ENGINEERING TOMORROW

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* 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

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 / hour at a pressure drop across valve $\Delta p = 1$ bar, $\rho = 1000$ Kg / m^3.
C_v value is the water flow in [gal / min] at a pressure drop across valve $\Delta p = 1$ psi, $\rho = 10$ lbs / 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 / 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 / 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 $t_e = -10$ °C,
- liquid temperature ahead of the valve $t_l = 25$ °C,
- pressure drop in valve $\Delta p = 0.15$ bar.

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

Type	R22/R407C	R134a	R404A/R507	R407A	R410A	R290	K_v value [m^3 / 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

Rated hot gas capacity is based on:
- condensing temperature $t_c = 40$ °C,
- hot gas temperature $t_h = 65$ °C
- subcooling of refrigerant $\Delta tsub = 4$ K
- Pressure drop across valve $\Delta p = 0.8$ bar

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 [1]) [TR] **US units**

Type	R22/R407C	R134a	R404A/R507	R407A	R410A	R290	C_V–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

[1]) Rated liquid and suction capacity are based on:
- evaporating temperature t_e = 40 °F,
- liquid temperature ahead of the valve t_l = 100 °F,
- pressure drop Δp across valve – with liquid:
  - Δp = 2 psi for R134a
  - Δp = 3 psi for R22, R404A/R507 – with suction vapor: Δp = 1 psi

Suction vapor – Rated capacity [1]) [TR] **US units**

Type	R22/R407C	R134a	R404A/R507	R407A	R410A	R290	C_V–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

[1]) Rated liquid and suction capacity are based on:
- evaporating temperature t_e = 40 °F,
- liquid temperature ahead of the valve t_l = 100 °F,
- pressure drop Δp across valve – with liquid:
  - Δp = 2 psi for R134a
  - Δp = 3 psi for R22, R404A/R507 – with suction vapor: Δp = 1 psi

Hot gas – Rated capacity [1]) [TR] **US units**

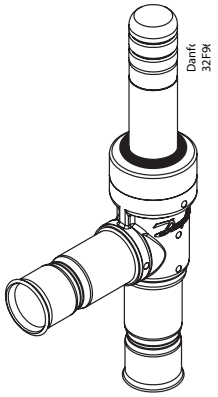
Type	R22/R407C	R134a	R404A/ R507	R407A	R410A	R290	C_V–value [gal / min]
EVUL 1	0.10	0.07	0.08	0.09	0.11	0.13	0.12
EVUL 2	0.19	0.15	0.15	0.18	0.22	0.27	0.23
EVUL 3	0.29	0.22	0.23	0.28	0.33	0.40	0.35
EVUL 4	0.48	0.37	0.38	0.46	0.54	0.67	0.58
EVUL 5	0.62	0.48	0.49	0.60	0.70	0.86	0.75
EVUL 6	0.72	0.56	0.57	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 °F,
- hot gas temperature t_h = 140 °F,
- pressure drop across valve Δp = 2 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).

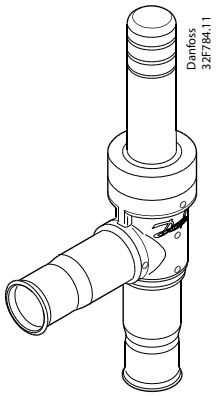
Ordering valve



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	**032F8200**	40	**–**	6	**032F8227**	40	**–**
	1/4	**–**	-	**032F9506**	6	**–**	-	**032F9508**
EVUL 2	1/4	**032F8201**	40	**032F9510**	6	**032F8228**	40	**032F9516**
EVUL 3	1/4	**032F8202**	40	**032F9511**	6	**032F8229**	40	**032F9517**
	3/8	**032F8203**	40	**–**	10	**032F8230**	40	**–**
EVUL 4	1/4	**032F8204**	40	**032F9512**	6	**032F8231**	40	**032F9518**
	3/8	**032F8205**	40	**–**	10	**032F8232**	40	**–**
	1/2	**032F8206**	40	**–**	12	**032F8233**	40	**–**
EVUL 5	3/8	**032F8207**	40	**032F9513**	10	**032F8234**	40	**032F9519**
	1/2	**032F8208**	40	**–**	12	**032F8235**	40	**–**
EVUL 6	3/8	**032F8209**	40	**–**	10	**032F8236**	40	**–**
	1/2	**032F8210**	40	**032F9514**	12	**032F8237**	40	**032F9521**
EVUL 8	1/2	**032F8211**	40	**032F9515**	12	**032F8238**	40	**032F9522**

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	**032F8245**	40
EVUL 2	1/4	**032F8246**	40
EVUL 3	1/4	**032F8247**	40
	3/8	**032F8248**	40
EVUL 4	1/4	**032F8249**	40
	3/8	**032F8250**	40
	1/2	**032F8251**	40
EVUL 5	3/8	**032F8252**	40
	1/2	**032F8253**	40
EVUL 6	3/8	**032F8254**	40
	1/2	**032F8255**	40
EVUL 8	1/2	**032F8256**	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.

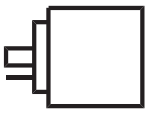
If coils are below IPx5, they must be protected against ultraviolet, moisture and major impact, especially the connection of coils.

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



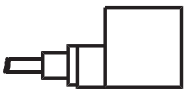
Single pack
1 product in a box with installation guide
Multi pack
box with x pieces single pack
(can be split)
Industrial pack
x pieces in one box (cannot be split)

Alternating current AC - with DIN plug [1]) - 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			

[1]) 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^2. 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.

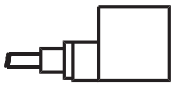
For countries where safety standards are not an indispensable part of the safety system Danfoss recommend the installer to get a third party approval of the system containing flammable refrigerant.

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.

Ordering coils (continued)

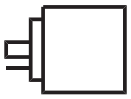
Cable connection



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

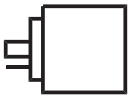


Direct current DC with DIN spade IP00

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.

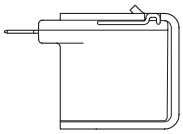
DIN spade (UL recognized version) connection



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

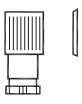


Alternating current AC with US spade IP00

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.) **NB:** **Valve body suppplied with O-ring**	**032F6115**	125

Capacity
Liquid capacity Q_e [kW]

SI Units

Type	K_v [m^3 / h]	Liquid capacity Q_e [kW] at pressure drop across valve Δp [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^3 / h]	Pressure drop Δp [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 Δp in valve.

Correction factors for liquid temperature t_l

t_l [°C]	10	15	20	25	30	35	40	45	50
R22/R407C	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^3 / h]	Pressure drop Δp [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 Δp in valve.

Correction factors for liquid temperature t_l

t_l [°C]	10	15	20	25	30	35	40	45	50
R134a	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^3 / h]	Pressure drop Δp [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 Δp in valve.

Correction factors for liquid temperature t_l

t_l [°C]	10	15	20	25	30	35	40	45	50
R404A/R507	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^3 / h]	Pressure drop Δp [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 Δp 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^3 / h]	Pressure drop Δp [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 Δp in valve.

Correction factors for liquid temperature t_l

t_l [°C]	10	15	20	25	30	35	40	45	50
R290	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^3 / h]	Pressure drop across valve Δp [bar]	Hot gas capacity Q_h [kW] Evaporating temp. t_e = -10 °C. Hot gas temp. $t_h = t_c$ + 25 K Subcooling Δt_{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 Δt_{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^3 / h]	Pressure drop across valve Δp [bar]	Hot gas capacity Q_h [kW] Evaporating temp. t_e = -10 °C. Hot gas temp. $t_h = t_c$ + 25 K Subcooling Δt_{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 Δt_{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_h [kW]
(continued)

SI Units

Type	K_V [m^3 / h]	Pressure drop across valve Δp [bar]	Hot gas capacity Q_h [kW] Evaporating temp. t_e = -10 °C. Hot gas temp. $t_h = t_c + 25$ K Subcooling Δt_{sub} = 4 K ¹) Condensing temp. t_c [°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

¹) Bubble point

Capacities are based on:
- evaporating temp. t_e = -10 °C,
- hot gas temp. $t_h = t_c$ 25 K,
- subcooling Δt_{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
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_e.

Capacity
Hot gas capacity Q_h [kW]
(continued)

SI Units

Type	K_V [m^3 / h]	Pressure drop across valve Δp [bar]	Hot gas capacity Q_h [kW] Evaporating temp. t_e = -10 °C. Hot gas temp. $t_h = t_c$ + 25 K Subcooling Δt_{sub} = 4 K ¹) Condensing temp. t_c [°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

¹) Bubble point

Capacities are based on:
- evaporating temp. t_e = -10 °C,
- hot gas temp. $t_h = t_c$ 25 K,
- subcooling Δt_{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
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_e.

Capacity
Hot gas capacity Q_h [kW]
(continued)

SI Units

Type	K_V [m^3 / h]	Pressure drop across valve Δp [bar]	Hot gas capacity Q_h [kW] Evaporating temp. t_e = -10 °C. Hot gas temp. $t_h = t_c$ + 25 K Subcooling Δt_{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 Δt_{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
R290	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 Δp [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 Δp [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 Δp 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_e [TR]
(continued)

US Units

Type	C_v [gal / min]	Pressure drop Δp [psi]	Suction vapour capacity Q_e [TR] at evaporating temperature t_e [°F]							
			-40	-20	0	10	20	30	40	50
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_e,
- pressure drop Δp 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_e [TR]
(continued)

US Units

Type	C_v [gal / min]	Pressure drop Δp [psi]	Suction vapour capacity Q_e [TR] at evaporating temperature t_e [°F]							
			-40	-20	0	10	20	30	40	50
										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_e,
- pressure drop Δp 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_e [TR]
(continued)

US Units

Type	C_v [gal / min]	Pressure drop Δp [psi]	Suction vapour capacity Q_e [TR] at evaporating temperature t_e [°F]							
			-40	-20	0	10	20	30	40	50
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_e,
- pressure drop Δp 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_e [TR]
(continued)

US Units

Type	C_v [gal / min]	Pressure drop Δp [psi]	Suction vapour capacity Q_e [TR] at evaporating temperature t_e [°F]							
			-40	-20	0	10	20	30	40	50
										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_e,
- pressure drop Δp 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
Hot gas capacity Q_h [TR]

US Units

Type	C_v [gal / min]	Pressure drop across valve Δp [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
		25	0.307	0.328	0.335	0.340	0.333
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
		25	0.615	0.657	0.670	0.680	0.665
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
		25	0.922	0.985	1.005	1.020	0.998
EVUL 4	0.58	2	0.483	0.501	0.506	0.506	0.489
		5	0.755	0.785	0.794	0.794	0.769
		10	1.044	1.093	1.107	1.111	1.078
		15	1.250	1.316	1.337	1.347	1.310
		20	1.409	1.494	1.521	1.538	1.500
		25	1.537	1.642	1.675	1.700	1.663
EVUL 5	0.75	2	0.628	0.652	0.658	0.657	0.635
		5	0.981	1.021	1.032	1.033	0.999
		10	1.357	1.421	1.439	1.445	1.402
		15	1.624	1.711	1.737	1.751	1.703
		20	1.832	1.943	1.977	1.999	1.950
		25	1.998	2.134	2.177	2.210	2.161
EVUL 6	0.87	2	0.725	0.752	0.759	0.758	0.733
		5	1.132	1.178	1.191	1.191	1.153
		10	1.566	1.639	1.660	1.667	1.618
		15	1.874	1.975	2.005	2.020	1.965
		20	2.113	2.241	2.281	2.307	2.250
		25	2.305	2.462	2.512	2.550	2.494
EVUL 8	1.04	2	0.870	0.903	0.911	0.910	0.880
		5	1.358	1.414	1.429	1.430	1.384
		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

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

The table values refer to evaporator capacity and are given as a function of:
- evaporating temperature t_e,
- pressure drop Δp 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_h [TR]
(continued)

US Units

Type	C_v [gal / min]	Pressure drop across valve Δp [bar]	Hot gas capacity Q_h [TR] at condensing temp. t_c [°F]				
			70	90	100	120	140
							R134a
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
		25	0.208	0.235	0.245	0.258	0.260
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
		25	0.416	0.471	0.491	0.516	0.521
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
		25	0.624	0.706	0.736	0.774	0.781
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
		25	1.040	1.177	1.227	1.290	1.302
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
		25	1.352	1.530	1.595	1.677	1.692
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
		25	1.560	1.766	1.841	1.935	1.952
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_e = 40 °F,
- hot gas temperature $t_h = t_c$ 40 °F,
- subcooling Δt_u = 10 °F.

The table values refer to evaporator capacity and are given as a function of:
- evaporating temperature t_e,
- pressure drop Δp 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_h [TR]
(continued)

US Units

Type	C_v [gal / min]	Pressure drop across valve Δp [bar]	Hot gas capacity Q_h [TR] at condensing temp. t_c [°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_e = 40 °F,
- hot gas temperature $t_h = t_c$ 40 °F,
- subcooling Δt_u = 10 °F.

The table values refer to evaporator capacity and are given as a function of:
- evaporating temperature t_e,
- pressure drop Δp 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_h [TR]
(continued)

US Units

Type	C_v [gal / min]	Pressure drop across valve Δp [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
		25	0.365	0.384	0.389	0.389	0.371
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
		25	0.730	0.768	0.778	0.778	0.741
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
		25	1.095	1.152	1.167	1.166	1.112
EVUL 4	0.58	2	0.555	0.572	0.575	0.569	0.538
		5	0.869	0.899	0.905	0.896	0.848
		10	1.211	1.257	1.267	1.257	1.193
		15	1.460	1.522	1.537	1.528	1.452
		20	1.659	1.737	1.757	1.752	1.667
		25	1.825	1.919	1.945	1.944	1.853
EVUL 5	0.75	2	0.721	0.744	0.748	0.740	0.700
		5	1.130	1.168	1.176	1.164	1.102
		10	1.574	1.634	1.647	1.634	1.550
		15	1.898	1.978	1.998	1.987	1.888
		20	2.157	2.258	2.284	2.277	2.168
		25	2.373	2.495	2.528	2.527	2.409
EVUL 6	0.87	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
		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
EVUL 8	1.04	2	0.998	1.030	1.036	1.024	0.969
		5	1.564	1.617	1.628	1.612	1.526
		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 Δt_u = 10 °F.

The table values refer to evaporator capacity and are given as a function of:
- evaporating temperature t_e,
- pressure drop Δp 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_h [TR]
(continued)

US Units

Type	C_v [gal / min]	Pressure drop across valve Δp [bar]	Hot gas capacity Q_h [TR] at condensing temp. t_c [°F]				
			70	90	100	120	140
							R290
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
		25	0.345	0.345	0.374	0.370	0.370
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
		25	0.690	0.690	0.747	0.740	0.740
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
		25	1.034	1.034	1.121	1.110	1.110
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
		25	1.724	1.724	1.868	1.849	1.849
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
		25	2.241	2.241	2.428	2.404	2.404
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
		25	2.586	2.586	2.802	2.774	2.774
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 Δt_u = 10 °F.

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

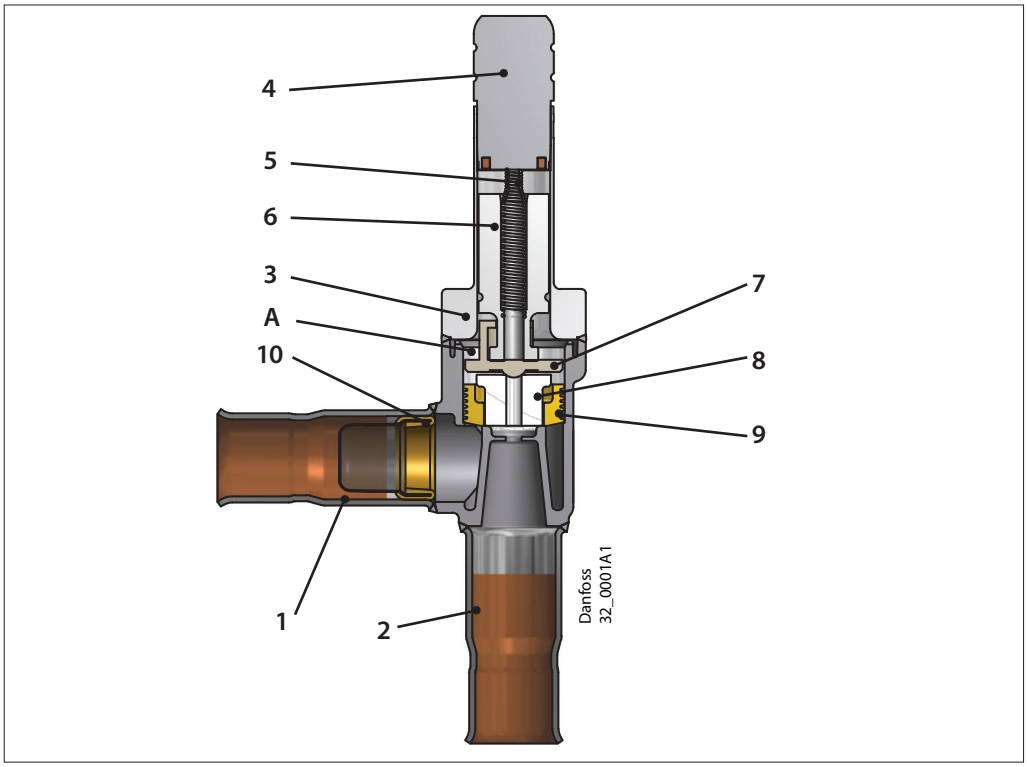
Capacities are based on a hot gas temperature superheated 40 °F above condensing temperature ($t_h = t_c$ 40 °F).
For each additional 10 °F of superheat above 40 °F, the table capacities must be reduced by 1%.

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.

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.

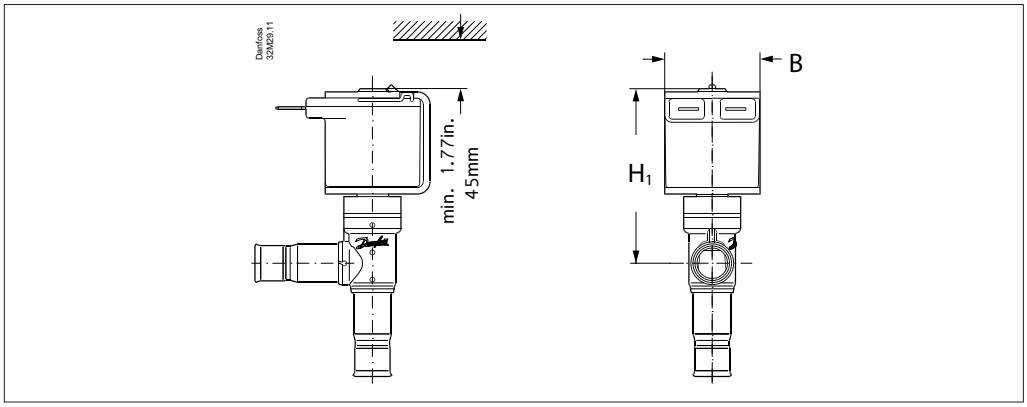
When the current to the coil is switched off, the spring (5) forces the armature (9) down towards the pilot plate (7). The pressure in the servo chamber (A) increases and the piston will no longer be able to hold the seat plate (8) in lifted position, by which the main orifice closes. The armature (6)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

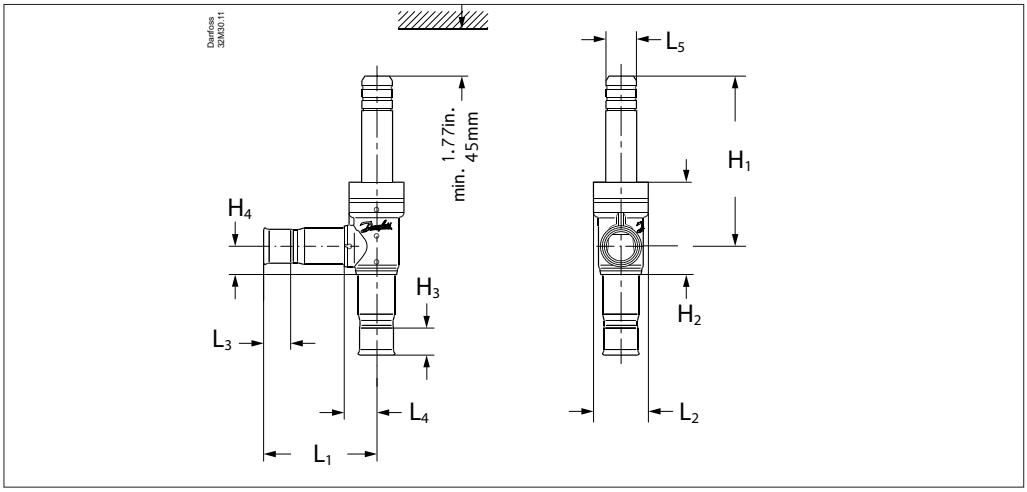
Dimensions [in.] and weights [lbs]

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		H1 [mm]	H2 [mm]	H3 [mm]	H4 [mm]	L1 [mm]	L2 [mm]	L3 [mm]	L4 [mm]	L5 [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_1 [in]	H_2 [in]	H_3 [in]	H_4 [in]	L_1 [in]	L_2 [in]	L_3 [in]	L_4 [in]	L_5 [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
	–	12	2.16	1.18	0.39	0.33	1.41	0.71	0.39	0.38	0.39	1.18	0.4
EVUL 5	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
	–	12	2.16	1.18	0.39	0.33	1.41	0.71	0.39	0.38	0.39	1.18	0.4
EVUL 6	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
	–	12	2.16	1.18	0.39	0.33	1.41	0.71	0.39	0.38	0.39	1.18	0.4
EVUL 8	1/2	–	2.16	1.18	0.39	0.33	1.37	0.71	0.39	0.38	0.39	1.18	0.4
	–	12	2.16	1.18	0.39	0.33	1.41	0.71	0.39	0.38	0.39	1.18	0.4