[\text{gal} / \text{min}]$  at a pressure drop across valve  $\Delta p = 1 \text{ psi}$ ,  $\rho = 10 \text{ lbs} / \text{gal}$

**Humidity**

0 – 100% R.H. (0-97% R.H. non-condensation condition if IP level is below IPX5).

**Liquid – Rated capacity [Kw]**
**SI units**

Type	R22/R407C	R134a	R404A/R507	R407A	R410A	R290	$K_v$ value [ $m^3 / \text{hour}$ ]
EVUL 1	2.01	1.65	1.38	1.85	2.02	2.24	0.10
EVUL 2	4.02	3.31	2.76	3.70	4.04	4.48	0.20
EVUL 3	6.03	4.96	4.14	5.55	6.06	6.72	0.30
EVUL 4	10.05	8.27	6.91	9.25	10.10	11.20	0.50
EVUL 5	13.06	10.75	8.98	12.02	13.13	14.55	0.65
EVUL 6	15.07	12.40	10.36	13.87	15.15	16.79	0.75
EVUL 8	18.09	14.88	12.43	16.65	18.18	20.15	0.90

**Suction vapor – Rated capacity [Kw]**
**SI units**

Type	R22/R407C	R134a	R404A/R507	R407A	R410A	R290	$K_v$ value [ $m^3 / \text{hour}$ ]
EVUL 1	0.16	0.13	0.14	0.16	0.21	0.27	0.10
EVUL 2	0.32	0.26	0.29	0.31	0.41	0.54	0.20
EVUL 3	0.48	0.38	0.43	0.47	0.62	0.82	0.30
EVUL 4	0.79	0.64	0.71	0.78	1.04	1.36	0.50
EVUL 5	1.03	0.83	0.93	1.01	1.35	1.77	0.65
EVUL 6	1.19	0.96	1.07	1.17	1.56	2.04	0.75
EVUL 8	1.43	1.15	1.29	1.40	1.87	2.45	0.90

Rated liquid and suction vapor capacity are based on:

- evaporating temperature  $t_e = -10 \text{ }^\circ\text{C}$ ,
- liquid temperature ahead of the valve  $t_l = 25 \text{ }^\circ\text{C}$ ,
- pressure drop in valve  $\Delta p = 0.15 \text{ bar}$ .

Rated hot gas capacity is based on:

- condensing temperature  $t_c = 40 \text{ }^\circ\text{C}$ ,
- hot gas temperature  $t_h = 65 \text{ }^\circ\text{C}$
- subcooling of refrigerant  $\Delta t_{\text{sub}} = 4 \text{ K}$
- Pressure drop across valve  $\Delta p = 0.8 \text{ bar}$

**Hot gas – Rated capacity [Kw]**
**SI units**

Type	R22/R407C	R134a	R404A/R507	R407A	R410A	R290	$K_v$ value [ $m^3 / \text{hour}$ ]
EVUL 1	0.42	0.32	0.34	0.41	0.49	1.02	0.10
EVUL 2	0.85	0.64	0.67	0.82	0.98	2.05	0.20
EVUL 3	1.27	0.96	1.01	1.22	1.46	3.07	0.30
EVUL 4	2.11	1.60	1.69	2.04	2.44	5.12	0.50
EVUL 5	2.75	2.08	2.19	2.65	3.17	6.67	0.65
EVUL 6	3.17	2.40	2.53	3.06	3.66	7.78	0.75
EVUL 8	3.80	2.88	3.03	3.67	4.39	9.21	0.90



The EVUL can be applied on systems with R290 as the working fluid.

For countries where safety standards are not an indispensable part of the safety system Danfoss recommends the installer gets a third party approval of any system containing flammable refrigerant. **Note:** please follow specific selection criteria stated in the datasheet for this particular refrigerants.

**Technical data**  
(continued)

*Liquid – Rated capacity<sup>1)</sup> [TR]*
**US units**

Type	R22/R407C	R134a	R404A/R507	R407A	R410A	R290	C <sub>v</sub> -value [gal / min]
EVUL 1	0.58	0.47	0.39	0.53	0.57	0.68	0.12
EVUL 2	1.15	0.93	0.79	1.06	1.15	1.37	0.23
EVUL 3	1.73	1.40	1.18	1.59	1.72	2.05	0.35
EVUL 4	2.88	2.33	1.97	2.65	2.87	3.42	0.58
EVUL 5	3.74	3.02	2.57	3.44	3.73	4.44	0.75
EVUL 6	4.32	3.49	2.96	3.97	4.31	5.13	0.87
EVUL 8	5.18	4.19	3.55	4.77	5.17	6.15	1.04

<sup>1)</sup> Rated liquid and suction capacity are based on:  
 - evaporating temperature  $t_e = 40\text{ °F}$ ,  
 - liquid temperature ahead of the valve  $t_l = 100\text{ °F}$ ,  
 - pressure drop  $\Delta p$  across valve – with liquid:  
 -  $\Delta p = 2\text{ psi}$  for R134a  
 -  $\Delta p = 3\text{ psi}$  for R22, R404A/R507 – with suction vapor:  $\Delta p = 1\text{ psi}$

*Suction vapor – Rated capacity<sup>1)</sup> [TR]*
**US units**

Type	R22/R407C	R134a	R404A/R507	R407A	R410A	R290	C <sub>v</sub> -value [gal / min]
EVUL 1	0.05	0.04	0.04	0.05	0.06	0.06	0.12
EVUL 2	0.10	0.08	0.09	0.09	0.12	0.12	0.23
EVUL 3	0.14	0.12	0.13	0.14	0.19	0.19	0.35
EVUL 4	0.24	0.20	0.22	0.24	0.31	0.31	0.58
EVUL 5	0.31	0.25	0.28	0.31	0.40	0.40	0.75
EVUL 6	0.36	0.29	0.32	0.35	0.47	0.47	0.87
EVUL 8	0.43	0.35	0.39	0.42	0.56	0.56	1.04

<sup>1)</sup> Rated liquid and suction capacity are based on:  
 - evaporating temperature  $t_e = 40\text{ °F}$ ,  
 - liquid temperature ahead of the valve  $t_l = 100\text{ °F}$ ,  
 - pressure drop  $\Delta p$  across valve – with liquid:  
 -  $\Delta p = 2\text{ psi}$  for R134a  
 -  $\Delta p = 3\text{ psi}$  for R22, R404A/R507 – with suction vapor:  $\Delta p = 1\text{ psi}$

*Hot gas – Rated capacity<sup>1)</sup> [TR]*
**US units**

Type	R22/R407C	R134a	R404A/R507	R407A	R410A	R290	C <sub>v</sub> -value [gal / min]
EVUL 1	0.10	0.07	0.08	0.09	0.11	0.13	0.12
EVUL 2	0.19	0.15	0.15	0.18	0.22	0.27	0.23
EVUL 3	0.29	0.22	0.23	0.28	0.33	0.40	0.35
EVUL 4	0.48	0.37	0.38	0.46	0.54	0.67	0.58
EVUL 5	0.62	0.48	0.49	0.60	0.70	0.86	0.75
EVUL 6	0.72	0.56	0.57	0.69	0.81	1.00	0.87
EVUL 8	0.86	0.67	0.68	0.83	0.98	1.19	1.04

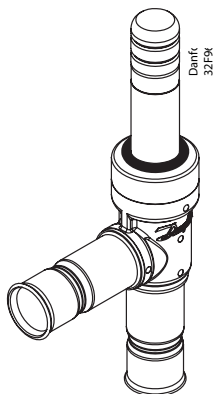
Rated hot gas capacity is based on:  
 - condensing temperature  $t_c = 100\text{ °F}$ ,  
 - hot gas temperature  $t_h = 140\text{ °F}$ ,  
 - pressure drop across valve  $\Delta p = 2\text{ psi}$

**Capacity R744**

Due to the fact that EVU only can be used for sub critical R744 application, capacity tables are not illustrated in this technical leaflet.

For capacity dimension please refer to Danfoss interactive calculation and selection tool CoolSelector® (DIR Calc).

Ordering valve

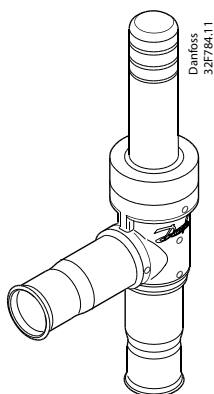


Normally closed (NC)

Valve type	Connections	Industrial pack		Multi pack	Connections	Industrial pack		Multi pack
	[in.]	Code no.	Pcs.	Code no.	[mm]	Code no.	Pcs.	Code no.
EVUL 1	1/4	<b>032F8200</b>	40	-	6	<b>032F8227</b>	40	-
	1/4	-	-	<b>032F9506</b>	6	-	-	<b>032F9508</b>
EVUL 2	1/4	<b>032F8201</b>	40	<b>032F9510</b>	6	<b>032F8228</b>	40	<b>032F9516</b>
EVUL 3	1/4	<b>032F8202</b>	40	<b>032F9511</b>	6	<b>032F8229</b>	40	<b>032F9517</b>
	3/8	<b>032F8203</b>	40	-	10	<b>032F8230</b>	40	-
EVUL 4	1/4	<b>032F8204</b>	40	<b>032F9512</b>	6	<b>032F8231</b>	40	<b>032F9518</b>
	3/8	<b>032F8205</b>	40	-	10	<b>032F8232</b>	40	-
	1/2	<b>032F8206</b>	40	-	12	<b>032F8233</b>	40	-
EVUL 5	3/8	<b>032F8207</b>	40	<b>032F9513</b>	10	<b>032F8234</b>	40	<b>032F9519</b>
	1/2	<b>032F8208</b>	40	-	12	<b>032F8235</b>	40	-
EVUL 6	3/8	<b>032F8209</b>	40	-	10	<b>032F8236</b>	40	-
	1/2	<b>032F8210</b>	40	<b>032F9514</b>	12	<b>032F8237</b>	40	<b>032F9521</b>
EVUL 8	1/2	<b>032F8211</b>	40	<b>032F9515</b>	12	<b>032F8238</b>	40	<b>032F9522</b>

Single pack = 1 product in a box with installation guide  
 Multi pack = box with x pieces single pack (can be split)  
 Industrial pack = x pieces in one box (cannot be split)

Normally closed (NC) - only works with UL/UR approved coils



Valve type	Connections [in.]	Industrial pack	
		Code no.	Pcs.
EVUL 1	1/4	<b>032F8245</b>	40
EVUL 2	1/4	<b>032F8246</b>	40
EVUL 3	1/4	<b>032F8247</b>	40
	3/8	<b>032F8248</b>	40
EVUL 4	1/4	<b>032F8249</b>	40
	3/8	<b>032F8250</b>	40
	1/2	<b>032F8251</b>	40
EVUL 5	3/8	<b>032F8252</b>	40
	1/2	<b>032F8253</b>	40
EVUL 6	3/8	<b>032F8254</b>	40
	1/2	<b>032F8255</b>	40
EVUL 8	1/2	<b>032F8256</b>	40

Single pack = 1 product in a box with installation guide  
 Multi pack = box with x pieces single pack (can be split)  
 Industrial pack = x pieces in one box (cannot be split)

Ordering coils



**Special note for R290:**

The EVUL coil (IP65/67) is validated in accordance to ISO 5149, IEC 60335 (ref. IEC/EN 60079-15). Ignition risk is evaluated in accordance to ISO 5149 and IEC 60335 (ref. IEC/EN 60079-15). See safety note at the bottom of this page.

Please make sure that there is no spark, arc on the spade connection during the application.

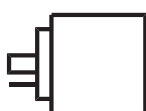
If coils are below IPx5, they must be protected against ultraviolet, moisture and major impact, especially the connection of coils.

Always Install a fuse ahead of the coil:  
rated current: two times of rated current,  
time lag: medium, to avoid short circuit.

The coil used in an area of not more than pollution degree 2.

Follow the installation guide to mount the coil correctly, and apply o-ring for sealing to prevent moisture penetrating inside the coil.

DIN spade connection



**Single pack**  
1 product in a box with installation guide  
**Multi pack**  
box with x pieces single pack  
(can be split)  
**Industrial pack**  
x pieces in one box (cannot be split)

Alternating current AC - with DIN plug <sup>1)</sup> - IP65

Type	Ambient Temp. [°C]	Supply voltage [V]	Voltage variation	Frequency [Hz]	Power consumption		Industrial pack		Multi pack
					[W]	[VA]	Code no.	Pcs.	Code no.
AS024CS	-40 – 50	24	-15% – 10%	50	9.5	18	-	-	042N7608
		24	-15% – 10%	60	7.0	14			
AS230CS	-40 – 50	230	-15% – 10%	50	8.0	16	-	-	042N7601
		208 – 240	-15% – 10%	60	7.0	14			
AS240CS	-40 – 50	240	-15% – 10%	50	6.5	13	-	-	042N7602
		240	-15% – 10%	60	5.0	10			

<sup>1)</sup> The three pins on the coil can be fitted with spade tabs, 6.3 mm wide (to DIN 46247). The two current carrying pins can also be fitted with spade tabs, 4.8 mm wide. Max. lead cross section: 1.5 mm<sup>2</sup>. If DIN plug is used (DIN 43650) the leads must be connected in the socket. The socket is fitted with a Pg 11 screwed entry for 6 – 12 mm.

Cable connection



**Single pack**  
1 product in a box with installation guide  
**Multi pack**  
box with x pieces single pack  
(can be split)  
**Industrial pack**  
x pieces in one box (cannot be split)

Alternating current AC with 1 m cable - IP67

Type	Ambient Temp. [°C]	Supply voltage [V]	Voltage variation	Frequency [Hz]	Power consumption		Industrial pack		Multi pack
					[W]	[VA]	Code no.	Pcs.	Code no.
AU115CS	-40 – 50	115	-15% – 10%	50	7.0	14	-	-	042N7662
		115	-15% – 10%	60	5.0	10			
AU230CS	-40 – 50	230	-15% – 10%	50	7.0	14	042N8651	20	042N7651
		230	-15% – 10%	60	5.0	10			
AU240CS	-40 – 50	240	-15% – 10%	50	6.5	13	042N8652	20	-
		240	-15% – 10%	60	5.0	10			



The EVUL coil (IP65/67) can be applied on systems with R290 as the working fluid.

For countries where safety standards are not an indispensable part of the safety system Danfoss recommend the installer to get a third party approval of the system containing flammable refrigerant.

**Note:** please follow specific selection criteria stated in the datasheet for these particular refrigerants.

**Note:** The EVUL coil (IP65/67) has NOT been verified ATEX or IECEx or IEC 60079 series zone 2 compliant. This product is only validated for systems in compliance with ISO5149, IEC 60335 (ref. IEC/EN 60079-15). It is the responsibility of the user to verify such compliance. Improper use can cause explosion, fire, leakage potentially causing death, personal injury, or damage to property.

## Data sheet | Solenoid valves, Type EVUL

### Ordering coils (continued)

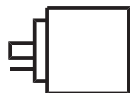
Cable connection



Direct current DC with 1 m cable IP67

Type	Ambient Temp. [°C]	Supply voltage [V]	Voltage variation	Frequency [Hz]	Power consumption		Industrial pack		Multi pack
					[W]	[VA]	Code no.	Pcs.	Code no.
AU012DS	-40 – 50	12	±10%	DC	12	–	042N8696	20	042N7696
AU024DS	-40 – 50	24	±10%	DC	14	–	042N8697	20	042N7697

DIN spade connection

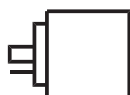


Direct current DC with DIN spade IP00

Type	Ambient Temp. [°C]	Supply voltage [V]	Voltage variation	Frequency [Hz]	Power consumption		Industrial pack		Multi pack
					[W]	[VA]	Code no.	Pcs.	Code no.
AS012DS	-40 – 60	12	±10%	DC	14	–	042N8686	40	–
AS024D	-40 – 50	24	±10%	DC	14	–	042N8687	40	042N7687

DC coils with 0.25 in. US spade can be supplied on request.

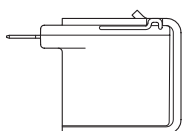
DIN spade (UL recognized version) connection



Alternating current AC with DIN spade (UL recognized version) IP00

Type	Ambient Temp. [°C]	Supply voltage [V]	Voltage variation	Frequency [Hz]	Power consumption		Industrial pack		Multi pack
					[W]	[VA]	Code no.	Pcs.	Code no.
AZ240CS	-40 – 50	230	-15% – 10%	50	8.0	16	042N8201	40	042N4201
		208 – 240	-15% – 10%	60	7.0	14			
AZ120CS	-40 – 50	115	-15% – 10%	50	8.5	16	042N8202	40	042N4202
		110 – 120	-15% – 10%	60	7.0	14			
AZ024CS	-40 – 50	24	-15% – 10%	50	9.5	18	042N8203	40	042N4203
		24	-15% – 10%	60	7.0	14			

0.25 in. US spade connections



Alternating current AC with US spade IP00

Type	Ambient Temp. [°C]	Supply voltage [V]	Voltage variation	Frequency [Hz]	Power consumption		Industrial pack		Multi pack
					[W]	[VA]	Code no.	Pcs.	Code no.
AY240C	-40 – 50	208 – 240	-15% – 10%	50	8.0	16	042N8230	40	042N4230
		208 – 240	-15% – 10%	60	8.0	16			
AY120C	-40 – 50	110 – 120	-15% – 10%	50	8.0	16	042N8233	40	042N4233
		110 – 120	-15% – 10%	60	8.0	16			
AY024C	-40 – 50	24	-15% – 10%	50	8.0	16	042N8236	40	–
		24	-15% – 10%	60	8.0	16			

Single pack

1 product in a box with installation guide

Multi pack

box with x pieces single pack

(can be split)

Industrial pack

x pieces in one box (cannot be split)

### Accessories

Part	Description	Multi pack	
		Code no.	Pcs.
	DIN plug	042N0156	100
	O-ring for sealing the coil. Industrial pack (50 pcs.) <b>NB:</b> Valve body supplied with O-ring	032F6115	125

**Capacity  
Liquid capacity  $Q_e$  [kW]**

SI Units

Type	$K_v$ [m <sup>3</sup> / h]	Liquid capacity $Q_e$ [kW] at pressure drop across valve $\Delta p$ [bar]				
		0.1	0.2	0.3	0.4	0.5

**R22/R407C**

EVUL 1	0.10	1.6	2.2	2.7	3.1	3.5
EVUL 2	0.20	3.1	4.4	5.4	6.3	7.0
EVUL 3	0.30	4.7	6.7	8.1	9.4	10.5
EVUL 4	0.50	7.8	11.1	13.6	15.7	17.5
EVUL 5	0.65	10.2	14.4	17.6	20.4	22.8
EVUL 6	0.75	11.8	16.6	20.4	23.5	26.3
EVUL 8	0.90	14.1	20.0	24.4	28.2	31.5

**R134a**

EVUL 1	0.10	1.52	2.15	2.63	3.04	3.40
EVUL 2	0.20	3.04	4.30	5.27	6.08	6.80
EVUL 3	0.30	4.56	6.45	7.90	9.12	10.20
EVUL 4	0.50	7.60	10.75	13.17	15.20	17.00
EVUL 5	0.65	9.88	13.98	17.12	19.76	22.10
EVUL 6	0.75	11.40	16.13	19.75	22.81	25.50
EVUL 8	0.90	13.68	19.35	23.70	27.37	30.60

**R404A/R507**

EVUL 1	0.10	1.1	1.6	1.9	2.2	2.5
EVUL 2	0.20	2.2	3.1	3.9	4.5	5.0
EVUL 3	0.30	3.3	4.7	5.8	6.7	7.5
EVUL 4	0.50	5.6	7.9	9.6	11.1	12.4
EVUL 5	0.65	7.2	10.2	12.5	14.5	16.2
EVUL 6	0.75	8.3	11.8	14.5	16.7	18.7
EVUL 8	0.90	10.0	14.2	17.3	20.0	22.4

**R410A**

EVUL 1	0.10	1.6	2.3	2.8	3.2	3.6
EVUL 2	0.20	3.2	4.6	5.6	6.4	7.2
EVUL 3	0.30	4.8	6.8	8.4	9.7	10.8
EVUL 4	0.50	8.1	11.4	14.0	16.1	18.0
EVUL 5	0.65	10.5	14.8	18.1	20.9	23.4
EVUL 6	0.75	12.1	17.1	20.9	24.2	27.0
EVUL 8	0.90	14.5	20.5	25.1	29.0	32.4

**R290**

EVUL 1	0.10	1.8	2.6	3.2	3.7	4.1
EVUL 2	0.20	3.7	5.2	6.3	7.3	8.2
EVUL 3	0.30	5.5	7.8	9.5	11.0	12.3
EVUL 4	0.50	9.1	12.9	15.8	18.3	20.4
EVUL 5	0.65	11.9	16.8	20.6	23.8	26.6
EVUL 6	0.75	13.7	19.4	23.7	27.4	30.7
EVUL 8	0.90	16.5	23.3	28.5	32.9	36.8

Capacities are based on:  
 - liquid temperature  $t_l = 25$  °C ahead of valve,  
 - evaporating temperature  $t_e = -10$  °C,  
 - superheat: 0 K.

**Correction factors for liquid temperature  $t_l$** 

$t_l$ [°C]	-10	0	10	15	20	25	30	35	40	45	50
R22/R407C	0.76	0.82	0.88	0.92	0.96	1.00	1.05	1.10	1.16	1.22	1.30
R134a	0.73	0.79	0.86	0.90	0.95	1.00	1.06	1.12	1.19	1.27	1.37
R404A/507	0.65	0.72	0.81	0.86	0.93	1.00	1.09	1.20	1.33	1.51	1.74
R410A	0.73	0.79	0.86	0.90	0.95	1.00	1.06	1.14	1.23	1.33	1.47
R290	0.74	0.79	0.86	0.90	0.95	1.00	1.05	1.12	1.19	1.28	1.36

When sizing valves, the plant capacity must be multiplied by a correction factor depending on liquid temperature  $t_l$  ahead of valve / evaporator. When the corrected capacity is known, the selection can be made from the table.

Capacity  
Suction vapour  
capacity  $Q_e$  [kW]

SI Units

Type	$K_v$ [m <sup>3</sup> / h]	Pressure drop $\Delta p$ [bar]	Suction vapour capacity $Q_e$ [kW] at Evaporating temperature $t_e$ [°C]					
			-40	-30	-20	-10	0	10

**R22/R407C**

EVUL 1	0.10	0.1	0.077	0.104	0.134	0.170	0.210	0.255
		0.15	0.090	0.124	0.162	0.206	0.255	0.311
		0.2	0.100	0.139	0.184	0.235	0.293	0.357
EVUL 2	0.20	0.1	0.154	0.207	0.269	0.339	0.419	0.510
		0.15	0.181	0.248	0.324	0.411	0.510	0.622
		0.2	0.199	0.279	0.368	0.470	0.585	0.715
EVUL 3	0.30	0.1	0.231	0.311	0.403	0.509	0.629	0.765
		0.15	0.271	0.372	0.486	0.617	0.765	0.933
		0.2	0.299	0.418	0.553	0.705	0.878	1.072
EVUL 4	0.50	0.1	0.386	0.518	0.672	0.848	1.048	1.275
		0.15	0.452	0.619	0.810	1.028	1.275	1.555
		0.2	0.499	0.697	0.921	1.175	1.463	1.787
EVUL 5	0.65	0.1	0.501	0.674	0.873	1.102	1.363	1.658
		0.15	0.588	0.805	1.053	1.336	1.658	2.021
		0.2	0.648	0.906	1.197	1.528	1.901	2.323
EVUL 6	0.75	0.1	0.579	0.778	1.008	1.272	1.573	1.913
		0.15	0.679	0.929	1.215	1.542	1.913	2.332
		0.2	0.748	1.045	1.381	1.763	2.194	2.680
EVUL 8	0.90	0.1	0.694	0.933	1.209	1.526	1.887	2.296
		0.15	0.814	1.115	1.458	1.850	2.296	2.798
		0.2	0.897	1.254	1.658	2.115	2.633	3.216

Capacities are based on dry, saturated vapour ahead of valve.

Capacities are based on:  
 - liquid temperature  $t_l = 25$  °C ahead of evaporator.  
 The table values refer to the evaporator capacity and are given as a function of:  
 - evaporating temperature  $t_e$ ,  
 - pressure drop  $\Delta p$  in valve.

*Correction factors for liquid temperature  $t_l$*

$t_l$ [°C]	10	15	20	25	30	35	40	45	50
<b>R22/R407C</b>	0.90	0.93	0.96	1.00	1.04	1.08	1.13	1.18	1.24

When sizing valves, the plant capacity must be multiplied by a correction factor depending on liquid temperature  $t_l$  ahead of valve evaporator. When the corrected capacity is known, the selection can be made from the table.



**Capacity  
Suction vapour  
capacity  $Q_e$  [kW]**  
(continued)

SI Units

Type	$K_v$ [m <sup>3</sup> / h]	Pressure drop $\Delta p$ [bar]	Suction vapour capacity $Q_e$ [kW] at Evaporating temperature $t_e$ [°C]					
			-40	-30	-20	-10	0	10

**R134a**

EVUL 1	0.10	0.1	0.056	0.078	0.104	0.134	0.169	0.208
		0.15	0.062	0.091	0.124	0.162	0.204	0.253
		0.2	0.065	0.100	0.139	0.183	0.233	0.290
EVUL 2	0.20	0.1	0.111	0.156	0.208	0.268	0.338	0.417
		0.15	0.125	0.182	0.248	0.323	0.409	0.507
		0.2	0.130	0.201	0.278	0.366	0.467	0.580
EVUL 3	0.30	0.1	0.167	0.234	0.312	0.402	0.506	0.625
		0.15	0.187	0.274	0.372	0.485	0.613	0.760
		0.2	0.196	0.301	0.417	0.550	0.700	0.871
EVUL 4	0.50	0.1	0.278	0.390	0.520	0.671	0.844	1.042
		0.15	0.312	0.456	0.620	0.808	1.022	1.267
		0.2	0.326	0.501	0.696	0.916	1.167	1.451
EVUL 5	0.65	0.1	0.361	0.507	0.676	0.872	1.097	1.355
		0.15	0.405	0.593	0.806	1.050	1.329	1.646
		0.2	0.424	0.652	0.905	1.191	1.517	1.886
EVUL 6	0.75	0.1	0.416	0.585	0.780	1.006	1.266	1.563
		0.15	0.468	0.684	0.930	1.211	1.533	1.900
		0.2	0.489	0.752	1.044	1.374	1.750	2.176
EVUL 8	0.90	0.1	0.500	0.702	0.936	1.207	1.519	1.876
		0.15	0.561	0.821	1.116	1.454	1.840	2.280
		0.2	0.587	0.902	1.252	1.649	2.100	2.612

Capacities are based on dry, saturated vapour ahead of valve.

 Capacities are based on:  
 - liquid temperature  $t_l = 25$  °C ahead of evaporator.  
 The table values refer to the evaporator capacity and are given as a function of:  
 - evaporating temperature  $t_e$ ,  
 - pressure drop  $\Delta p$  in valve.

**Correction factors for liquid temperature  $t_l$** 

$t_l$ [°C]	10	15	20	25	30	35	40	45	50
<b>R134a</b>	0.88	0.92	0.96	1.00	1.05	1.10	1.16	1.23	1.31

 When sizing valves, the plant capacity must be multiplied by a correction factor depending on liquid temperature  $t_l$  ahead of valve evaporator. When the corrected capacity is known, the selection can be made from the table.

**Capacity  
Suction vapour  
capacity  $Q_e$  [kW]**  
(continued)

SI Units

Type	$K_v$ [m <sup>3</sup> / h]	Pressure drop $\Delta p$ [bar]	Suction vapour capacity $Q_e$ [kW] at Evaporating temperature $t_e$ [°C]					
			-40	-30	-20	-10	0	10

**R404A/R507**

EVUL 1	0.10	0.1	0.075	0.099	0.127	0.159	0.196	0.239
		0.15	0.089	0.119	0.154	0.194	0.239	0.291
		0.2	0.100	0.135	0.176	0.222	0.275	0.335
EVUL 2	0.20	0.1	0.150	0.198	0.254	0.319	0.393	0.477
		0.15	0.179	0.239	0.308	0.388	0.479	0.583
		0.2	0.201	0.271	0.352	0.444	0.550	0.670
EVUL 3	0.30	0.1	0.225	0.297	0.381	0.478	0.589	0.716
		0.15	0.268	0.358	0.462	0.581	0.718	0.874
		0.2	0.301	0.406	0.527	0.666	0.825	1.005
EVUL 4	0.50	0.1	0.375	0.495	0.635	0.797	0.982	1.194
		0.15	0.447	0.596	0.769	0.969	1.197	1.457
		0.2	0.502	0.677	0.879	1.110	1.375	1.676
EVUL 5	0.65	0.1	0.488	0.644	0.826	1.036	1.277	1.552
		0.15	0.582	0.775	1.000	1.260	1.556	1.893
		0.2	0.653	0.880	1.142	1.444	1.788	2.178
EVUL 6	0.75	0.1	0.563	0.743	0.953	1.195	1.474	1.790
		0.15	0.671	0.895	1.154	1.453	1.796	2.185
		0.2	0.754	1.016	1.318	1.666	2.063	2.514
EVUL 8	0.90	0.1	0.675	0.891	1.143	1.434	1.768	2.148
		0.15	0.805	1.074	1.385	1.744	2.155	2.622
		0.2	0.904	1.219	1.582	1.999	2.475	3.016

Capacities are based on dry, saturated vapour ahead of valve.  
During operation with superheated vapour ahead of valve, the capacities are reduced by 4% for each 10 K superheat.

Capacities are based on:  
- liquid temperature  $t_l = 25$  °C ahead of evaporator.  
The table values refer to the evaporator capacity and are given as a function of:  
- evaporating temperature  $t_e$ ,  
- pressure drop  $\Delta p$  in valve.

*Correction factors for liquid temperature  $t_l$*

$t_l$ [°C]	10	15	20	25	30	35	40	45	50
<b>R404A/R507</b>	0.84	0.89	0.94	1.00	1.07	1.16	1.26	1.40	1.57

When sizing valves, the plant capacity must be multiplied by a correction factor depending on liquid temperature  $t_l$  ahead of valve evaporator. When the corrected capacity is known, the selection can be made from the table.

**Capacity  
Suction vapour  
capacity  $Q_e$  [kW]**  
(continued)

SI Units

Type	$K_v$ [m <sup>3</sup> / h]	Pressure drop $\Delta p$ [bar]	Suction vapour capacity $Q_e$ [kW] at Evaporating temperature $t_e$ [°C]					
			-40	-30	-20	-10	0	10

**R410A**

EVUL 1	0.10	0.1	0.117	0.150	0.187	0.229	0.276	0.329
		0.15	0.141	0.182	0.228	0.279	0.337	0.402
		0.2	0.160	0.207	0.261	0.321	0.388	0.463
EVUL 2	0.20	0.1	0.235	0.300	0.375	0.459	0.553	0.657
		0.15	0.282	0.363	0.455	0.559	0.674	0.803
		0.2	0.320	0.415	0.522	0.642	0.776	0.925
EVUL 3	0.30	0.1	0.352	0.450	0.562	0.688	0.829	0.986
		0.15	0.423	0.545	0.683	0.838	1.012	1.205
		0.2	0.480	0.622	0.783	0.963	1.164	1.388
EVUL 4	0.50	0.1	0.587	0.750	0.936	1.146	1.382	1.644
		0.15	0.706	0.909	1.138	1.397	1.686	2.008
		0.2	0.799	1.037	1.305	1.605	1.940	2.313
EVUL 5	0.65	0.1	0.763	0.976	1.217	1.490	1.796	2.137
		0.15	0.917	1.181	1.480	1.816	2.192	2.610
		0.2	1.039	1.348	1.696	2.086	2.522	3.007
EVUL 6	0.75	0.1	0.880	1.126	1.405	1.720	2.072	2.465
		0.15	1.059	1.363	1.708	2.096	2.529	3.012
		0.2	1.199	1.555	1.957	2.407	2.910	3.469
EVUL 8	0.90	0.1	1.056	1.351	1.686	2.064	2.487	2.958
		0.15	1.270	1.635	2.049	2.515	3.035	3.614
		0.2	1.439	1.866	2.348	2.889	3.492	4.163

Capacities are based on dry, saturated vapour ahead of valve.  
During operation with superheated vapour ahead of valve, the capacities are reduced by 4% for each 10 K superheat.

Capacities are based on:  
- liquid temperature  $t_l = 25$  °C ahead of evaporator.  
The table values refer to the evaporator capacity and are given as a function of:  
- evaporating temperature  $t_e$ ,  
- pressure drop  $\Delta p$  in valve.

*Correction factors for liquid temperature  $t_l$*

$t_l$ [°C]	10	15	20	25	30	35	40	45	50
R410A	0.89	0.92	0.96	1.00	1.05	1.11	1.18	1.26	1.37

When sizing valves, the plant capacity must be multiplied by a correction factor depending on liquid temperature  $t_l$  ahead of valve evaporator. When the corrected capacity is known, the selection can be made from the table.

**Capacity  
Suction vapour  
capacity  $Q_e$  [kW]**  
(continued)

SI Units

Type	$K_v$ [m <sup>3</sup> / h]	Pressure drop $\Delta p$ [bar]	Suction vapour capacity $Q_e$ [kW] at Evaporating temperature $t_e$ [°C]					
			-40	-30	-20	-10	0	10

**R290**

EVUL 1	0.10	0.1	0.113	0.146	0.184	0.227	0.276	0.330
		0.15	0.134	0.176	0.222	0.275	0.335	0.402
		0.2	0.150	0.199	0.253	0.315	0.384	0.462
EVUL 2	0.20	0.1	0.226	0.292	0.368	0.454	0.551	0.660
		0.15	0.269	0.351	0.445	0.551	0.670	0.804
		0.2	0.301	0.397	0.507	0.630	0.769	0.924
EVUL 3	0.30	0.1	0.340	0.439	0.552	0.681	0.827	0.990
		0.15	0.403	0.527	0.667	0.826	1.006	1.207
		0.2	0.451	0.596	0.760	0.945	1.153	1.386
EVUL 4	0.50	0.1	0.566	0.731	0.920	1.135	1.378	1.650
		0.15	0.672	0.878	1.112	1.377	1.676	2.011
		0.2	0.752	0.993	1.267	1.575	1.922	2.311
EVUL 5	0.65	0.1	0.736	0.950	1.196	1.476	1.791	2.145
		0.15	0.874	1.141	1.446	1.790	2.179	2.614
		0.2	0.978	1.291	1.647	2.048	2.499	3.004
EVUL 6	0.75	0.1	0.849	1.097	1.380	1.703	2.067	2.475
		0.15	1.008	1.317	1.668	2.066	2.514	3.017
		0.2	1.128	1.490	1.900	2.363	2.883	3.466
EVUL 8	0.90	0.1	1.019	1.316	1.656	2.043	2.480	2.971
		0.15	1.210	1.580	2.001	2.479	3.017	3.620
		0.2	1.354	1.788	2.280	2.836	3.460	4.159

Capacities are based on dry, saturated vapour ahead of valve.

During operation with superheated vapour ahead of valve, the capacities are reduced by 4% for each 10 K superheat.

Capacities are based on:

- liquid temperature  $t_l = 25$  °C ahead of evaporator.

The table values refer to the evaporator capacity and are given as a function of:

- evaporating temperature  $t_e$ ,

- pressure drop  $\Delta p$  in valve.

*Correction factors for liquid temperature  $t_l$*

$t_l$ [°C]	10	15	20	25	30	35	40	45	50
<b>R290</b>	0.51	0.65	0.82	1.00	1.21	1.44	1.57	1.26	1.37

When sizing valves, the plant capacity must be multiplied by a correction factor depending on liquid temperature  $t_l$  ahead of valve evaporator. When the corrected capacity is known, the selection can be made from the table.

Capacity  
Hot gas capacity  $Q_h$  [kW]

SI Units

Type	$K_v$ [m <sup>3</sup> /h]	Pressure drop across valve $\Delta p$ [bar]	Hot gas capacity $Q_h$ [kW]				
			Evaporating temp. $t_e = -10$ °C. Hot gas temp. $t_h = t_c + 25$ K Subcooling $\Delta t_{sub} = 4$ K				
			1) Condensing temp. $t_c$ [°C]				
			20	30	40	50	60

R22/R407C

EVUL 1	0.10	0.1	0.29	0.31	0.33	0.34	0.34
		0.2	0.41	0.44	0.46	0.48	0.48
		0.4	0.57	0.61	0.65	0.67	0.68
		0.8	0.79	0.85	0.90	0.94	0.95
		1.6	1.05	1.15	1.23	1.29	1.32
EVUL 2	0.20	0.1	0.58	0.62	0.65	0.68	0.69
		0.2	0.82	0.88	0.92	0.95	0.97
		0.4	1.14	1.23	1.29	1.34	1.36
		0.8	1.57	1.70	1.80	1.87	1.91
		1.6	2.10	2.30	2.46	2.58	2.65
EVUL 3	0.30	0.1	0.88	0.93	0.98	1.01	1.03
		0.2	1.23	1.31	1.38	1.43	1.45
		0.4	1.72	1.84	1.94	2.01	2.04
		0.8	2.36	2.55	2.70	2.81	2.86
		1.6	3.14	3.45	3.70	3.88	3.97
EVUL 4	0.50	0.1	1.46	1.56	1.63	1.69	1.71
		0.2	2.05	2.19	2.30	2.38	2.42
		0.4	2.86	3.07	3.23	3.35	3.40
		0.8	3.94	4.25	4.50	4.68	4.77
		1.6	5.24	5.75	6.16	6.46	6.62
EVUL 5	0.65	0.1	1.90	2.02	2.12	2.19	2.23
		0.2	2.67	2.85	2.99	3.09	3.14
		0.4	3.72	3.99	4.20	4.35	4.43
		0.8	5.12	5.52	5.85	6.08	6.20
		1.6	6.81	7.48	8.01	8.40	8.61
EVUL 6	0.75	0.1	2.19	2.33	2.45	2.53	2.57
		0.2	3.08	3.28	3.45	3.57	3.63
		0.4	4.29	4.60	4.85	5.02	5.11
		0.8	5.90	6.37	6.75	7.02	7.16
		1.6	7.86	8.63	9.24	9.69	9.94
EVUL 8	0.90	0.1	2.63	2.80	2.94	3.04	3.08
		0.2	3.69	3.94	4.14	4.29	4.35
		0.4	5.15	5.52	5.82	6.03	6.13
		0.8	7.08	7.65	8.10	8.42	8.59
		1.6	9.43	10.35	11.09	11.63	11.92

1) Bubble point

Capacities are based on:  
 - evaporating temp.  $t_e = -10$  °C,  
 - hot gas temp.  $t_h = t_c + 25$  K,  
 - subcooling  $\Delta t_{sub} = 4$  K.

An increase in hot gas temperature  $t_h$  of 10 K, based on  $t_h = t_c + 25$  °C, reduces valve capacity approx. 2% and vice versa.  
 A change in evaporating temperature  $t_e$  changes valve capacity; see correction factor table.

Correction factors for evaporating temperature  $t_e$

$t_e$ [°C]	-40	-30	-20	-10	0	10
R22 / R407C	0.92	0.95	0.98	1.00	1.02	1.04

When sizing valves, the table value must be multiplied by a correction factor depending on evaporating temperature  $t_e$ .

**Capacity**  
**Hot gas capacity  $Q_h$  [kW]**  
*(continued)*

SI Units

Type	$K_v$ [m <sup>3</sup> / h]	Pressure drop across valve $\Delta p$ [bar]	Hot gas capacity $Q_h$ [kW]				
			Evaporating temp. $t_e = -10$ °C. Hot gas temp. $t_h = t_c + 25$ K Subcooling $\Delta t_{sub} = 4$ K				
			1) Condensing temp. $t_c$ [°C]				
			20	30	40	50	60

**R134a**

EVUL 1	0.10	0.1	0.23	0.25	0.26	0.26	0.26
		0.2	0.32	0.34	0.36	0.37	0.37
		0.4	0.45	0.48	0.50	0.52	0.51
		0.8	0.60	0.65	0.69	0.71	0.72
		1.6	0.76	0.85	0.93	0.97	0.98
EVUL 2	0.20	0.1	0.46	0.49	0.51	0.52	0.52
		0.2	0.65	0.69	0.72	0.74	0.73
		0.4	0.89	0.96	1.01	1.03	1.03
		0.8	1.20	1.31	1.38	1.43	1.43
		1.6	1.51	1.71	1.85	1.94	1.96
EVUL 3	0.30	0.1	0.69	0.74	0.77	0.78	0.78
		0.2	0.97	1.03	1.08	1.10	1.10
		0.4	1.34	1.44	1.51	1.55	1.54
		0.8	1.80	1.96	2.08	2.14	2.15
		1.6	2.27	2.56	2.78	2.91	2.95
EVUL 4	0.50	0.1	1.16	1.23	1.28	1.31	1.30
		0.2	1.62	1.72	1.80	1.84	1.83
		0.4	2.23	2.40	2.51	2.58	2.57
		0.8	3.00	3.27	3.46	3.57	3.58
		1.6	3.78	4.27	4.63	4.85	4.91
EVUL 5	0.65	0.1	1.50	1.60	1.67	1.70	1.69
		0.2	2.10	2.24	2.34	2.39	2.38
		0.4	2.90	3.12	3.27	3.35	3.34
		0.8	3.90	4.25	4.50	4.64	4.66
		1.6	4.91	5.55	6.01	6.30	6.38
EVUL 6	0.75	0.1	1.74	1.84	1.92	1.96	1.95
		0.2	2.43	2.59	2.70	2.76	2.75
		0.4	3.35	3.59	3.77	3.86	3.86
		0.8	4.50	4.90	5.19	5.36	5.37
		1.6	5.67	6.40	6.94	7.27	7.37
EVUL 8	0.90	0.1	2.08	2.21	2.31	2.35	2.34
		0.2	2.91	3.10	3.24	3.31	3.30
		0.4	4.02	4.31	4.52	4.64	4.63
		0.8	5.40	5.88	6.23	6.43	6.45
		1.6	6.80	7.69	8.33	8.72	8.84

1) Bubble point

Capacities are based on:  
 - evaporating temp.  $t_e = -10$  °C,  
 - hot gas temp.  $t_h = t_c + 25$  K,  
 - subcooling  $\Delta t_{sub} = 4$  K.

An increase in hot gas temperature  $t_h$  of 10 K, based on  $t_h = t_c + 25$  °C, reduces valve capacity approx. 2% and vice versa.  
 A change in evaporating temperature  $t_e$  changes valve capacity; see correction factor table.

**Correction factors for evaporating temperature  $t_e$**

$t_e$ [°C]	-40	-30	-20	-10	0	10
R134a	0.88	0.92	0.96	1.00	1.04	1.08

When sizing valves, the table value must be multiplied by a correction factor depending on evaporating temperature  $t_e$ .

**Capacity**  
**Hot gas capacity Q<sub>h</sub> [kW]**  
*(continued)*

SI Units

Type	K <sub>v</sub> [m <sup>3</sup> / h]	Pressure drop across valve Δp [bar]	Hot gas capacity Q <sub>h</sub> [kW]				
			Evaporating temp. t <sub>e</sub> = -10 °C. Hot gas temp. t <sub>h</sub> = t <sub>c</sub> + 25 K Subcooling Δt <sub>sub</sub> = 4 K				
			<sup>1)</sup> Condensing temp. t <sub>c</sub> [°C]				
			20	30	40	50	60

**R404A/R507**

EVUL 1	0.10	0.1	0.26	0.27	0.27	0.26	0.23
		0.2	0.37	0.38	0.38	0.36	0.32
		0.4	0.52	0.53	0.53	0.51	0.46
		0.8	0.72	0.74	0.74	0.71	0.64
		1.6	0.96	1.01	1.02	0.98	0.89
EVUL 2	0.20	0.1	0.53	0.54	0.53	0.51	0.46
		0.2	0.74	0.76	0.75	0.72	0.65
		0.4	1.04	1.06	1.06	1.02	0.91
		0.8	1.43	1.48	1.48	1.42	1.28
		1.6	1.93	2.01	2.03	1.97	1.79
EVUL 3	0.30	0.1	0.79	0.81	0.80	0.77	0.69
		0.2	1.11	1.14	1.13	1.08	0.97
		0.4	1.56	1.59	1.59	1.52	1.37
		0.8	2.15	2.22	2.22	2.13	1.93
		1.6	2.89	3.02	3.05	2.95	2.68
EVUL 4	0.50	0.1	1.32	1.35	1.34	1.28	1.15
		0.2	1.85	1.90	1.88	1.80	1.62
		0.4	2.59	2.66	2.65	2.54	2.29
		0.8	3.58	3.69	3.69	3.55	3.21
		1.6	4.81	5.03	5.08	4.92	4.47
EVUL 5	0.65	0.1	1.71	1.75	1.74	1.66	1.49
		0.2	2.41	2.46	2.45	2.34	2.11
		0.4	3.37	3.45	3.44	3.30	2.97
		0.8	4.66	4.80	4.80	4.62	4.17
		1.6	6.26	6.54	6.61	6.40	5.81
EVUL 6	0.75	0.1	1.98	2.02	2.00	1.92	1.72
		0.2	2.78	2.84	2.83	2.70	2.43
		0.4	3.89	3.99	3.97	3.81	3.43
		0.8	5.37	5.54	5.54	5.33	4.81
		1.6	7.22	7.55	7.62	7.38	6.70
EVUL 8	0.90	0.1	2.37	2.42	2.41	2.30	2.07
		0.2	3.34	3.41	3.39	3.25	2.92
		0.4	4.67	4.78	4.76	4.57	4.12
		0.8	6.45	6.65	6.65	6.40	5.78
		1.6	8.67	9.06	9.15	8.86	8.04

<sup>1)</sup> Bubble point

Capacities are based on:  
 - evaporating temp. t<sub>e</sub> = -10 °C,  
 - hot gas temp. t<sub>h</sub> = t<sub>c</sub> + 25 K,  
 - subcooling Δt<sub>sub</sub> = 4 K.

An increase in hot gas temperature t<sub>h</sub> of 10 K, based on t<sub>h</sub> = t<sub>c</sub> + 25 °C, reduces valve capacity approx. 2% and vice versa.  
 A change in evaporating temperature t<sub>e</sub> changes valve capacity; see correction factor table.

**Correction factors for evaporating temperature t<sub>e</sub>**

t <sub>e</sub> [°C]	-40	-30	-20	-10	0	10
R404A/R507	0.85	0.90	0.95	1.00	1.05	1.09

When sizing valves, the table value must be multiplied by a correction factor depending on evaporating temperature t<sub>e</sub>.

**Capacity**  
**Hot gas capacity Q<sub>h</sub> [kW]**  
*(continued)*

SI Units

Type	K <sub>v</sub> [m <sup>3</sup> / h]	Pressure drop across valve Δp [bar]	Hot gas capacity Q <sub>h</sub> [kW]				
			Evaporating temp. t <sub>e</sub> = -10 °C. Hot gas temp. t <sub>h</sub> = t <sub>c</sub> + 25 K Subcooling Δt <sub>sub</sub> = 4 K				
			<sup>1)</sup> Condensing temp. t <sub>c</sub> [°C]				
			20	30	40	50	60

**R410A**

EVUL 1	0.10	0.1	0.37	0.39	0.40	0.40	0.39
		0.2	0.52	0.54	0.56	0.56	0.54
		0.4	0.73	0.76	0.79	0.79	0.77
		0.8	1.01	1.07	1.11	1.12	1.08
		1.6	1.38	1.47	1.54	1.56	1.51
EVUL 2	0.20	0.1	0.73	0.77	0.79	0.80	0.77
		0.2	1.03	1.09	1.12	1.13	1.09
		0.4	1.45	1.53	1.58	1.59	1.54
		0.8	2.02	2.14	2.21	2.23	2.16
		1.6	2.76	2.95	3.07	3.11	3.02
EVUL 3	0.30	0.1	1.10	1.16	1.19	1.20	1.16
		0.2	1.55	1.63	1.68	1.69	1.63
		0.4	2.18	2.29	2.37	2.38	2.30
		0.8	3.03	3.20	3.32	3.35	3.24
		1.6	4.14	4.42	4.61	4.67	4.54
EVUL 4	0.50	0.1	1.84	1.93	1.99	1.99	1.93
		0.2	2.59	2.72	2.80	2.82	2.72
		0.4	3.63	3.82	3.94	3.97	3.84
		0.8	5.05	5.34	5.53	5.58	5.40
		1.6	6.90	7.37	7.68	7.78	7.56
EVUL 5	0.65	0.1	2.39	2.51	2.58	2.59	2.50
		0.2	3.36	3.53	3.64	3.66	3.54
		0.4	4.72	4.97	5.13	5.16	4.99
		0.8	6.56	6.94	7.19	7.25	7.02
		1.6	8.97	9.58	9.98	10.11	9.83
EVUL 6	0.75	0.1	2.75	2.89	2.98	2.99	2.89
		0.2	3.88	4.08	4.20	4.22	4.08
		0.4	5.44	5.73	5.92	5.95	5.76
		0.8	7.57	8.01	8.29	8.36	8.10
		1.6	10.35	11.05	11.51	11.67	11.34
EVUL 8	0.90	0.1	3.31	3.47	3.57	3.59	3.47
		0.2	4.66	4.89	5.04	5.07	4.90
		0.4	6.53	6.88	7.10	7.14	6.91
		0.8	9.09	9.61	9.95	10.04	9.72
		1.6	12.42	13.26	13.82	14.00	13.61

<sup>1)</sup> Bubble point

Capacities are based on:  
 - evaporating temp. t<sub>e</sub> = -10 °C,  
 - hot gas temp. t<sub>h</sub> = t<sub>c</sub> + 25 K,  
 - subcooling Δt<sub>sub</sub> = 4 K.

An increase in hot gas temperature t<sub>h</sub> of 10 K, based on t<sub>h</sub> = t<sub>c</sub> + 25 °C, reduces valve capacity approx. 2% and vice versa.  
 A change in evaporating temperature t<sub>e</sub> changes valve capacity; see correction factor table.

**Correction factors for evaporating temperature t<sub>e</sub>**

t <sub>e</sub> [°C]	-40	-30	-20	-10	0	10
R410A	0.92	0.95	0.98	1.00	1.02	1.03

When sizing valves, the table value must be multiplied by a correction factor depending on evaporating temperature t<sub>e</sub>.



**Capacity**  
**Hot gas capacity  $Q_h$  [kW]**  
*(continued)*

SI Units

Type	$K_v$ [m <sup>3</sup> / h]	Pressure drop across valve $\Delta p$ [bar]	Hot gas capacity $Q_h$ [kW]				
			Evaporating temp. $t_e = -10$ °C. Hot gas temp. $t_h = t_c + 25$ K Subcooling $\Delta t_{sub} = 4$ K				
			1) Condensing temp. $t_c$ [°C]				
			20	30	40	50	60

**R290**

EVUL 1	0.10	0.1	0.35	0.37	0.37	0.37	0.36
		0.2	0.49	0.51	0.53	0.53	0.51
		0.4	0.69	0.72	0.74	0.74	0.72
		0.8	0.94	0.99	1.02	1.03	1.01
		1.6	1.25	1.34	1.39	1.41	1.39
EVUL 2	0.20	0.1	0.70	0.73	0.75	0.75	0.73
		0.2	0.99	1.03	1.05	1.05	1.03
		0.4	1.37	1.44	1.48	1.48	1.45
		0.8	1.88	1.99	2.05	2.06	2.02
		1.6	2.49	2.67	2.78	2.83	2.79
EVUL 3	0.30	0.1	1.06	1.10	1.12	1.12	1.09
		0.2	1.48	1.54	1.58	1.58	1.54
		0.4	2.06	2.16	2.21	2.22	2.17
		0.8	2.83	2.98	3.07	3.09	3.03
		1.6	3.74	4.01	4.18	4.24	4.18
EVUL 4	0.50	0.1	1.76	1.83	1.87	1.87	1.82
		0.2	2.47	2.57	2.63	2.64	2.57
		0.4	3.44	3.60	3.69	3.70	3.62
		0.8	4.71	4.96	5.12	5.16	5.05
		1.6	6.23	6.68	6.96	7.07	6.97
EVUL 5	0.65	0.1	2.29	2.38	2.43	2.43	2.37
		0.2	3.21	3.34	3.42	3.43	3.34
		0.4	4.47	4.67	4.79	4.81	4.70
		0.8	6.12	6.45	6.65	6.70	6.57
		1.6	8.10	8.68	9.05	9.19	9.06
EVUL 6	0.75	0.1	2.64	2.75	2.81	2.81	2.74
		0.2	3.70	3.86	3.95	3.95	3.86
		0.4	5.16	5.39	5.53	5.55	5.42
		0.8	7.06	7.45	7.68	7.73	7.58
		1.6	9.35	10.01	10.44	10.61	10.45
EVUL 8	0.90	0.1	3.17	3.29	3.37	3.37	3.28
		0.2	4.44	4.63	4.74	4.75	4.63
		0.4	6.19	6.47	6.64	6.66	6.51
		0.8	8.48	8.93	9.21	9.28	9.09
		1.6	11.22	12.02	12.53	12.73	12.54

1) Bubble point

Capacities are based on:  
 - evaporating temp.  $t_e = -10$  °C,  
 - hot gas temp.  $t_h = t_c + 25$  K,  
 - subcooling  $\Delta t_{sub} = 4$  K.

An increase in hot gas temperature  $t_h$  of 10 K, based on  $t_h = t_c + 25$  °C, reduces valve capacity approx. 2% and vice versa.  
 A change in evaporating temperature  $t_e$  changes valve capacity; see correction factor table.

**Correction factors for evaporating temperature  $t_e$**

$t_e$ [°C]	-40	-30	-20	-10	0	10
<b>R290</b>	0.88	0.92	0.96	1.00	1.04	1.07

When sizing valves, the table value must be multiplied by a correction factor depending on evaporating temperature  $t_e$ .

Capacity  
Liquid capacity  $Q_e$  [TR]

US Units

Type	$C_v$ [gal / min]	Liquid capacity $Q_e$ [TR] at pressure drop across valve $\Delta p$ [psi]						
		1	2	3	4	5	6	7

**R22/R407C**

EVUL 1	0.12	0.3	0.5	0.6	0.7	0.7	0.8	0.9
EVUL 2	0.23	0.7	0.9	1.2	1.3	1.5	1.6	1.8
EVUL 3	0.35	1.0	1.4	1.7	2.0	2.2	2.4	2.6
EVUL 4	0.58	1.7	2.4	2.9	3.3	3.7	4.1	4.4
EVUL 5	0.75	2.2	3.1	3.7	4.3	4.8	5.3	5.7
EVUL 6	0.87	2.5	3.5	4.3	5.0	5.6	6.1	6.6
EVUL 8	1.04	3.0	4.2	5.2	6.0	6.7	7.3	7.9

**R134a**

EVUL 1	0.12	0.33	0.47	0.57	0.66	0.74	0.81	0.87
EVUL 2	0.23	0.66	0.93	1.14	1.32	1.47	1.61	1.74
EVUL 3	0.35	0.99	1.40	1.71	1.97	2.21	2.42	2.61
EVUL 4	0.58	1.64	2.33	2.85	3.29	3.68	4.03	4.35
EVUL 5	0.75	2.14	3.02	3.70	4.27	4.78	5.24	5.66
EVUL 6	0.87	2.47	3.49	4.27	4.93	5.51	6.04	6.53
EVUL 8	1.04	2.96	4.19	5.13	5.92	6.62	7.25	7.83

**R404A/R507**

EVUL 1	0.12	0.2	0.3	0.4	0.5	0.5	0.6	0.6
EVUL 2	0.23	0.5	0.6	0.8	0.9	1.0	1.1	1.2
EVUL 3	0.35	0.7	1.0	1.2	1.4	1.5	1.7	1.8
EVUL 4	0.58	1.1	1.6	2.0	2.3	2.5	2.8	3.0
EVUL 5	0.75	1.5	2.1	2.6	3.0	3.3	3.6	3.9
EVUL 6	0.87	1.7	2.4	3.0	3.4	3.8	4.2	4.5
EVUL 8	1.04	2.1	2.9	3.6	4.1	4.6	5.0	5.4

**R410A**

EVUL 1	0.12	0.3	0.5	0.6	0.7	0.7	0.8	0.9
EVUL 2	0.23	0.7	0.9	1.1	1.3	1.5	1.6	1.8
EVUL 3	0.35	1.0	1.4	1.7	2.0	2.2	2.4	2.6
EVUL 4	0.58	1.7	2.3	2.9	3.3	3.7	4.1	4.4
EVUL 5	0.75	2.2	3.0	3.7	4.3	4.8	5.3	5.7
EVUL 6	0.87	2.5	3.5	4.3	5.0	5.6	6.1	6.6
EVUL 8	1.04	3.0	4.2	5.2	6.0	6.7	7.3	7.9

**R290**

EVUL 1	0.12	0.4	0.6	0.7	0.8	0.9	1.0	1.0
EVUL 2	0.23	0.8	1.1	1.4	1.6	1.8	1.9	2.1
EVUL 3	0.35	1.2	1.7	2.1	2.4	2.6	2.9	3.1
EVUL 4	0.58	2.0	2.8	3.4	3.9	4.4	4.8	5.2
EVUL 5	0.75	2.6	3.6	4.4	5.1	5.7	6.3	6.8
EVUL 6	0.87	3.0	4.2	5.1	5.9	6.6	7.2	7.8
EVUL 8	1.04	3.6	5.0	6.2	7.1	7.9	8.7	9.4

Capacities are based on:  
 - liquid temperature:  $t_l = 100$  °F ahead of valve,  
 - evaporating temperature:  $t_e = 40$  °F,  
 - superheat temperature:  $(t_e + 10$  °F) = 50 °F.

Correction factors for liquid temperature  $t_l$

$t_l$ [°F]	80	90	100	110	120
Factor	1.10	1.05	1.00	0.95	0.90

When liquid temperature  $t_l$  ahead of the expansion valve is other than 100 °F, adjust the table capacities by multiplying them by the appropriate correction factor found in the following table.

Capacity  
Suction vapour capacity  
 $Q_e$  [TR]

US Units

Type	$C_v$ [gal / min]	Pressure drop $\Delta p$ [psi]	Suction vapour capacity $Q_e$ [TR] at evaporating temperature $t_e$ [°F]							
			-40	-20	0	10	20	30	40	50

R22/R407C

EVUL 1	0.12	1	0.016	0.022	0.030	0.034	0.038	0.043	0.048	0.054
		2	0.022	0.031	0.041	0.047	0.053	0.060	0.067	0.075
		3	0.025	0.036	0.049	0.057	0.065	0.073	0.082	0.092
EVUL 2	0.23	1	0.032	0.045	0.059	0.067	0.076	0.086	0.096	0.107
		2	0.043	0.061	0.082	0.094	0.107	0.120	0.135	0.151
		3	0.050	0.072	0.099	0.113	0.129	0.146	0.164	0.183
EVUL 3	0.35	1	0.049	0.067	0.089	0.101	0.115	0.129	0.144	0.161
		2	0.065	0.092	0.123	0.141	0.160	0.180	0.202	0.226
		3	0.075	0.109	0.148	0.170	0.194	0.219	0.246	0.275
EVUL 4	0.58	1	0.081	0.112	0.148	0.169	0.191	0.215	0.240	0.268
		2	0.108	0.153	0.206	0.235	0.267	0.301	0.337	0.376
		3	0.124	0.181	0.247	0.283	0.323	0.365	0.410	0.458
EVUL 5	0.75	1	0.105	0.145	0.193	0.219	0.248	0.279	0.313	0.348
		2	0.141	0.199	0.267	0.305	0.347	0.391	0.438	0.489
		3	0.161	0.236	0.321	0.368	0.419	0.474	0.533	0.595
EVUL 6	0.87	1	0.122	0.168	0.222	0.253	0.286	0.322	0.361	0.402
		2	0.162	0.230	0.308	0.352	0.400	0.451	0.506	0.565
		3	0.186	0.272	0.370	0.425	0.484	0.547	0.615	0.687
EVUL 8	1.04	1	0.146	0.201	0.267	0.304	0.344	0.387	0.433	0.482
		2	0.195	0.275	0.370	0.423	0.480	0.541	0.607	0.678
		3	0.224	0.326	0.444	0.510	0.581	0.657	0.738	0.824

The table values refer to evaporator capacity and are given as a function of:  
 - evaporating temperature  $t_e$ ,  
 - pressure drop  $\Delta p$  across the valve.

Capacities are based on:  
 - liquid temperature  $t_l = 100$  °F ahead of the expansion valve,  
 - superheat  $t_s = 7$  °F.  
 For each additional 10 °F of superheat, the table capacities must be reduced by 2%.

Correction factors for liquid temperature  $t_l$

$t_l$ [°F]	80	90	100	110	120
Factor	1.10	1.05	1.00	0.95	0.90

When liquid temperature  $t_l$  ahead of the expansion valve is other than 100 °F, adjust the table capacities by multiplying them by the appropriate correction factor found in the following table.

**Capacity  
Suction vapour capacity  
Q<sub>e</sub> [TR]  
(continued)**
**US Units**

Type	C <sub>v</sub> [gal / min]	Pressure drop Δp [psi]	Suction vapour capacity Q <sub>e</sub> [TR] at evaporating temperature t <sub>e</sub> [°F]						
			-40	-20	0	10	20	30	40

**R134a**

EVUL 1	0.12	1	0.012	0.017	0.023	0.027	0.031	0.035	0.039	0.044
		2	0.015	0.023	0.032	0.037	0.042	0.048	0.055	0.062
		3	0.016	0.026	0.038	0.044	0.051	0.058	0.066	0.075
EVUL 2	0.23	1	0.024	0.034	0.046	0.053	0.061	0.069	0.078	0.088
		2	0.030	0.045	0.063	0.074	0.085	0.096	0.109	0.123
		3	0.032	0.052	0.075	0.088	0.101	0.116	0.132	0.149
EVUL 3	0.35	1	0.036	0.051	0.070	0.080	0.092	0.104	0.117	0.132
		2	0.045	0.068	0.095	0.110	0.127	0.145	0.164	0.185
		3	0.048	0.078	0.113	0.132	0.152	0.174	0.198	0.224
EVUL 4	0.58	1	0.059	0.085	0.116	0.134	0.153	0.173	0.196	0.220
		2	0.075	0.114	0.159	0.184	0.211	0.241	0.273	0.308
		3	0.080	0.131	0.188	0.219	0.254	0.290	0.330	0.373
EVUL 5	0.75	1	0.077	0.111	0.151	0.174	0.198	0.225	0.254	0.286
		2	0.098	0.148	0.206	0.239	0.275	0.313	0.355	0.400
		3	0.104	0.170	0.244	0.285	0.330	0.378	0.429	0.484
EVUL 6	0.87	1	0.089	0.128	0.174	0.200	0.229	0.260	0.294	0.330
		2	0.113	0.170	0.238	0.276	0.317	0.362	0.410	0.461
		3	0.120	0.196	0.281	0.329	0.380	0.436	0.495	0.559
EVUL 8	1.04	1	0.107	0.153	0.209	0.240	0.275	0.312	0.352	0.396
		2	0.135	0.205	0.286	0.331	0.381	0.434	0.492	0.554
		3	0.144	0.235	0.338	0.395	0.456	0.523	0.594	0.671

The table values refer to evaporator capacity and are given as a function of:  
 - evaporating temperature t<sub>e</sub>,  
 - pressure drop Δp across the valve.

Capacities are based on:  
 - liquid temperature t<sub>l</sub> = 100 °F ahead of the expansion valve,  
 - superheat t<sub>s</sub> = 7 °F.  
 For each additional 10 °F of superheat, the table capacities must be reduced by 2%.

**Correction factors for liquid temperature t<sub>l</sub>**

t <sub>l</sub> [°F]	80	90	100	110	120
<b>Factor</b>	1.10	1.05	1.00	0.95	0.90

When liquid temperature t<sub>l</sub> ahead of the expansion valve is other than 100 °F, adjust the table capacities by multiplying them by the appropriate correction factor found in the following table.

**Capacity**  
**Suction vapour capacity**  
**Q<sub>e</sub> [TR]**  
*(continued)*

US Units

Type	C <sub>v</sub> [gal / min]	Pressure drop Δp [psi]	Suction vapour capacity Q <sub>e</sub> [TR] at evaporating temperature t <sub>e</sub> [°F]						
			-40	-20	0	10	20	30	40

**R404A/R507**

EVUL 1	0.12	1	0.015	0.020	0.026	0.030	0.034	0.038	0.043	0.048
		2	0.020	0.028	0.037	0.042	0.048	0.054	0.060	0.068
		3	0.023	0.033	0.045	0.051	0.058	0.065	0.074	0.082
EVUL 2	0.23	1	0.029	0.040	0.053	0.060	0.068	0.077	0.086	0.096
		2	0.040	0.055	0.074	0.084	0.096	0.108	0.121	0.135
		3	0.047	0.066	0.089	0.102	0.116	0.131	0.147	0.165
EVUL 3	0.35	1	0.044	0.060	0.079	0.090	0.102	0.115	0.129	0.144
		2	0.060	0.083	0.111	0.126	0.143	0.162	0.181	0.203
		3	0.070	0.099	0.134	0.153	0.174	0.196	0.221	0.247
EVUL 4	0.58	1	0.073	0.100	0.132	0.151	0.170	0.192	0.215	0.240
		2	0.100	0.138	0.184	0.211	0.239	0.269	0.302	0.338
		3	0.117	0.166	0.223	0.255	0.290	0.327	0.368	0.411
EVUL 5	0.75	1	0.095	0.130	0.172	0.196	0.222	0.249	0.280	0.312
		2	0.130	0.180	0.240	0.274	0.310	0.350	0.393	0.439
		3	0.153	0.215	0.290	0.332	0.377	0.426	0.478	0.535
EVUL 6	0.87	1	0.110	0.150	0.198	0.226	0.256	0.288	0.323	0.360
		2	0.149	0.207	0.277	0.316	0.358	0.404	0.453	0.506
		3	0.176	0.248	0.334	0.383	0.435	0.491	0.552	0.617
EVUL 8	1.04	1	0.132	0.180	0.238	0.271	0.307	0.345	0.387	0.432
		2	0.179	0.249	0.332	0.379	0.430	0.485	0.544	0.608
		3	0.211	0.298	0.401	0.459	0.522	0.589	0.662	0.741

The table values refer to evaporator capacity and are given as a function of:  
 - evaporating temperature t<sub>e</sub>,  
 - pressure drop Δp across the valve.

Capacities are based on:  
 - liquid temperature t<sub>l</sub> = 100 °F ahead of the expansion valve,  
 - superheat t<sub>s</sub> = 7 °F.  
 For each additional 10 °F of superheat, the table capacities must be reduced by 2%.

*Correction factors for liquid temperature t<sub>l</sub>*

t <sub>l</sub> [°F]	80	90	100	110	120
Factor	1.10	1.05	1.00	0.95	0.90

When liquid temperature t<sub>l</sub> ahead of the expansion valve is other than 100 °F, adjust the table capacities by multiplying them by the appropriate correction factor found in the following table.

**Capacity**  
**Suction vapour capacity**  
**Q<sub>e</sub> [TR]**  
*(continued)*

US Units

Type	C <sub>v</sub> [gal / min]	Pressure drop Δp [psi]	Suction vapour capacity Q <sub>e</sub> [TR] at evaporating temperature t <sub>e</sub> [°F]						
			-40	-20	0	10	20	30	40

**R410A**

EVUL 1	0.12	1	0.024	0.032	0.041	0.046	0.051	0.056	0.062	0.068
		2	0.033	0.044	0.057	0.064	0.071	0.079	0.087	0.096
		3	0.040	0.054	0.069	0.078	0.087	0.096	0.107	0.118
EVUL 2	0.23	1	0.049	0.064	0.081	0.091	0.101	0.112	0.124	0.137
		2	0.067	0.089	0.114	0.128	0.143	0.158	0.175	0.193
		3	0.080	0.107	0.138	0.155	0.173	0.193	0.213	0.235
EVUL 3	0.35	1	0.073	0.096	0.122	0.137	0.152	0.169	0.186	0.205
		2	0.100	0.133	0.171	0.192	0.214	0.237	0.262	0.289
		3	0.120	0.161	0.207	0.233	0.260	0.289	0.320	0.353
EVUL 4	0.58	1	0.121	0.159	0.203	0.228	0.254	0.281	0.311	0.342
		2	0.167	0.222	0.285	0.319	0.356	0.396	0.437	0.482
		3	0.200	0.268	0.345	0.388	0.434	0.482	0.534	0.588
EVUL 5	0.75	1	0.158	0.207	0.264	0.296	0.330	0.366	0.404	0.444
		2	0.218	0.288	0.370	0.415	0.463	0.514	0.569	0.626
		3	0.260	0.348	0.449	0.505	0.564	0.627	0.694	0.764
EVUL 6	0.87	1	0.182	0.239	0.305	0.341	0.380	0.422	0.466	0.513
		2	0.251	0.333	0.427	0.479	0.535	0.594	0.656	0.723
		3	0.299	0.401	0.518	0.582	0.651	0.723	0.800	0.882
EVUL 8	1.04	1	0.218	0.287	0.366	0.410	0.456	0.506	0.559	0.615
		2	0.301	0.399	0.512	0.575	0.641	0.712	0.787	0.867
		3	0.359	0.482	0.622	0.699	0.781	0.868	0.960	1.058

The table values refer to evaporator capacity and are given as a function of:  
 - evaporating temperature t<sub>e</sub>,  
 - pressure drop Δp across the valve.

Capacities are based on:  
 - liquid temperature t<sub>l</sub> = 100 °F ahead of the expansion valve,  
 - superheat t<sub>s</sub> = 7 °F.  
 For each additional 10 °F of superheat, the table capacities must be reduced by 2%.

*Correction factors for liquid temperature t<sub>l</sub>*

t <sub>l</sub> [°F]	80	90	100	110	120
<b>Factor</b>	1.10	1.05	1.00	0.95	0.90

When liquid temperature t<sub>l</sub> ahead of the expansion valve is other than 100 °F, adjust the table capacities by multiplying them by the appropriate correction factor found in the following table.

**Capacity**  
**Suction vapour capacity**  
**Q<sub>e</sub> [TR]**  
*(continued)*

US Units

Type	C <sub>v</sub> [gal / min]	Pressure drop Δp [psi]	Suction vapour capacity Q <sub>e</sub> [TR] at evaporating temperature t <sub>e</sub> [°F]						
			-40	-20	0	10	20	30	40

**R290**

EVUL 1	0.12	1	0.024	0.031	0.040	0.046	0.051	0.057	0.063	0.070
		2	0.032	0.043	0.056	0.063	0.071	0.080	0.088	0.098
		3	0.038	0.052	0.068	0.077	0.086	0.096	0.107	0.119
EVUL 2	0.23	1	0.047	0.063	0.081	0.091	0.102	0.114	0.126	0.139
		2	0.064	0.086	0.112	0.127	0.142	0.159	0.177	0.196
		3	0.075	0.103	0.135	0.153	0.172	0.193	0.215	0.238
EVUL 3	0.35	1	0.071	0.094	0.121	0.137	0.153	0.170	0.189	0.209
		2	0.096	0.130	0.169	0.190	0.214	0.239	0.265	0.294
		3	0.113	0.155	0.203	0.230	0.259	0.289	0.322	0.357
EVUL 4	0.58	1	0.118	0.157	0.202	0.228	0.255	0.284	0.315	0.349
		2	0.160	0.216	0.281	0.317	0.356	0.398	0.442	0.489
		3	0.188	0.258	0.338	0.383	0.431	0.482	0.537	0.595
EVUL 5	0.75	1	0.154	0.204	0.263	0.296	0.331	0.369	0.410	0.453
		2	0.208	0.281	0.365	0.413	0.463	0.517	0.575	0.636
		3	0.244	0.335	0.440	0.498	0.561	0.627	0.698	0.774
EVUL 6	0.87	1	0.177	0.235	0.303	0.341	0.382	0.426	0.473	0.523
		2	0.241	0.324	0.422	0.476	0.534	0.597	0.663	0.734
		3	0.282	0.387	0.508	0.575	0.647	0.724	0.806	0.893
EVUL 8	1.04	1	0.213	0.282	0.364	0.410	0.459	0.511	0.567	0.627
		2	0.289	0.389	0.506	0.571	0.641	0.716	0.796	0.881
		3	0.338	0.464	0.609	0.690	0.776	0.868	0.967	1.072

The table values refer to evaporator capacity and are given as a function of:  
 - evaporating temperature t<sub>e</sub>,  
 - pressure drop Δp across the valve.

Capacities are based on:  
 - liquid temperature t<sub>l</sub> = 100 °F ahead of the expansion valve,  
 - superheat t<sub>s</sub> = 7 °F.  
 For each additional 10 °F of superheat, the table capacities must be reduced by 2%.

*Correction factors for liquid temperature t<sub>l</sub>*

t <sub>l</sub> [°F]	80	90	100	110	120
<b>Factor</b>	1.10	1.05	1.00	0.95	0.90

When liquid temperature t<sub>l</sub> ahead of the expansion valve is other than 100 °F, adjust the table capacities by multiplying them by the appropriate correction factor found in the following table.

Capacity  
Hot gas capacity  $Q_h$  [TR]

US Units

Type	$C_v$ [gal / min]	Pressure drop across valve $\Delta p$ [bar]	Hot gas capacity $Q_h$ [TR] at condensing temp. $t_c$ [°F]				
			70	90	100	120	140

R22/R407C

EVUL 1	0.12	2	0.097	0.100	0.101	0.101	0.098
		5	0.151	0.157	0.159	0.159	0.154
		10	0.209	0.219	0.221	0.222	0.216
		15	0.250	0.263	0.267	0.269	0.262
		20	0.282	0.299	0.304	0.308	0.300
EVUL 2	0.23	2	0.193	0.201	0.202	0.202	0.195
		5	0.302	0.314	0.318	0.318	0.308
		10	0.418	0.437	0.443	0.445	0.431
		15	0.500	0.527	0.535	0.539	0.524
		20	0.564	0.598	0.608	0.615	0.600
EVUL 3	0.35	2	0.290	0.301	0.304	0.303	0.293
		5	0.453	0.471	0.476	0.477	0.461
		10	0.626	0.656	0.664	0.667	0.647
		15	0.750	0.790	0.802	0.808	0.786
		20	0.845	0.897	0.912	0.923	0.900
EVUL 4	0.58	2	0.922	0.985	1.005	1.020	0.998
		5	1.483	1.501	1.506	1.506	1.489
		10	2.044	2.093	2.107	2.111	2.078
		15	2.250	2.316	2.337	2.347	2.310
		20	2.409	2.494	2.521	2.538	2.500
EVUL 5	0.75	2	1.537	1.642	1.675	1.700	1.663
		5	2.628	2.652	2.658	2.657	2.635
		10	3.981	4.021	4.032	4.033	3.999
		15	5.357	5.421	5.439	5.445	5.402
		20	6.624	6.711	6.737	6.751	6.703
EVUL 6	0.87	2	1.832	1.943	1.977	1.999	1.950
		5	2.198	2.134	2.177	2.210	2.161
		10	3.725	3.752	3.759	3.758	3.733
		15	5.132	5.178	5.191	5.191	5.153
		20	6.566	6.639	6.660	6.667	6.618
EVUL 8	1.04	5	1.874	1.975	2.005	2.020	1.965
		10	2.113	2.241	2.281	2.307	2.250
		15	2.305	2.462	2.512	2.550	2.494
		20	2.870	2.903	2.911	2.910	2.880
		25	3.358	3.414	3.429	3.430	3.384
EVUL 8	1.04	10	1.879	1.967	1.993	2.001	1.941
		15	2.249	2.370	2.406	2.424	2.358
		20	2.536	2.690	2.737	2.768	2.700
		25	2.766	2.955	3.015	3.061	2.993
		25	3.061	3.250	3.310	3.356	3.288

Capacities are based on:  
 - Evaporating temperature  $t_e = 40$  °F,  
 - hot gas temperature  $t_h = t_c + 40$  °F,  
 - subcooling  $\Delta t_s = 10$  °F.

The table values refer to evaporator capacity and are given as a function of:  
 - evaporating temperature  $t_e$ ,  
 - pressure drop  $\Delta p$  across the valve.

Capacities are based on a hot gas temperature superheated 40 °F above condensing temperature ( $t_h = t_c + 40$  °F).  
 For each additional 10 °F of superheat above 40 °F, the table capacities must be reduced by 1%.

Correction factors for evaporating temperature  $t_e$

$t_e$ [°F]	-40	-20	0	20	40	50
Factor	1.18	1.14	1.09	1.04	1	0.97

When the valve is used in a hot gas defrost circuit, evaporator temperature affects the capacity.  
 When the evaporator temperature differs from 40 °F, adjust the table capacities by multiplying them by the appropriate correction factor found in the following table.



**Capacity**  
**Hot gas capacity Q<sub>h</sub> [TR]**  
*(continued)*

US Units

Type	C <sub>v</sub> [gal / min]	Pressure drop across valve Δp [bar]	Hot gas capacity Q <sub>h</sub> [TR] at condensing temp. t <sub>c</sub> [°F]				
			70	90	100	120	140
<b>R134a</b>							
EVUL 1	0.12	2	0.073	0.077	0.079	0.080	0.079
		5	0.113	0.120	0.122	0.125	0.123
		10	0.153	0.165	0.169	0.173	0.172
		15	0.179	0.195	0.201	0.208	0.208
		20	0.196	0.218	0.226	0.236	0.236
EVUL 2	0.23	2	0.146	0.155	0.157	0.160	0.158
		5	0.226	0.240	0.245	0.250	0.247
		10	0.306	0.329	0.338	0.347	0.344
		15	0.358	0.391	0.403	0.416	0.416
		20	0.393	0.436	0.452	0.471	0.473
EVUL 3	0.35	2	0.220	0.232	0.236	0.240	0.236
		5	0.339	0.360	0.367	0.375	0.370
		10	0.459	0.494	0.506	0.520	0.516
		15	0.537	0.586	0.604	0.624	0.623
		20	0.589	0.655	0.678	0.707	0.709
EVUL 4	0.58	2	0.366	0.386	0.393	0.399	0.394
		5	0.565	0.600	0.612	0.624	0.617
		10	0.765	0.823	0.844	0.866	0.861
		15	0.894	0.977	1.006	1.041	1.039
		20	0.982	1.091	1.130	1.178	1.182
EVUL 5	0.75	2	0.476	0.502	0.511	0.519	0.512
		5	0.734	0.780	0.796	0.812	0.803
		10	0.994	1.071	1.097	1.126	1.119
		15	1.162	1.270	1.308	1.353	1.351
		20	1.277	1.418	1.469	1.531	1.537
EVUL 6	0.87	2	0.549	0.579	0.590	0.599	0.591
		5	0.847	0.900	0.919	0.937	0.926
		10	1.147	1.235	1.266	1.300	1.291
		15	1.341	1.465	1.510	1.561	1.559
		20	1.473	1.636	1.695	1.767	1.773
EVUL 8	1.04	2	0.659	0.695	0.708	0.719	0.709
		5	1.017	1.080	1.102	1.124	1.111
		10	1.377	1.482	1.519	1.560	1.549
		15	1.610	1.758	1.812	1.873	1.870
		20	1.768	1.964	2.034	2.120	2.128
		25	1.872	2.119	2.209	2.322	2.343

Capacities are based on:  
 - Evaporating temperature t<sub>e</sub> = 40 °F,  
 - hot gas temperature t<sub>h</sub> = t<sub>c</sub> 40 °F,  
 - subcooling Δt<sub>u</sub> = 10 °F.

The table values refer to evaporator capacity and are given as a function of:  
 - evaporating temperature t<sub>e</sub>,  
 - pressure drop Δp across the valve.

Capacities are based on a hot gas temperature superheated 40 °F above condensing temperature (t<sub>h</sub> = t<sub>c</sub> 40 °F).  
 For each additional 10 °F of superheat above 40 °F, the table capacities must be reduced by 1%.

**Correction factors for evaporating temperature t<sub>e</sub>**

t <sub>e</sub> [°F]	-40	-20	0	20	40	50
<b>Factor</b>	1.18	1.14	1.09	1.04	1	0.97

When the valve is used in a hot gas defrost circuit, evaporator temperature affects the capacity.  
 When the evaporator temperature differs from 40 °F, adjust the table capacities by multiplying them  
 by the appropriate correction factor found in the following table.

**Capacity**  
**Hot gas capacity Q<sub>h</sub> [TR]**  
*(continued)*

US Units

Type	C <sub>v</sub> [gal / min]	Pressure drop across valve Δp [bar]	Hot gas capacity Q <sub>h</sub> [TR] at condensing temp. t <sub>c</sub> [°F]				
			70	90	100	120	140

**R404A**

EVUL 1	0.12	2	0.082	0.083	0.082	0.078	0.069
		5	0.128	0.129	0.128	0.122	0.109
		10	0.178	0.180	0.179	0.171	0.153
		15	0.213	0.217	0.216	0.207	0.186
		20	0.241	0.247	0.246	0.237	0.213
		25	0.263	0.271	0.271	0.262	0.236
EVUL 2	0.23	2	0.164	0.165	0.164	0.155	0.139
		5	0.257	0.259	0.257	0.244	0.218
		10	0.356	0.360	0.358	0.342	0.306
		15	0.426	0.434	0.432	0.414	0.372
		20	0.481	0.493	0.492	0.473	0.426
		25	0.525	0.542	0.542	0.523	0.472
EVUL 3	0.35	2	0.247	0.248	0.245	0.233	0.208
		5	0.385	0.388	0.385	0.366	0.327
		10	0.533	0.541	0.537	0.512	0.459
		15	0.639	0.652	0.648	0.621	0.558
		20	0.722	0.740	0.738	0.710	0.639
		25	0.788	0.814	0.814	0.785	0.708
EVUL 4	0.58	2	0.411	0.413	0.409	0.388	0.347
		5	0.642	0.647	0.641	0.610	0.546
		10	0.889	0.901	0.895	0.854	0.765
		15	1.065	1.086	1.081	1.035	0.930
		20	1.203	1.233	1.231	1.183	1.065
		25	1.313	1.356	1.356	1.308	1.181
EVUL 5	0.75	2	0.535	0.537	0.532	0.505	0.451
		5	0.835	0.841	0.834	0.793	0.709
		10	1.156	1.171	1.163	1.110	0.995
		15	1.385	1.412	1.405	1.346	1.209
		20	1.563	1.603	1.600	1.537	1.384
		25	1.707	1.763	1.763	1.700	1.535
EVUL 6	0.87	2	0.617	0.620	0.613	0.582	0.520
		5	0.963	0.971	0.962	0.915	0.818
		10	1.334	1.351	1.342	1.281	1.148
		15	1.598	1.629	1.621	1.553	1.395
		20	1.804	1.850	1.846	1.774	1.597
		25	1.970	2.034	2.034	1.962	1.771
EVUL 8	1.04	2	0.740	0.743	0.736	0.699	0.624
		5	1.156	1.165	1.154	1.098	0.982
		10	1.600	1.622	1.611	1.537	1.378
		15	1.918	1.955	1.945	1.863	1.674
		20	2.165	2.220	2.215	2.129	1.917
		25	2.364	2.441	2.441	2.354	2.125

Capacities are based on:  
 - Evaporating temperature t<sub>e</sub> = 40 °F,  
 - hot gas temperature t<sub>h</sub> = t<sub>c</sub> 40 °F,  
 - subcooling Δt<sub>s</sub> = 10 °F.

The table values refer to evaporator capacity and are given as a function of:  
 - evaporating temperature t<sub>e</sub>,  
 - pressure drop Δp across the valve.

Capacities are based on a hot gas temperature superheated 40 °F above condensing temperature (t<sub>h</sub> = t<sub>c</sub> 40 °F).  
 For each additional 10 °F of superheat above 40 °F, the table capacities must be reduced by 1%.

**Correction factors for evaporating temperature t<sub>e</sub>**

t <sub>e</sub> [°F]	-40	-20	0	20	40	50
<b>Factor</b>	1.18	1.14	1.09	1.04	1	0.97

When the valve is used in a hot gas defrost circuit, evaporator temperature affects the capacity.  
 When the evaporator temperature differs from 40 °F, adjust the table capacities by multiplying them by the appropriate correction factor found in the following table.

**Capacity**  
**Hot gas capacity  $Q_h$  [TR]**  
*(continued)*

US Units

Type	$C_v$ [gal / min]	Pressure drop across valve $\Delta p$ [bar]	Hot gas capacity $Q_h$ [TR] at condensing temp. $t_c$ [°F]				
			70	90	100	120	140

**R410A**

EVUL 1	0.12	2	0.111	0.114	0.115	0.114	0.108
		5	0.174	0.180	0.181	0.179	0.170
		10	0.242	0.251	0.253	0.251	0.239
		15	0.292	0.304	0.307	0.306	0.290
		20	0.332	0.347	0.351	0.350	0.333
EVUL 2	0.23	2	0.222	0.229	0.230	0.228	0.215
		5	0.348	0.359	0.362	0.358	0.339
		10	0.484	0.503	0.507	0.503	0.477
		15	0.584	0.609	0.615	0.611	0.581
		20	0.664	0.695	0.703	0.701	0.667
EVUL 3	0.35	2	0.333	0.343	0.345	0.341	0.323
		5	0.521	0.539	0.543	0.537	0.509
		10	0.726	0.754	0.760	0.754	0.716
		15	0.876	0.913	0.922	0.917	0.871
		20	0.996	1.042	1.054	1.051	1.000
EVUL 4	0.58	2	1.095	1.152	1.167	1.166	1.112
		5	0.555	0.572	0.575	0.569	0.538
		10	0.869	0.899	0.905	0.896	0.848
		15	1.211	1.257	1.267	1.257	1.193
		20	1.460	1.522	1.537	1.528	1.452
EVUL 5	0.75	25	1.659	1.737	1.757	1.752	1.667
		2	1.825	1.919	1.945	1.944	1.853
		5	0.721	0.744	0.748	0.740	0.700
		10	1.130	1.168	1.176	1.164	1.102
		15	1.574	1.634	1.647	1.634	1.550
EVUL 6	0.87	20	1.898	1.978	1.998	1.987	1.888
		25	2.157	2.258	2.284	2.277	2.168
		2	0.832	0.858	0.863	0.853	0.807
		5	1.304	1.348	1.357	1.343	1.272
		10	1.816	1.885	1.901	1.886	1.789
EVUL 8	1.04	15	2.190	2.283	2.305	2.293	2.178
		20	2.489	2.606	2.636	2.628	2.501
		25	2.738	2.879	2.917	2.916	2.780
		2	0.998	1.030	1.036	1.024	0.969
		5	1.564	1.617	1.628	1.612	1.526
EVUL 8	1.04	10	2.179	2.262	2.281	2.263	2.147
		15	2.628	2.739	2.766	2.751	2.614
		20	2.987	3.127	3.163	3.153	3.001
		25	3.285	3.455	3.501	3.499	3.336

Capacities are based on:  
 - Evaporating temperature  $t_e = 40$  °F,  
 - hot gas temperature  $t_h = t_c + 40$  °F,  
 - subcooling  $\Delta t_s = 10$  °F.

The table values refer to evaporator capacity and are given as a function of:  
 - evaporating temperature  $t_e$ ,  
 - pressure drop  $\Delta p$  across the valve.

Capacities are based on a hot gas temperature superheated 40 °F above condensing temperature ( $t_h = t_c + 40$  °F).  
 For each additional 10 °F of superheat above 40 °F, the table capacities must be reduced by 1%.

**Correction factors for evaporating temperature  $t_e$**

$t_e$ [°F]	-40	-20	0	20	40	50
<b>Factor</b>	1.18	1.14	1.09	1.04	1	0.97

When the valve is used in a hot gas defrost circuit, evaporator temperature affects the capacity.  
 When the evaporator temperature differs from 40 °F, adjust the table capacities by multiplying them by the appropriate correction factor found in the following table.

**Capacity**  
**Hot gas capacity  $Q_h$  [TR]**  
*(continued)*

US Units

Type	$C_v$ [gal / min]	Pressure drop across valve $\Delta p$ [bar]	Hot gas capacity $Q_h$ [TR] at condensing temp. $t_c$ [°F]				
			70	90	100	120	140
<b>R290</b>							
EVUL 1	0.12	2	0.110	0.110	0.115	0.110	0.110
		5	0.172	0.172	0.179	0.173	0.173
		10	0.237	0.237	0.249	0.242	0.242
		15	0.282	0.282	0.300	0.293	0.293
		20	0.317	0.317	0.340	0.334	0.334
EVUL 2	0.23	2	0.221	0.221	0.229	0.220	0.220
		5	0.344	0.344	0.358	0.345	0.345
		10	0.474	0.474	0.498	0.483	0.483
		15	0.565	0.565	0.600	0.585	0.585
		20	0.635	0.635	0.680	0.669	0.669
EVUL 3	0.35	2	0.331	0.331	0.344	0.329	0.329
		5	0.516	0.516	0.538	0.518	0.518
		10	0.711	0.711	0.748	0.725	0.725
		15	0.847	0.847	0.900	0.878	0.878
		20	0.952	0.952	1.021	1.003	1.003
EVUL 4	0.58	2	0.552	0.552	0.573	0.549	0.549
		5	0.860	0.860	0.896	0.863	0.863
		10	1.185	1.185	1.246	1.208	1.208
		15	1.412	1.412	1.500	1.463	1.463
		20	1.586	1.586	1.701	1.672	1.672
EVUL 5	0.75	2	0.718	0.718	0.744	0.714	0.714
		5	1.118	1.118	1.165	1.122	1.122
		10	1.540	1.540	1.620	1.570	1.570
		15	1.836	1.836	1.949	1.903	1.903
		20	2.062	2.062	2.211	2.174	2.174
EVUL 6	0.87	2	0.828	0.828	0.859	0.824	0.824
		5	1.290	1.290	1.344	1.294	1.294
		10	1.777	1.777	1.869	1.811	1.811
		15	2.119	2.119	2.249	2.195	2.195
		20	2.379	2.379	2.552	2.508	2.508
EVUL 8	1.04	2	0.994	0.994	1.031	0.988	0.988
		5	1.548	1.548	1.613	1.553	1.553
		10	2.132	2.132	2.243	2.174	2.174
		15	2.542	2.542	2.699	2.634	2.634
		20	2.855	2.855	3.062	3.010	3.010
		25	3.103	3.103	3.362	3.329	3.329

Capacities are based on:  
 - Evaporating temperature  $t_e = 40$  °F,  
 - hot gas temperature  $t_h = t_c + 40$  °F,  
 - subcooling  $\Delta t_s = 10$  °F.

The table values refer to evaporator capacity and are given as a function of:  
 - evaporating temperature  $t_e$ ,  
 - pressure drop  $\Delta p$  across the valve.

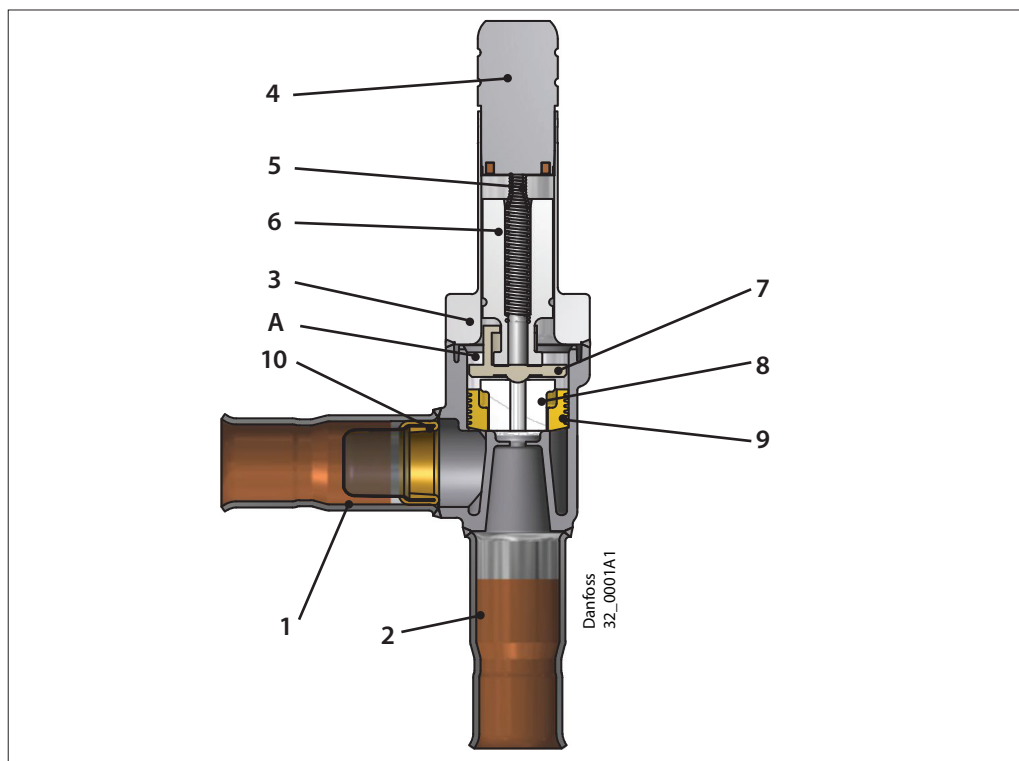
Capacities are based on a hot gas temperature superheated 40 °F above condensing temperature ( $t_h = t_c + 40$  °F).  
 For each additional 10 °F of superheat above 40 °F, the table capacities must be reduced by 1%.

**Correction factors for evaporating temperature  $t_e$**

$t_e$ [°F]	-40	-20	0	20	40	50
<b>Factor</b>	1.18	1.14	1.09	1.04	1	0.97

When the valve is used in a hot gas defrost circuit, evaporator temperature affects the capacity.  
 When the evaporator temperature differs from 40 °F, adjust the table capacities by multiplying them by the appropriate correction factor found in the following table.

**Design and material specifications**



No.	Description	Material
1	Bi-metallic tube	Stainless steel / Cu
2	Bi-metallic tube	Stainless steel / Cu
3	Flange	Stainless steel
4	Armature tube	Stainless steel
5	Return spring	Spring wire stainless

No.	Description	Material
6	Armature	Stainless steel
7	Pilot plate	Thermoplast
8	Seat plate	Teflon
9	Piston	Brass
10	Inlet filter	Stainless steel / brass

**Function**

*Servo operated*

EVUL 1 – 8 are servo operated piston solenoid valves. The servo piston principle results in a fast operating and compact valve that is able to open against a high differential pressure. The valve closes rather soft, because the pilot system does not fully close before the main orifice has closed. This minimizes liquid hammer.

When the coil is currentless, the main orifice, seat plate (8) and pilot orifice (on the pilot plate (7)) are closed. The pilot orifice and main orifice are held closed by the armature spring force and the differential pressure between inlet and outlet sides.

When current is applied to the coil, the armature (6) is drawn up into the magnetic field and thus lifts the pilot plate (7) and opens for the pilot orifice so that the de-energising of the servo chamber (A) starts and the pressure is relieved to the level of the outlet side. As the inlet pressure that acts on the bottom of the piston (9) now is higher than the pressure in the servo chamber (A), the piston is moved upwards and lifts both the pilot plate (7) and the seat plate (8).

When the seat plate is lifted, the main orifice opens for full flow. Therefore a minimum differential pressure of 0.02 bar is necessary to open the valve and keep it open.

When the current to the coil is switched off, the spring (5) forces the armature (9) down towards the pilot plate (7). The pressure in the servo chamber (A) increases and the piston will no longer be able to hold the seat plate (8) in lifted position, by which the main orifice closes. The armature (6) continues its downwards movement until the pilot orifice on the pilot plate (7) is fully closed.

**⚠ Note:**

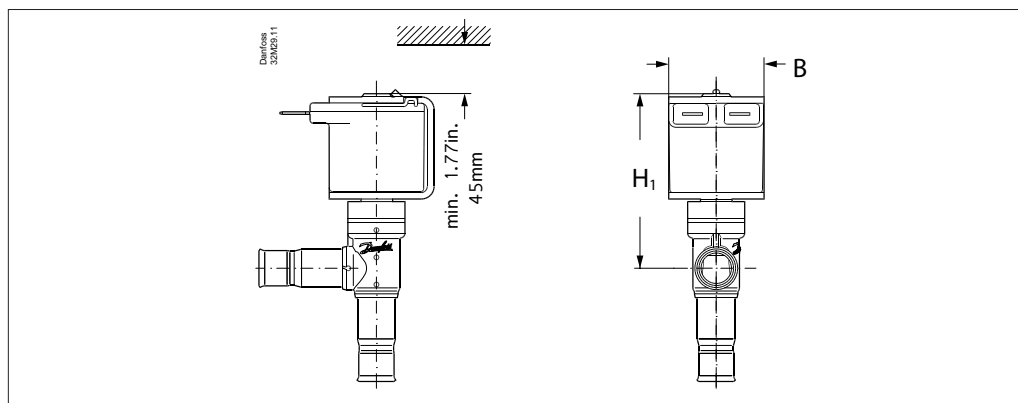
Danfoss recommends that a suitable filter or filter drier (max. size of 40 – 50 µm) is installed ahead of each solenoid valve to keep scale, solder material and other foreign dirt and particles out of the valve.

**⚠ Note:**

By using the valve for oil return application - please contact Danfoss.

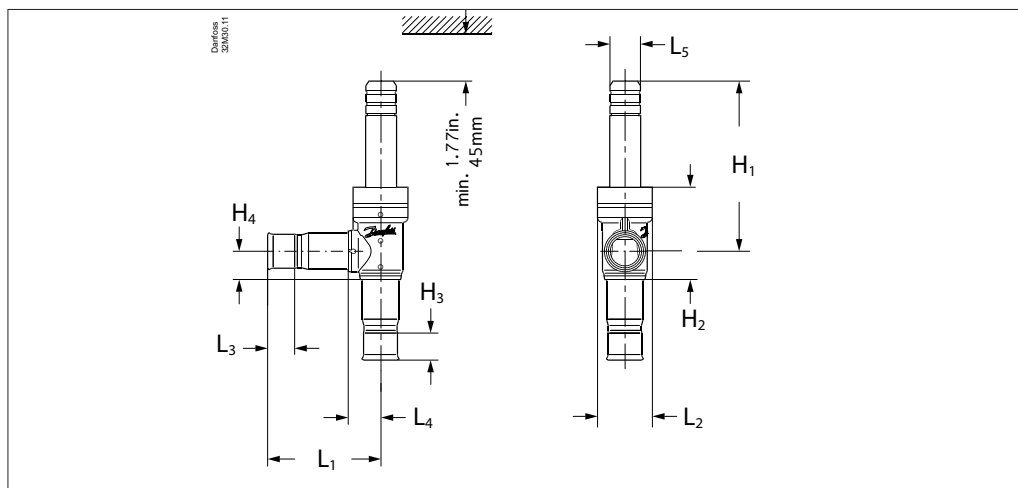
**Dimensions [in.]  
and weights [lbs]**

EVUL 1 – 6 and EVUL 8 mounted with coil with 0.25 in. US spade



**Note:** the drawings are only representative.

EVUL 1 – 6 and EVUL 8



**Note:** the drawings are only representative.

Net weight of coil:  
approx. 0.10 Kg (0.22 lbs)

Net weight of valve:  
approx. 0.05 Kg (0.11 lbs)

SI Units

Type	Connection Solder		H <sub>1</sub> [mm]	H <sub>2</sub> [mm]	H <sub>3</sub> [mm]	H <sub>4</sub> [mm]	L <sub>1</sub> [mm]	L <sub>2</sub> [mm]	L <sub>3</sub> [mm]	L <sub>4</sub> [mm]	L <sub>5</sub> [mm]	B [mm]	Net weight with coil [Kg]
	[in.]	[mm]											
EVUL 1	1/4	6	55	30	7	8.5	37	18	7	9.9	10	30	0.18
EVUL 2	1/4	6	55	30	7	8.5	37	18	7	9.9	10	30	0.18
EVUL 3	1/4	6	55	30	7	8.5	37	18	7	9.9	10	30	0.18
	3/8	10	55	30	9	8.5	37	18	9	9.9	10	30	0.18
EVUL 4	1/4	6	55	30	7	8.5	37	18	7	9.9	10	30	0.18
	3/8	10	55	30	9	8.5	37	18	9	9.9	10	30	0.18
	1/2	–	55	30	10	8.5	35	18	10	9.9	10	30	0.18
	–	12	55	30	10	8.5	36	18	10	9.9	10	30	0.18
EVUL 5	3/8	10	55	30	9	8.5	37	18	9	9.9	10	30	0.18
	1/2	–	55	30	10	8.5	35	18	10	9.9	10	30	0.18
	–	12	55	30	10	8.5	36	18	10	9.9	10	30	0.18
EVUL 6	3/8	10	55	30	9	8.5	37	18	9	9.9	10	30	0.18
	1/2	–	55	30	10	8.5	35	18	10	9.9	10	30	0.18
	–	12	55	30	10	8.5	36	18	10	9.9	10	30	0.18
EVUL 8	1/2	–	55	30	10	8.5	35	18	10	9.9	10	30	0.18
	–	12	55	30	10	8.5	36	18	10	9.9	10	30	0.18

US Units

Type	Connection Solder		H <sub>1</sub> [in]	H <sub>2</sub> [in]	H <sub>3</sub> [in]	H <sub>4</sub> [in]	L <sub>1</sub> [in]	L <sub>2</sub> [in]	L <sub>3</sub> [in]	L <sub>4</sub> [in]	L <sub>5</sub> [in]	B [in]	Net weight with coil [Lbs]
	[in]	[mm]											
EVUL 1	1/4	6	2.16	1.18	0.27	0.33	1.45	0.71	0.27	0.38	0.39	1.18	0.4
EVUL 2	1/4	6	2.16	1.18	0.27	0.33	1.45	0.71	0.27	0.38	0.39	1.18	0.4
EVUL 3	1/4	6	2.16	1.18	0.27	0.33	1.45	0.71	0.27	0.38	0.39	1.18	0.4
	3/8	10	2.16	1.18	0.35	0.33	1.45	0.71	0.35	0.38	0.39	1.18	0.4
EVUL 4	1/4	6	2.16	1.18	0.27	0.33	1.45	0.71	0.27	0.38	0.39	1.18	0.4
	3/8	10	2.16	1.18	0.35	0.33	1.45	0.71	0.35	0.38	0.39	1.18	0.4
	1/2	–	2.16	1.18	0.39	0.33	1.45	0.71	0.39	0.38	0.39	1.18	0.4
EVUL 5	–	12	2.16	1.18	0.39	0.33	1.41	0.71	0.39	0.38	0.39	1.18	0.4
	3/8	10	2.16	1.18	0.35	0.33	1.45	0.71	0.35	0.38	0.39	1.18	0.4
	1/2	–	2.16	1.18	0.39	0.33	1.37	0.71	0.39	0.38	0.39	1.18	0.4
EVUL 6	–	12	2.16	1.18	0.39	0.33	1.41	0.71	0.39	0.38	0.39	1.18	0.4
	3/8	10	2.16	1.18	0.35	0.33	1.45	0.71	0.35	0.38	0.39	1.18	0.4
	1/2	–	2.16	1.18	0.39	0.33	1.37	0.71	0.39	0.38	0.39	1.18	0.4
EVUL 8	–	12	2.16	1.18	0.39	0.33	1.41	0.71	0.39	0.38	0.39	1.18	0.4
	1/2	–	2.16	1.18	0.39	0.33	1.37	0.71	0.39	0.38	0.39	1.18	0.4

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