

Data sheet

# Check valves

## Type NRVA



Check valve type NRVA can be used in liquid, suction and hot gas lines in refrigeration and air conditioning plant with ammonia.

NRVA can also be used in refrigerating systems with fluorinated refrigerants.

When the NRVA is used in liquid lines where cold, thick oil or impurities may be present, it is recommended that the standard spring be replaced by a special spring. See ordering table.

### Features

- Ensures correct direction of flow.
- Valve housing made of steel.
- Available for 40 bar g / 580 psig working pressure.
- Large range of flanges with connection dimensions in accordance with standards: DIN, ANSI, SOC, SA and FPT.
- Fitted with damping piston that makes the valves suitable for installation in lines where pulsation can occur, e.g. in the discharge line from the compressor.
- Classification: DNV, CRN, BV, EAC etc.  
To get an updated list of certification on the products please contact your local Danfoss Sales Company.

### Design

#### Connections

There is a very wide range of connection possibilities with NRVA check valves:

- Welding, DIN (2448)
- Welding, ANSI (B 36.10)
- Welding socket, ANSI (B 16.11)
- Solder connection, DIN (2856)
- Solder connection, ANSI (B 16.22)
- FPT internal thread, NPT (ANSI/ASME B 1.20.1)

#### Gaskets:

Do not contain asbestos.

#### Valve cone:

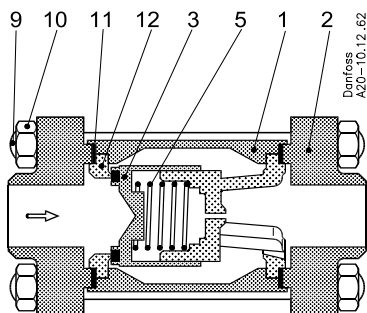
The valve cone has a teflon tightening ring. Teflon tightening ring renders perfect sealing at a minimum closing force.

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**Technical data**

- **Refrigerants**  
Applicable to HCFC, HFC and R717 (Ammonia).  
For further information please see installation instruction for NRVA.  
Use with flammable hydrocarbons cannot be recommended; please contact Danfoss.
- **Temperature range**  
-50 – 140 °C / -58 – 284 °F.
- **Pressure range**  
The valve is designed for:  
Max. working pressure: 40 bar g / 580 psig.

**Material specification**

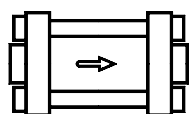


*Material specification for NRVA check valves*

No.	Part	Material	DIN	ISO	ASTM
1	Housing	Steel	G20Mn5QT *) EN10213-3 ----- P285QH EN10222-4		LCC, A352 ----- LF2,A350
2	Flanges	Steel	RSt. 37-2, 10025	Fe360 B, 630	Grade C, A 283
3	Valve cone	Stainless steel Teflon			
5	Spring	Steel			
9	Bolts	Stainless steel	A2-70		
10	Nut	Stainless steel			
11	Gasket	Non asbestos			
12	Valve seat	Steel			

\*) NRVA 40 / NRVA 50 housing material is TTSt 35N until January 2006

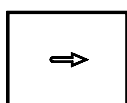
**Ordering**



*Complete valves incl. DIN 2448 flange:*

Type	Weld flange connection in.	Code no.		$\Delta p$ <sup>2)</sup>				$k_v$ value <sup>3)</sup> m <sup>3</sup> /h	$C_v$ value <sup>4)</sup> gal/min
		Valve	Spec. spring <sup>1)</sup>	With standard spring		With spec. spring <sup>1)</sup>			
				bar	psig	bar	psig		
NRVA 15	1/2	<b>020-2000</b>	<b>020-2307</b>	0.12	1.7	0.3	4.4	5	6
NRVA 20	3/4	<b>020-2001</b>	<b>020-2307</b>	0.12	1.7	0.3	4.4	6	7
NRVA 25	1	<b>020-2002</b>	<b>020-2317</b>	0.12	1.7	0.3	4.4	19	22
NRVA 32	1 1/4	<b>020-2003</b>	<b>020-2317</b>	0.12	1.7	0.3	4.4	20	23
NRVA 40	1 1/2	<b>020-2004</b>	<b>020-2327</b>	0.07	1.0	0.4	5.8	44	51
NRVA 50	2	<b>020-2005</b>	<b>020-2327</b>	0.07	1.0	0.4	5.8	44	51
NRVA 65	2 1/2	<b>020-2006</b>	<b>020-2337</b>	0.07	1.0	0.4	5.8	75	87

<sup>1)</sup> A special type spring can be supplied to replace the standard valve spring.  
<sup>2)</sup>  $\Delta p$  = the minimum pressure differential at which the valve is completely open.  
<sup>3)</sup> The  $k_v$  value is the flow of water in m<sup>3</sup>/h at a pressure drop across valve of 1 bar,  $\rho = 1000$  kg/m<sup>3</sup>.  
<sup>4)</sup> The  $C_v$  value is the flow of water in gal/min at a pressure drop across valve of 1 psig,  $\rho = 10$  lbs/gal.



*Valve body without flanges:*

Type	Code no.
NRVA 15	<b>020-2020</b>
NRVA 20	<b>020-2020</b>
NRVA 25	<b>020-2022</b>
NRVA 32	<b>020-2022</b>
NRVA 40	<b>020-2024</b>
NRVA 50	<b>020-2024</b>
NRVA 65	<b>020-2026</b>

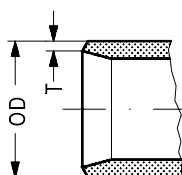
*Staybolts and gaskets*

Type	Dimensions	Code no.
NRVA 15 / 20	M 12 × 115 mm	<b>006-1107</b>
NRVA 25 / 32	M 12 × 148 mm	<b>006-1135</b>
NRVA 40 / 50	M 12 × 167 mm	<b>006-1137</b>
NRVA 65	M 16 × 200 mm	<b>006-1138</b>

**Flange connections**

Danfoss flange sets excluding gaskets, bolts and nuts, are specially made for the Danfoss product range and must only be used for the purpose described.

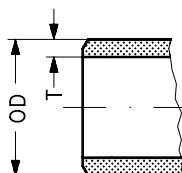
Select the valve based on capacity and then select the size of flanges most suitable for the application, which can be mounted on the valve.

**DIN**


Size mm	Size in.	OD mm	T mm	OD in.	T in.	Flange type	For use with valve housing size	Code no.
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**Butt welding DIN (2448)**

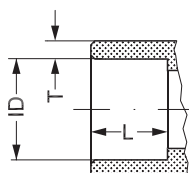
10	3/8	18	2	0.710	0.079	1.3	NRVA 15/20	<b>027N1112</b>
15	1/2	22	2.5	0.866	0.098	1.3	NRVA 15/20	<b>027N1115</b>
20	3/4	26.9	2.3	1.059	0.091	1.3	NRVA 15/20	<b>027N1120</b>
25	1	33.7	2.6	1.327	0.103	4	NRVA 25/32	<b>027N1026</b>
32	1 1/4	42.4	2.6	1.669	0.102	4	NRVA 25/32	<b>027N1033</b>
40	1 1/2	48.3	2.6	1.902	0.103	6	NRVA 40/50	<b>027N1042</b>
50	2	60.3	2.9	2.370	0.110	6	NRVA 40/50	<b>027N1051</b>
65	2 1/2	76.1	2.9	3.000	0.110	8	NRVA 65	<b>027N1055</b>

**ANSI**


Size mm	Size in.	OD mm	T mm	OD in.	T in.	Flange type	For use with valve housing size	Code no.
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**Butt welding ANSI B 36.10**

10	3/8	17.2	3.2	0.677	0.126	1.3	NRVA 15/20	<b>027N2020</b>
15	1/2	21.3	3.7	0.839	0.146	1.3	NRVA 15/20	<b>027N2021</b>
20	3/4	26.9	4.0	1.059	0.158	1.3	NRVA 15/20	<b>027N2022</b>
25	1	33.7	4.6	1.327	0.181	4	NRVA 25/32	<b>027N2023</b>
32	1 1/4	42.4	4.9	1.669	0.193	4	NRVA 25/32	<b>027N2024</b>
40	1 1/2	48.3	5.1	1.902	0.201	6	NRVA 40/50	<b>027N2025</b>
50	2	60.3	3.9	2.370	0.150	6	NRVA 40/50	<b>027N2026</b>
65	2 1/2	73.0	5.2	3.000	0.200	8	NRVA 65	<b>027N2027</b>

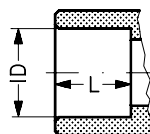
**SOC**


Size mm	Size in.	ID mm	T mm	ID in.	T in.	L mm	L in.	Flange type	For use with valve housing size	Code no.
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**Socket welding ANSI (B 16.11)**

10	3/8	17.8	4.1	0.701	0.161	10	0.394	1.3	NRVA 15/20	<b>027N2010</b>
15	1/2	22	4.8	0.866	0.189	10	0.394	1.3	NRVA 15/20	<b>027N2011</b>
20	3/4	27.4	5.0	1.079	0.197	13	0.512	4	NRVA 25/32	<b>027N2012</b>
25	1	34.1	5.8	1.343	0.228	13	0.512	4	NRVA 25/32	<b>027N2013</b>
32	1 1/4	42.9	6.0	1.689	0.236	13	0.512	4	NRVA 25/32	<b>027N2016</b>
40	1 1/2	49.0	6.5	1.929	0.254	13	0.512	6	NRVA 40/50	<b>027N2015</b>

Size mm	Size in.	ID mm	ID in.	L mm	L in.	Flange type	For use with valve housing size	Code no.
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**SA**

**Soldering DIN (2856)**

16		16.07				15		1.3	NRVA 15/20	<b>027L1116</b>
22		22.08				22		1.3	NRVA 15/20	<b>027L1122</b>
35		35.07				25		4	NRVA 25/32	<b>027L2335</b>
54		54.09				33		4	NRVA 40/50	<b>027L2554</b>

**Soldering (ANSI B 16.22)**

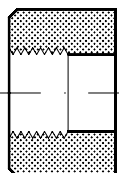
	5/8			0.628			0.807	1.3	NRVA 15/20	<b>027L1117</b>
	7/8			0.878			0.866	1.3	NRVA 15/20	<b>027L1123</b>
	1 3/8			1.375			0.984	4	NRVA 25/32	<b>027L2335</b>
	2 1/8			2.125			1.300	4	NRVA 40/50	<b>027L2554</b>

To be continued next page.

**Flange connections**

(Continued)

FPT



Size mm	Size in.	Inside pipe thread	Flange type	For use with valve housing size	Code no.
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FPT inside pipe thread, NPT (ANSI/ASME B 1.20.1)

10	<sup>3</sup> / <sub>8</sub>	( <sup>3</sup> / <sub>8</sub> × 18 NPT)	1.3	NRVA 15/20	<b>027G1005</b>
15	<sup>1</sup> / <sub>2</sub>	( <sup>1</sup> / <sub>2</sub> × 14 NPT)	1.3	NRVA 15/20	<b>027G1006</b>
20	<sup>3</sup> / <sub>4</sub>	( <sup>3</sup> / <sub>4</sub> × 14 NPT)	4	NRVA 25/32	<b>027G1007</b>

*Example*

NRVA 32 with 1 <sup>1</sup>/<sub>4</sub>" flanges for ANSI butt welding:

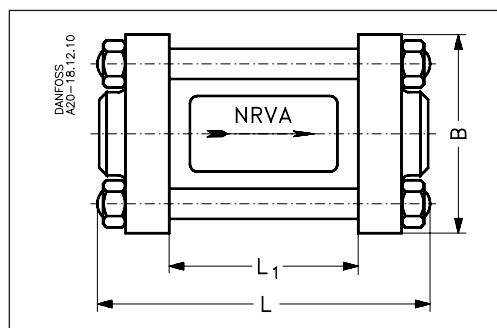
NRVA 32 + bolts + flanges (set) =  
020-2022 + 006-1135 + 027N2024



**NOTE:**

The flanges sets are exclusive gaskets, bolts and nuts.

**Dimensions and weights**

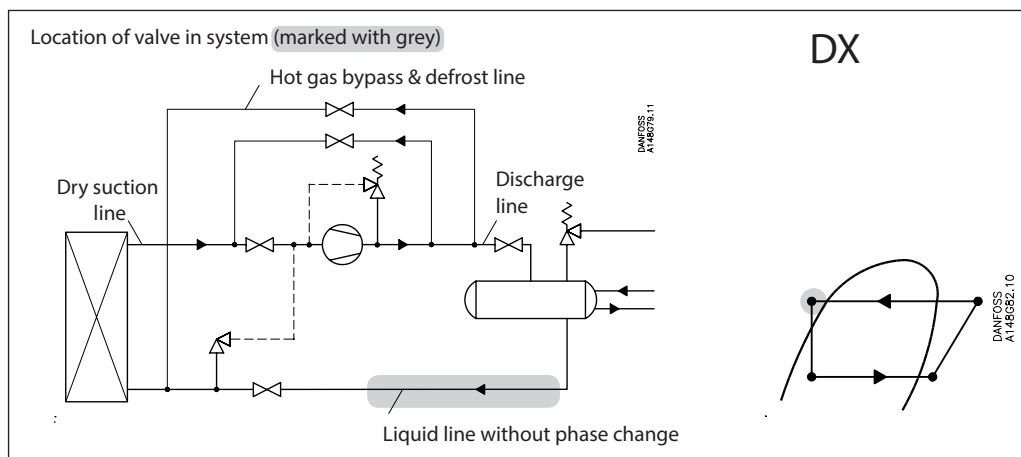
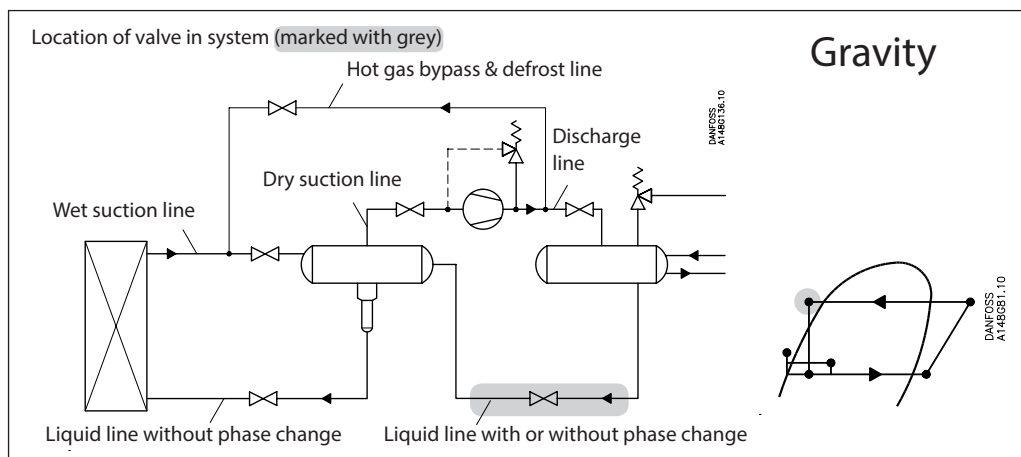
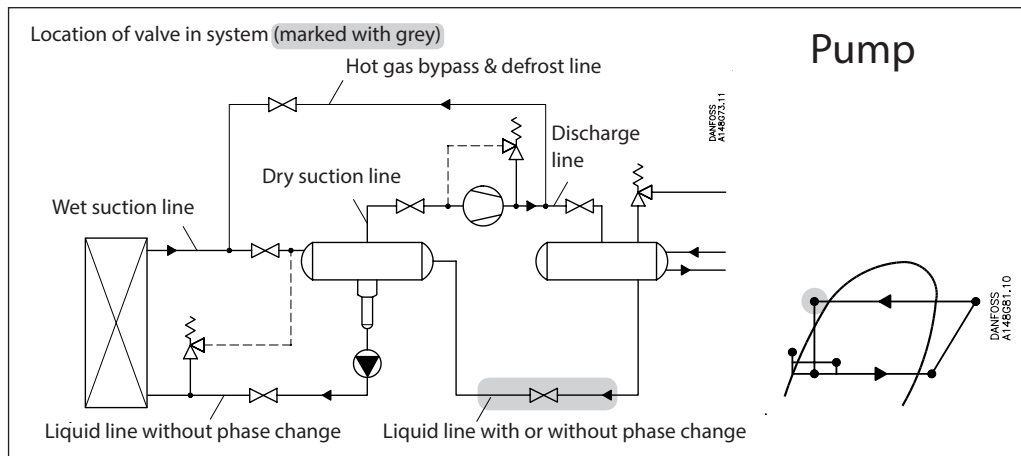


Type		L	L <sup>1)</sup>	B	Weight
NRVA 15 – 20	mm	115	50	80	1.4 kg
	in.	4.53	1.97	3.15	3.09 lb
NRVA 25 – 32	mm	138	74	∅ 83	3.0 kg
	in.	5.43	2.91	∅ 3.27	6.61 lb
NRVA 40 – 50	mm	172	94.5	∅ 103	5.0 kg
	in.	6.77	3.72	∅ 4.05	11.02 lb
NRVA 65	mm	226	124	∅ 185	13.0 kg
	in.	8.90	4.88	∅ 7.28	28.66 lb

<sup>1)</sup> Without flanges

Nominal capacities

Liquid line with/without phase change



Nominal capacities

Liquid line with/without phase change

SI units

Calculation example (R 134a capacities):

Running conditions in a plant are as follows:

$$T_e = -20\text{ °C}$$

$$Q_o = 300\text{ kW}$$

$$T_{liq} = 10\text{ °C}$$

$$\text{Max. } \Delta P = 0.3\text{ bar}$$

The capacity table is based on nominal conditions ( $\Delta P = 0.2\text{ bar}$ ,  $T_{liq} = 30\text{ °C}$ ).

The actual capacity must therefore be corrected to a nominal condition by multiplication with correction factors.

Correction factor for  $\Delta P\ 0.3\text{ bar}$   $f_{\Delta P} = 0.82$ .

Correction factor for liquid temperature  $f_{T_{liq}} = 0.82$ .

$$Q_n = Q_o \times f_{\Delta P} \times f_{T_{liq}} = 300 \times 0.82 \times 0.82 = 202\text{ kW.}$$

From the capacity table a NRVA 25 with  $Q_n = 370\text{ kW}$  is the correct selection for the application.

US units

Calculation example (R 134a capacities):

Running conditions in a plant are as follows:

$$T_e = -20\text{ °F}$$

$$Q_o = 130\text{ TR}$$

$$T_{liq} = 50\text{ °F}$$

$$\text{Max. } \Delta P = 5\text{ psi}$$

The capacity table is based on nominal conditions ( $\Delta P = 3\text{ psi}$ ,  $T_{liq} = 90\text{ °F}$ ).

The actual capacity must therefore be corrected to a nominal condition by multiplication with correction factors.

Correction factor for  $\Delta P\ 5\text{ psi}$ ,  $f_{\Delta P} = 0.79$

Correction factor for liquid temperature  $f_{T_{liq}} = 0.81$ .

$$Q_n = Q_o \times f_{\Delta P} \times f_{T_{liq}} = 130 \times 0.79 \times 0.81 = 83.2\text{ TR}$$

From the capacity table a NRVA 25 with  $Q_n = 100\text{ TR}$  is the correct selection for the application.

Nominal capacities

Liquid line with/without phase change

SI units

Capacity table for nominal conditions,  $Q_N$  [kW],  
 $T_{liq} = 30\text{ }^\circ\text{C}$ ,  
 $\Delta P = 0.2\text{ bar}$

R 717

Type	$k_v$ m <sup>3</sup> /h	Evaporating temperature $T_e$							
		-50 °C	-40 °C	-30 °C	-20 °C	-10 °C	0 °C	10 °C	20 °C
NRVA 15	5	504	512	519	526	532	537	542	546
NRVA 20	6	605	614	623	631	638	645	651	655
NRVA 25	19	1916	1945	1973	1998	2022	2042	2060	2075
NRVA 32	20	2016	2048	2077	2104	2128	2150	2169	2185
NRVA 40	44	4436	4505	4569	4628	4682	4730	4771	4806
NRVA 50	44	4436	4505	4569	4628	4682	4730	4771	4806
NRVA 65	75	7562	7678	7787	7889	7981	8062	8133	8192

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

$\Delta P$ (bar)	Correction factor
<b>0.2</b>	<b>1.00</b>
0.25	0.89
0.3	0.82
0.4	0.71
0.5	0.63
0.6	0.58

Correction factor for liquid temperature ( $T_{liq}$ )

Liquid temperature	Correction factor
-20 °C	0.82
-10 °C	0.86
0 °C	0.88
10 °C	0.92
20 °C	0.96
<b>30 °C</b>	<b>1.00</b>
40 °C	1.04
50 °C	1.09

US units

Capacity table for nominal conditions,  $Q_N$  [Tons of Refrigeration],  
 $T_{liq} = 90\text{ }^\circ\text{F}$ ,  
 $\Delta P = 3\text{ psi}$

R 717

Type	$C_v$ USgal/min	Evaporating temperature $T_e$							
		-60 °F*	-40 °F	-20 °F	0 °F	20 °F	40 °F	60 °F	80 °F
NRVA 15	6	143.9	145.9	147.7	149.2	150.6	151.7	152.5	153.0
NRVA 20	7	173	175	177	179	181	182	183	184
NRVA 25	22	547	554	561	567	572	576	580	581
NRVA 32	23	576	583	591	597	602	607	610	612
NRVA 40	51	1266	1284	1300	1313	1325	1335	1342	1347
NRVA 50	51	1266	1284	1300	1313	1325	1335	1342	1347
NRVA 65	87	2158	2188	2215	2239	2259	2276	2288	2295

\* 2 °F below min. operating temperature.

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

$\Delta P$ (psi)	Correction factor
<b>3</b>	<b>1.00</b>
4	0.87
5	0.79
6	0.72
7	0.66
8	0.62

Correction factor for liquid temperature ( $T_{liq}$ )

Liquid temperature	Correction factor
-10 °F	0.82
10 °F	0.85
30 °F	0.88
50 °F	0.92
70 °F	0.96
<b>90 °F</b>	<b>1.00</b>
110 °F	1.04
130 °F	1.09



Nominal capacities

Liquid line with/without phase change

SI units

Capacity table for nominal conditions,  $Q_N$  [kW],  
 $T_{liq} = 30\text{ °C}$ ,  
 $\Delta P = 0.2\text{ bar}$

R 22

Type	$k_v$ m <sup>3</sup> /h	Evaporating temperature $T_e$							
		-50 °C	-40 °C	-30 °C	-20 °C	-10 °C	0 °C	10 °C	20 °C
NRVA 15	5	99	102	105	108	111	114	116	118
NRVA 20	6	119	123	126	130	133	136	139	142
NRVA 25	19	376	389	400	411	422	431	440	448
NRVA 32	20	396	409	421	433	444	454	463	472
NRVA 40	44	872	900	927	952	977	999	1020	1038
NRVA 50	44	872	900	927	952	977	999	1020	1038
NRVA 65	75	1486	1534	1580	1623	1665	1703	1738	1769

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

$\Delta P$ (bar)	Correction factor
<b>0.2</b>	<b>1.00</b>
0.25	0.89
0.3	0.82
0.4	0.71
0.5	0.63
0.6	0.58

Correction factor for liquid temperature ( $T_{liq}$ )

Liquid temperature	Correction factor
-20 °C	0.71
-10 °C	0.75
0 °C	0.80
10 °C	0.86
20 °C	0.92
<b>30 °C</b>	<b>1.00</b>
40 °C	1.09
50 °C	1.22

US units

Capacity table for nominal conditions,  $Q_N$  [Tons of Refrigeration],  
 $T_{liq} = 90\text{ °F}$ ,  
 $\Delta P = 3\text{ psi}$

R 22

Type	$C_v$ USgal/min	Evaporating temperature $T_e$							
		-60 °F*	-40 °F	-20 °F	0 °F	20 °F	40 °F	60 °F	80 °F
NRVA 15	6	28	29	30	31	32	32	33	34
NRVA 20	7	34	35	36	37	38	39	40	41
NRVA 25	22	106	110	114	117	120	123	126	129
NRVA 32	23	112	116	120	123	127	130	133	135
NRVA 40	51	246	255	263	271	279	286	292	298
NRVA 50	51	246	255	263	271	279	286	292	298
NRVA 65	87	419	434	449	462	475	487	498	507

\* 2 °F below min. operating temperature.

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

$\Delta P$ (psi)	Correction factor
<b>3</b>	<b>1.00</b>
4	0.87
5	0.79
6	0.72
7	0.66
8	0.62

Correction factor for liquid temperature ( $T_{liq}$ )

Liquid temperature	Correction factor
-10 °F	0.73
10 °F	0.77
30 °F	0.82
50 °F	0.87
70 °F	0.93
<b>90 °F</b>	<b>1.00</b>
110 °F	1.09
130 °F	1.20

Nominal capacities

Liquid line with/without phase change

SI units

Capacity table for nominal conditions,  $Q_N$  [kW],  
 $T_{liq} = 30\text{ }^\circ\text{C}$ ,  
 $\Delta P = 0.2\text{ bar}$

R 134a

Type	$k_v$ m <sup>3</sup> /h	Evaporating temperature $T_e$							
		-50 °C	-40 °C	-30 °C	-20 °C	-10 °C	0 °C	10 °C	20 °C
NRVA 15	5	89	93	97	101	105	109	113	36
NRVA 20	6	107	112	117	122	127	131	136	68
NRVA 25	19	338	354	370	385	401	415	429	90
NRVA 32	20	356	373	390	406	422	437	452	158
NRVA 40	44	783	820	857	893	928	962	994	260
NRVA 50	44	783	820	857	893	928	962	994	389
NRVA 65	75	1335	1398	1461	1522	1582	1639	1695	678

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

$\Delta P$ (bar)	Correction factor
<b>0.2</b>	<b>1.00</b>
0.25	0.89
0.3	0.82
0.4	0.71
0.5	0.63
0.6	0.58

Correction factor for liquid temperature ( $T_{liq}$ )

Liquid temperature	Correction factor
-20 °C	0.66
-10 °C	0.70
0 °C	0.76
10 °C	0.82
20 °C	0.90
<b>30 °C</b>	<b>1.00</b>
40 °C	1.13
50 °C	1.29

US units

Capacity table for nominal conditions,  $Q_N$  [Tons of Refrigeration],  
 $T_{liq} = 90\text{ }^\circ\text{F}$ ,  
 $\Delta P = 3\text{ psi}$

R 134a

Type	$C_v$ USgal/min	Evaporating temperature $T_e$							
		-60 °F*	-40 °F	-20 °F	0 °F	20 °F	40 °F	60 °F	80 °F
NRVA 15	6	25	26	28	29	30	32	33	10
NRVA 20	7	30	32	33	35	36	38	39	20
NRVA 25	22	95	100	105	110	115	120	124	26
NRVA 32	23	100	106	111	116	121	126	131	46
NRVA 40	51	220	232	244	255	266	278	288	75
NRVA 50	51	220	232	244	255	266	278	288	112
NRVA 65	87	376	396	416	435	454	473	490	196

\* 2 °F below min. operating temperature.

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

$\Delta P$ (psi)	Correction factor
<b>3</b>	<b>1.00</b>
4	0.87
5	0.79
6	0.72
7	0.66
8	0.62

Correction factor for liquid temperature ( $T_{liq}$ )

Liquid temperature	Correction factor
-10 °F	0.64
10 °F	0.68
30 °F	0.74
50 °F	0.81
70 °F	0.89
<b>90 °F</b>	<b>1.00</b>
110 °F	1.15
130 °F	1.35

Nominal capacities

Liquid line with/without phase change

SI units

Capacity table for nominal conditions,  $Q_N$  [kW],  
 $T_{liq} = 30\text{ }^\circ\text{C}$ ,  
 $\Delta P = 0.2\text{ bar}$

R 404A

Type	$k_v$ m <sup>3</sup> /h	Evaporating temperature $T_e$							
		-50 °C	-40 °C	-30 °C	-20 °C	-10 °C	0 °C	10 °C	20 °C
NRVA 15	5	57.2	61.3	65.3	69.2	73.0	76.6	79.9	82.8
NRVA 20	6	68.7	73.6	78.4	83.1	87.6	91.9	95.8	99.4
NRVA 25	19	217.5	232.9	248.2	263.1	277.4	290.9	303.5	314.7
NRVA 32	20	228.9	245.2	261.3	276.9	292.0	306.3	319.5	331.2
NRVA 40	44	503.6	539.4	574.8	609.2	642.4	673.8	702.8	728.7
NRVA 50	44	503.6	539.4	574.8	609.2	642.4	673.8	702.8	728.7
NRVA 65	75	858.5	919.4	979.7	1038.4	1094.9	1148.5	1198.0	1242.1

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

$\Delta P$ (bar)	Correction factor
<b>0.2</b>	<b>1.00</b>
0.25	0.89
0.3	0.82
0.4	0.71
0.5	0.63
0.6	0.58

Correction factor for liquid temperature ( $T_{liq}$ )

Liquid temperature	Correction factor
-20 °C	0.55
-10 °C	0.60
0 °C	0.66
10 °C	0.74
20 °C	0.85
<b>30 °C</b>	<b>1.00</b>
40 °C	1.23
50 °C	1.68

US units

Capacity table for nominal conditions,  $Q_N$  [Tons of Refrigeration],  
 $T_{liq} = 90\text{ }^\circ\text{F}$ ,  
 $\Delta P = 3\text{ psi}$

R 404A

Type	$C_v$ USgal/min	Evaporating temperature $T_e$							
		-60 °F*	-40 °F	-20 °F	0 °F	20 °F	40 °F	60 °F	80 °F
NRVA 15	6	15.7	17.0	18.2	19.5	20.7	21.8	22.8	23.7
NRVA 20	7	18.8	20.4	21.9	23.4	24.8	26.1	27.4	28.4
NRVA 25	22	59.6	64.5	69.3	74.0	78.5	82.7	86.8	89.9
NRVA 32	23	62.8	67.9	73.0	77.9	82.6	87.0	91.3	94.7
NRVA 40	51	138.1	149.4	160.6	171.4	181.7	191.4	200.9	208.2
NRVA 50	51	138.1	149.4	160.6	171.4	181.7	191.4	200.9	208.2
NRVA 65	87	235.4	254.7	273.7	292.2	309.8	326.3	342.5	355.0

\* 2 °F below min. operating temperature.

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

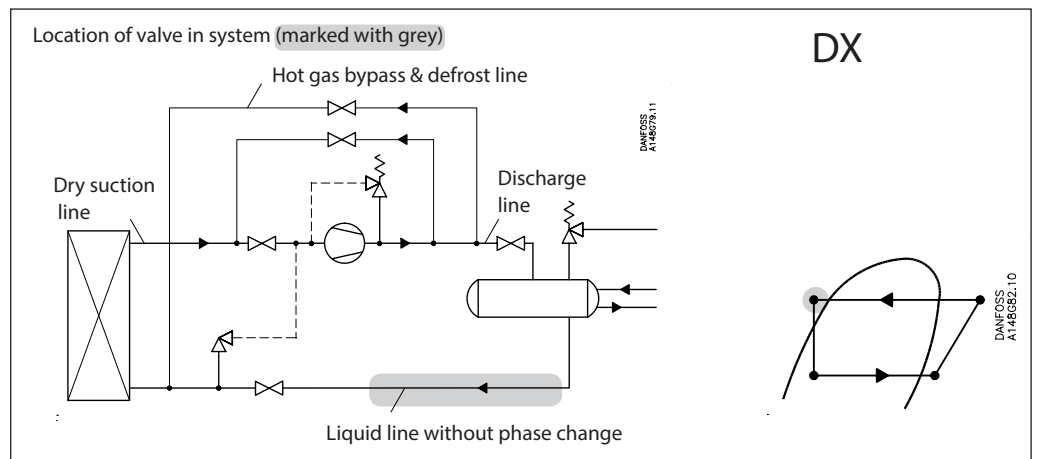
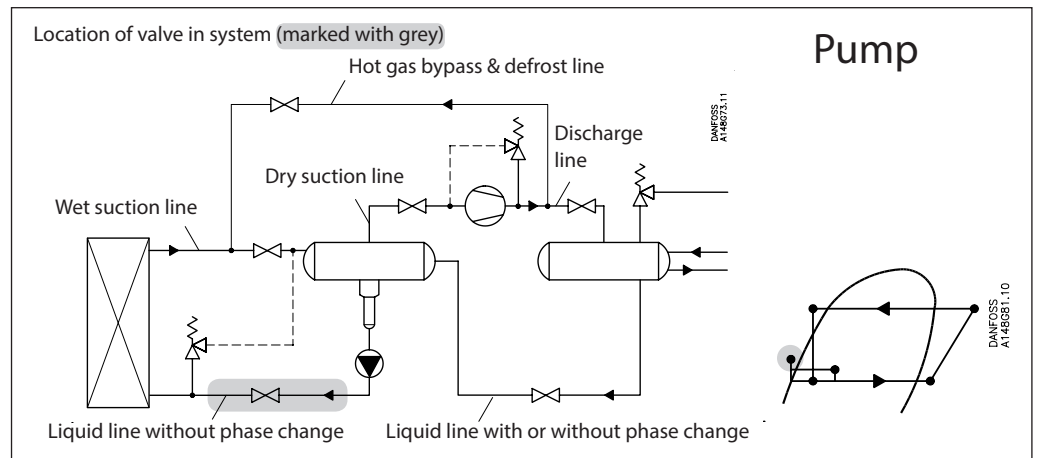
$\Delta P$ (psi)	Correction factor
<b>3</b>	<b>1.00</b>
4	0.87
5	0.79
6	0.72
7	0.66
8	0.62

Correction factor for liquid temperature ( $T_{liq}$ )

Liquid temperature	Correction factor
-10 °F	0.52
10 °F	0.57
30 °F	0.63
50 °F	0.72
70 °F	0.83
<b>90 °F</b>	<b>1.00</b>
110 °F	1.29
130 °F	1.92

Nominal capacities

Liquid line without phase change



Nominal capacities

Liquid line without phase change

SI units

Calculation example (R 134a capacities):

Running conditions in a plant are as follows:

$T_e = -20\text{ °C}$   
 $Q_0 = 300\text{ kW}$   
 circulation rate = 3  
 Max.  $\Delta P = 0.3\text{ bar}$

The capacity table is based on nominal conditions (pressure drop  $\Delta P = 0.2\text{ bar}$ , circulation rate = 4).

The actual capacity must therefore be corrected to a nominal condition by multiplication with correction factors.

Correction factor for  $\Delta P\ 0.3\text{ bar}$   $f_{\Delta P} = 0.82$   
 Correction factor for circulation rate  $f_{rec} = 0.75$ .

$$Q_n = Q_0 \times f_{\Delta P} \times f_{rec} = 300 \times 0.82 \times 0.75 = 184.5\text{ kW}$$

From the capacity table a NRVA 40 with  $Q_n = 336\text{ kW}$  is the correct selection for the application.

US units

Calculation example (R 134a capacities):

Running conditions in a plant are as follows:

$T_e = -20\text{ °F}$   
 $Q_0 = 130\text{ TR}$   
 Circulation rate = 3  
 Max.  $\Delta P = 5\text{ psi}$

The capacity table is based on nominal conditions (pressure drop  $\Delta p = 3\text{ psi}$ , circulation rate = 4).

The actual capacity must therefore be corrected to a nominal condition by multiplication with correction factors.

Correction factor for  $\Delta P\ 5\text{ psi}$   $f_{\Delta P} = 0.79$   
 Correction factor for circulation rate  $f_{rec} = 0.75$ .

$$Q_n = Q_0 \times f_{\Delta P} \times f_{rec} = 130 \times 0.79 \times 0.75 = 77.0\text{ TR}$$

From the capacity table a NRVA 40 with  $Q_n = 101\text{ TR}$  is the correct selection for the application.

Nominal capacities

Liquid line without phase change

SI units

Capacity table for nominal conditions,  $Q_N$  [kW], circulation rate = 4,  $\Delta P = 0.2$  bar

R 717

Type	$k_v$ m <sup>3</sup> /h	Evaporating temperature $T_e$							
		-50 °C	-40 °C	-30 °C	-20 °C	-10 °C	0 °C	10 °C	20 °C
NRVA 15	5	182.5	177.1	171.9	166.4	160.7	154.9	148.8	142.5
NRVA 20	6	219	213	206	200	193	186	179	171
NRVA 25	19	693	673	653	632	611	589	566	541
NRVA 32	20	730	708	687	665	643	620	595	570
NRVA 40	44	1606	1559	1512	1464	1414	1363	1310	1254
NRVA 50	44	1606	1559	1512	1464	1414	1363	1310	1254
NRVA 65	75	2737	2657	2578	2495	2411	2324	2232	2137

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

$\Delta P$ (bar)	Correction factor
<b>0.2</b>	<b>1.00</b>
0.25	0.89
0.3	0.82
0.4	0.71
0.5	0.63
0.6	0.58

Correction factor for circulation rate ( $f_{rec}$ )

Circulation rate	Correction factor
2	0.5
3	0.75
<b>4</b>	<b>1</b>
6	1.5
8	2
10	2.5

US units

Capacity table for nominal conditions,  $Q_N$  [Tons of Refrigeration], circulation rate = 4,  $\Delta P = 3$  psi

R 717

Type	$C_v$ USgal/min	Evaporating temperature $T_e$							
		-60 °F*	-40 °F	-20 °F	0 °F	20 °F	40 °F	60 °F	80 °F
NRVA 15	6	52.8	51.1	49.5	47.8	45.9	44.0	41.9	39.8
NRVA 20	7	63.3	61.4	59.4	57.4	55.1	52.8	50.3	47.8
NRVA 25	22	200.5	194.4	188.2	181.7	174.5	167.3	159.2	151.4
NRVA 32	23	211	205	198	191	184	176	168	159
NRVA 40	51	464	450	436	421	404	387	369	351
NRVA 50	51	464	450	436	421	404	387	369	351
NRVA 65	87	792	767	743	717	689	660	628	598

\* 2 °F below min. operating temperature.

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

$\Delta P$ (psi)	Correction factor
<b>3</b>	<b>1.00</b>
4	0.87
5	0.79
6	0.72
7	0.66
8	0.62

Correction factor for circulation rate ( $f_{rec}$ )

Circulation rate	Correction factor
2	0.5
3	0.75
<b>4</b>	<b>1</b>
6	1.5
8	2
10	2.5

Nominal capacities

Liquid line without phase change

SI units

Capacity table for nominal conditions,  $Q_N$  [kW], circulation rate = 4,  $\Delta P = 0.2$  bar

R 22

Type	$k_v$ m <sup>3</sup> /h	Evaporating temperature $T_e$							
		-50 °C	-40 °C	-30 °C	-20 °C	-10 °C	0 °C	10 °C	20 °C
NRVA 15	5	45	43	41	40	38	36	34	32
NRVA 20	6	53	52	50	48	46	43	41	39
NRVA 25	19	169	163	157	151	144	137	130	122
NRVA 32	20	178	172	166	159	152	145	137	128
NRVA 40	44	392	378	364	350	334	318	301	283
NRVA 50	44	392	378	364	350	334	318	301	283
NRVA 65	75	668	645	621	596	570	542	513	482

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

$\Delta P$ (bar)	Correction factor
<b>0.2</b>	<b>1.00</b>
0.25	0.89
0.3	0.82
0.4	0.71
0.5	0.63
0.6	0.58

Correction factor for circulation rate ( $f_{rec}$ )

Circulation rate	Correction factor
2	0.5
3	0.75
<b>4</b>	<b>1</b>
6	1.5
8	2
10	2.5

US units

Capacity table for nominal conditions,  $Q_N$  [Tons of Refrigeration], circulation rate = 4,  $\Delta P = 3$  psi

R 22

Type	$C_v$ USgal/min	Evaporating temperature $T_e$							
		-60 °F*	-40 °F	-20 °F	0 °F	20 °F	40 °F	60 °F	80 °F
NRVA 15	6	12.9	12.4	11.9	11.4	10.8	10.2	9.5	8.8
NRVA 20	7	15	15	14	14	13	12	11	11
NRVA 25	22	49	47	45	43	41	39	36	34
NRVA 32	23	52	50	48	46	43	41	38	35
NRVA 40	51	114	109	105	100	95	90	84	78
NRVA 50	51	114	109	105	100	95	90	84	78
NRVA 65	87	193	186	179	171	162	153	143	133

\* 2 °F below min. operating temperature.

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

$\Delta P$ (psi)	Correction factor
<b>3</b>	<b>1.00</b>
4	0.87
5	0.79
6	0.72
7	0.66
8	0.62

Correction factor for circulation rate ( $f_{rec}$ )

Circulation rate	Correction factor
2	0.5
3	0.75
<b>4</b>	<b>1</b>
6	1.5
8	2
10	2.5

Nominal capacities

Liquid line without phase change

SI units

Capacity table for nominal conditions,  $Q_N$  [kW], circulation rate = 4,  $\Delta P = 0.2$  bar

R 134a

Type	$k_v$ m <sup>3</sup> /h	Evaporating temperature $T_e$							
		-50 °C	-40 °C	-30 °C	-20 °C	-10 °C	0 °C	10 °C	20 °C
NRVA 15	5	41.2	39.7	38.2	36.6	34.8	33.0	31.1	32
NRVA 20	6	49	48	46	44	42	40	37.4	39
NRVA 25	19	157	151	145	139	132	126	118	122
NRVA 32	20	165	159	153	146	139	132	125	128
NRVA 40	44	363	350	336	322	307	291	274	283
NRVA 50	44	363	350	336	322	307	291	274	283
NRVA 65	75	618	596	573	549	523	496	467	482

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

$\Delta P$ (bar)	Correction factor
<b>0.2</b>	<b>1.00</b>
0.25	0.89
0.3	0.82
0.4	0.71
0.5	0.63
0.6	0.58

Correction factor for circulation rate ( $f_{rec}$ )

Circulation rate	Correction factor
2	0.5
3	0.75
<b>4</b>	<b>1</b>
6	1.5
8	2
10	2.5

US units

Capacity table for nominal conditions,  $Q_N$  [Tons of Refrigeration], circulation rate = 4,  $\Delta P = 3$  psi

R 134a

Type	$C_v$ USgal/min	Evaporating temperature $T_e$							
		-60 °F*	-40 °F	-20 °F	0 °F	20 °F	40 °F	60 °F	80 °F
NRVA 15	6	11.9	11.4	10.9	10.4	9.9	9.2	8.6	8.8
NRVA 20	7	14.3	13.7	13.1	12.5	11.8	11.1	10.3	11
NRVA 25	22	45	43	42	40	37	35	33	34
NRVA 32	23	48	46	44	42	39	37	34	35
NRVA 40	51	105	101	96	92	87	81	76	78
NRVA 50	51	105	101	96	92	87	81	76	78
NRVA 65	87	179	172	164	156	148	138	129	133

\* 2 °F below min. operating temperature.

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

$\Delta P$ (psi)	Correction factor
<b>3</b>	<b>1.00</b>
4	0.87
5	0.79
6	0.72
7	0.66
8	0.62

Correction factor for circulation rate ( $f_{rec}$ )

Circulation rate	Correction factor
2	0.5
3	0.75
<b>4</b>	<b>1</b>
6	1.5
8	2
10	2.5



Nominal capacities

Liquid line without phase change

SI units

Capacity table for nominal conditions,  $Q_N$  [kW], circulation rate = 4,  $\Delta P = 0.2$  bar

R 404A

Type	$k_v$ m <sup>3</sup> /h	Evaporating temperature $T_e$							
		-50 °C	-40 °C	-30 °C	-20 °C	-10 °C	0 °C	10 °C	20 °C
NRVA 15	5	36	35	33	31	30	28	26	23
NRVA 20	6	43	42	39	38	35	33	31	28
NRVA 25	19	138	132	125	119	112	105	97	89
NRVA 32	20	145	139	131	125	118	111	102	93
NRVA 40	44	319	306	289	276	260	244	225	205
NRVA 50	44	319	306	289	276	260	244	225	205
NRVA 65	75	543	521	492	470	444	415	384	350

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

$\Delta P$ (bar)	Correction factor
<b>0.2</b>	<b>1.00</b>
0.25	0.89
0.3	0.82
0.4	0.71
0.5	0.63
0.6	0.58

Correction factor for circulation rate ( $f_{rec}$ )

Circulation rate	Correction factor
2	0.5
3	0.75
<b>4</b>	<b>1</b>
6	1.5
8	2
10	2.5

US units

Capacity table for nominal conditions,  $Q_N$  [Tons of Refrigeration], circulation rate = 4,  $\Delta P = 3$  psi

R 404A

Type	$C_v$ USgal/min	Evaporating temperature $T_e$							
		-60 °F*	-40 °F	-20 °F	0 °F	20 °F	40 °F	60 °F	80 °F
NRVA 15	6	10.5	10.0	9.5	9.0	8.4	7.8	7.0	6.2
NRVA 20	7	13	12	11	11	10	9	8	7
NRVA 25	22	40	38	36	34	32	30	27	24
NRVA 32	23	42	40	38	36	34	31	28	25
NRVA 40	51	92	88	83	79	74	68	62	55
NRVA 50	51	92	88	83	79	74	68	62	55
NRVA 65	87	158	151	142	134	126	117	105	93

\* 2 °F below min. operating temperature.

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

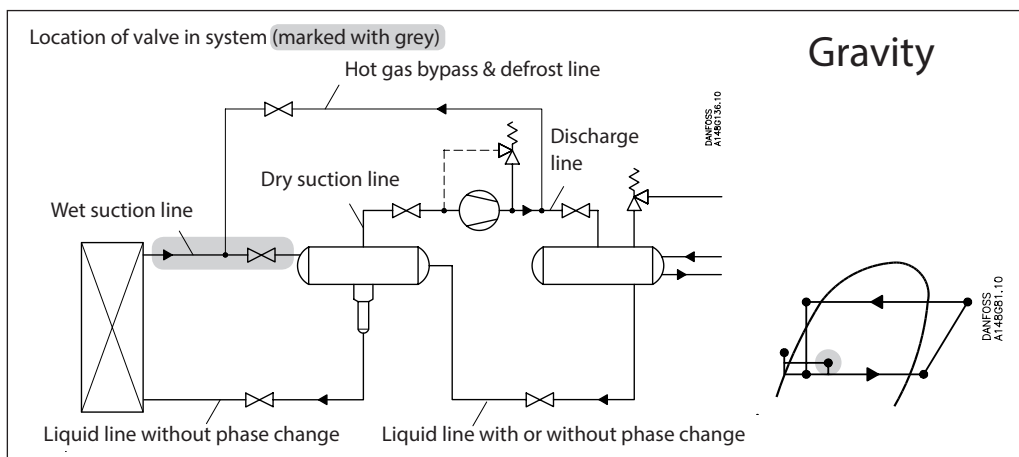
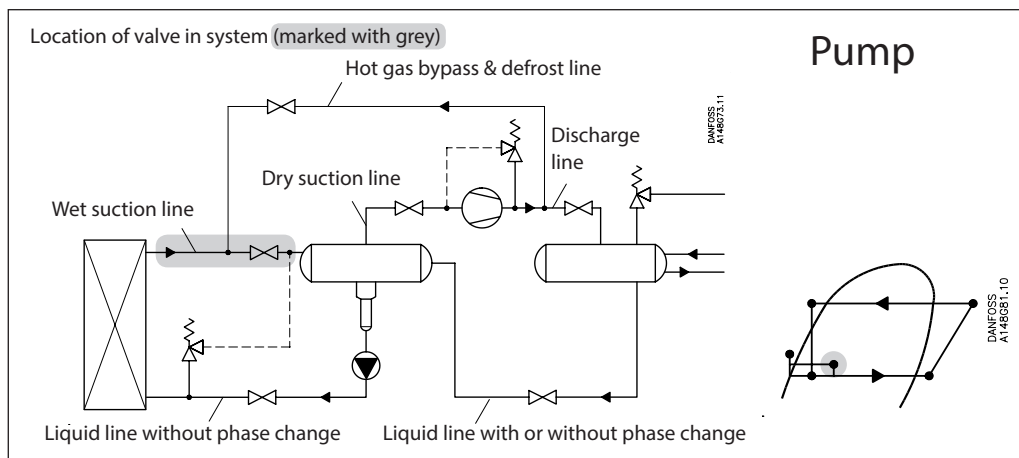
$\Delta P$ (psi)	Correction factor
<b>3</b>	<b>1.00</b>
4	0.87
5	0.79
6	0.72
7	0.66
8	0.62

Correction factor for circulation rate ( $f_{rec}$ )

Circulation rate	Correction factor
2	0.5
3	0.75
<b>4</b>	<b>1</b>
6	1.5
8	2
10	2.5

Nominal capacities

Wet suction line



Nominal capacities

Wet suction line

SI units

Calculation example (R 717 capacities):

Running conditions in a plant are as follows:

$T_e = -20\text{ °C}$   
 $Q_0 = 100\text{ kW}$   
 Circulation rate = 3  
 Max.  $\Delta P = 0.3\text{ bar}$

The capacity table is based on nominal conditions (pressure drop  $\Delta P = 0.2\text{ bar}$ , circulation rate = 4).

The actual capacity must therefore be corrected to a nominal condition by multiplication with correction factors.

Correction factor for  $\Delta P\ 0.3\text{ bar}$   $f_{\Delta P} = 0.82$   
 Correction factor for circulation rate  $f_{rec} = 0.9$ .

$$Q_n = Q_0 \times f_{\Delta P} \times f_{rec} = 100 \times 0.82 \times 0.9 = 73,8\text{ kW.}$$

From the capacity table a NRVA 40 with  $Q_n = 157\text{ kW}$  is the correct selection for the application.

Choosing NRVA 32 would give a slightly higher pressure drop than 0.3. Accepting this requires a plant evaluation.

US units

Calculation example (R 717 capacities):

Running conditions in a plant are as follows:

$T_e = -20\text{ °F}$   
 $Q_0 = 10\text{ TR}$   
 Circulation rate = 3  
 Max.  $\Delta P = 5\text{ psi}$

The capacity table is based on nominal conditions (pressure drop  $\Delta P = 3\text{ psi}$ , circulation rate = 4).

The actual capacity must therefore be corrected to a nominal condition by multiplication with correction factors.

Correction factor for  $\Delta P\ 5\text{ psi}$   $f_{\Delta P} = 0.79$   
 Correction factor for circulation rate  $f_{rec} = 0.9$ .

$$Q_n = Q_0 \times f_{\Delta P} \times f_{circ} = 10 \times 0.79 \times 0.9 = 7.1\text{ TR}$$

From the capacity table a NRVA 25 with  $Q_n = 16.5\text{ TR}$  is the correct selection for the application.

Nominal capacities

Wet suction line

SI units

Capacity table for nominal conditions,  $Q_N$  [kW], circulation rate = 4,  $\Delta P = 0.2$  bar

R 717

Type	$k_v$ m <sup>3</sup> /h	Evaporating temperature $T_e$							
		-50 °C	-40 °C	-30 °C	-20 °C	-10 °C	0 °C	10 °C	20 °C
NRVA 15	5	9.1	11.8	14.7	17.9	21.3	24.9	28.7	32.6
NRVA 20	6	11.0	14.2	17.6	21.4	25.5	29.9	34.5	39.2
NRVA 25	19	34.7	45.0	55.9	67.9	80.9	94.7	109.1	124.0
NRVA 32	20	36.6	47.3	58.8	71.5	85.1	99.7	115	131
NRVA 40	44	80.4	104.1	129.4	157	187	219	253	287
NRVA 50	44	80.4	104	129	157	187	219	253	287
NRVA 65	75	137	178	221	268	319	374	431	490

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

$\Delta P$ (bar)	Correction factor
<b>0.2</b>	<b>1.00</b>
0.25	0.89
0.3	0.82
0.4	0.71
0.5	0.63
0.6	0.58

Correction factor for circulation rate ( $f_{rec}$ )

Circulation rate	Correction factor
2	0.77
3	0.90
<b>4</b>	<b>1</b>
6	1.13
8	1.20
10	1.25

US units

Capacity table for nominal conditions,  $Q_N$  [Tons of Refrigeration], circulation rate = 4,  $\Delta P = 3$  psi

R 717

Type	$C_v$ USgal/min	Evaporating temperature $T_e$							
		-60 °F*	-40 °F	-20 °F	0 °F	20 °F	40 °F	60 °F	80 °F
NRVA 15	6	2.5	3.4	4.3	5.4	6.5	7.7	8.9	10.1
NRVA 20	7	3.1	4.1	5.2	6.5	7.8	9.2	10.7	12.1
NRVA 25	22	9.7	13.0	16.5	20.5	24.7	29.2	33.8	38.5
NRVA 32	23	10.2	13.7	17.3	21.6	26.0	30.8	35.5	40.5
NRVA 40	51	22.4	30.1	38.1	47.5	57.2	67.7	78.2	89.1
NRVA 50	51	22.4	30.1	38.1	47.5	57.2	67.7	78.2	89.1
NRVA 65	87	38.2	51.3	65.0	80.9	97.6	115	133	152

\* 2 °F below min. operating temperature.

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

$\Delta P$ (psi)	Correction factor
<b>3</b>	<b>1.00</b>
4	0.87
5	0.79
6	0.72
7	0.66
8	0.62

Correction factor for circulation rate ( $f_{rec}$ )

Circulation rate	Correction factor
2	0.77
3	0.90
<b>4</b>	<b>1</b>
6	1.13
8	1.20
10	1.25

Nominal capacities

Wet suction line

SI units

Capacity table for nominal conditions,  $Q_N$  [kW], circulation rate = 4,  $\Delta P = 0.2$  bar

R 22

Type	$k_v$ m <sup>3</sup> /h	Evaporating temperature $T_e$							
		-50 °C	-40 °C	-30 °C	-20 °C	-10 °C	0 °C	10 °C	20 °C
NRVA 15	5	4.5	5.5	6.5	7.7	8.9	10.0	11.2	12.4
NRVA 20	6	5.3	6.6	7.9	9.2	10.6	12.1	13.5	14.9
NRVA 25	19	16.9	21	25	29	34	38	43	47
NRVA 32	20	17.8	22	26	31	35	40	45	50
NRVA 40	44	39	48	58	68	78	88	99	109
NRVA 50	44	39	48	58	68	78	88	99	109
NRVA 65	75	67	82	98	115	133	151	168	186

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

$\Delta P$ (bar)	Correction factor
<b>0.2</b>	<b>1.00</b>
0.25	0.89
0.3	0.82
0.4	0.71
0.5	0.63
0.6	0.58

Correction factor for circulation rate ( $f_{rec}$ )

Circulation rate	Correction factor
2	0.77
3	0.90
<b>4</b>	<b>1</b>
6	1.13
8	1.20
10	1.25

US units

Capacity table for nominal conditions,  $Q_N$  [Tons of Refrigeration], circulation rate = 4,  $\Delta P = 3$  psi

R 22

Type	$C_v$ USgal/min	Evaporating temperature $T_e$							
		-60 °F*	-40 °F	-20 °F	0 °F	20 °F	40 °F	60 °F	80 °F
NRVA 15	6	1.3	1.6	1.9	2.3	2.7	3.0	3.4	3.8
NRVA 20	7	1.5	1.9	2.3	2.7	3.2	3.6	4.1	4.6
NRVA 25	22	4.8	6.0	7.3	8.7	10.1	11.5	13.1	14.4
NRVA 32	23	5.0	6.3	7.7	9.2	10.6	12.2	13.8	15.2
NRVA 40	51	11.1	13.9	16.9	20	23	27	30	33
NRVA 50	51	11.1	13.9	16.9	20	23	27	30	33
NRVA 65	87	18.9	24	29	34	40	46	52	57

\* 2 °F below min. operating temperature.

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

$\Delta P$ (psi)	Correction factor
<b>3</b>	<b>1.00</b>
4	0.87
5	0.79
6	0.72
7	0.66
8	0.62

Correction factor for circulation rate ( $f_{rec}$ )

Circulation rate	Correction factor
2	0.77
3	0.90
<b>4</b>	<b>1</b>
6	1.13
8	1.20
10	1.25

Nominal capacities

Wet suction line

SI units

Capacity table for nominal conditions,  $Q_N$  [kW], circulation rate = 4,  $\Delta P = 0.2$  bar

R 134a

Type	$k_v$ m <sup>3</sup> /h	Evaporating temperature $T_e$							
		-50 °C	-40 °C	-30 °C	-20 °C	-10 °C	0 °C	10 °C	20 °C
NRVA 15	5	3.3	4.6	5.7	6.7	7.7	8.8	9.8	12.4
NRVA 20	6	4.0	5.5	6.8	8.0	9.3	10.5	11.8	14.9
NRVA 25	19	12.6	17.3	22	25	29	33	37	47
NRVA 32	20	13.3	18.2	23	27	31	35	39	50
NRVA 40	44	29	40.1	50	59	68	77	87	109
NRVA 50	44	29	40.1	50	59	68	77	87	109
NRVA 65	75	50	68.4	85	100	116	132	148	186

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

$\Delta P$ (bar)	Correction factor
<b>0.2</b>	<b>1.00</b>
0.25	0.89
0.3	0.82
0.4	0.71
0.5	0.63
0.6	0.58

Correction factor for circulation rate ( $f_{rec}$ )

Circulation rate	Correction factor
2	0.77
3	0.90
<b>4</b>	<b>1</b>
6	1.13
8	1.20
10	1.25

US units

Capacity table for nominal conditions,  $Q_N$  [Tons of Refrigeration], circulation rate = 4,  $\Delta P = 3$  psi

R 134a

Type	$C_v$ USgal/min	Evaporating temperature $T_e$							
		-60 °F*	-40 °F	-20 °F	0 °F	20 °F	40 °F	60 °F	80 °F
NRVA 15	6	1.0	1.3	1.7	2.0	2.4	2.7	3.1	3.8
NRVA 20	7	1.2	1.6	2.0	2.4	2.8	3.3	3.7	4.6
NRVA 25	22	3.7	5.1	6.4	7.7	9.0	10.3	11.6	14.4
NRVA 32	23	3.8	5.4	6.8	8.1	9.4	10.9	12.2	15.2
NRVA 40	51	8.5	11.8	14.9	17.8	21	24	27	33
NRVA 50	51	8.5	11.8	14.9	17.8	21	24	27	33
NRVA 65	87	14.4	20	25	30	35	41	46	57

\* 2 °F below min. operating temperature.

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

$\Delta P$ (psi)	Correction factor
<b>3</b>	<b>1.00</b>
4	0.87
5	0.79
6	0.72
7	0.66
8	0.62

Correction factor for circulation rate ( $f_{rec}$ )

Circulation rate	Correction factor
2	0.77
3	0.90
<b>4</b>	<b>1</b>
6	1.13
8	1.20
10	1.25

Nominal capacities

Wet suction line

SI units

Capacity table for nominal conditions,  $Q_N$  [kW], circulation rate = 4,  $\Delta P = 0.2$  bar

R 404A

Type	$k_v$ m <sup>3</sup> /h	Evaporating temperature $T_e$							
		-50 °C	-40 °C	-30 °C	-20 °C	-10 °C	0 °C	10 °C	20 °C
NRVA 15	5	4.6	5.5	6.5	7.6	8.7	9.8	10.8	11.7
NRVA 20	6	5.5	6.7	7.8	9.1	10.4	11.7	12.9	14.0
NRVA 25	19	17.4	21.1	24.7	28.9	33.0	37.1	40.9	44.4
NRVA 32	20	18.3	22.2	26.1	30.4	34.7	39.0	43.1	46.7
NRVA 40	44	40.3	48.8	57.3	66.9	76.4	85.8	94.8	102.8
NRVA 50	44	40.3	48.8	57.3	66.9	76.4	85.8	94.8	102.8
NRVA 65	75	68.7	83.2	97.7	114.0	130.3	146.3	161.6	175.3

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

$\Delta P$ (bar)	Correction factor
<b>0.2</b>	<b>1.00</b>
0.25	0.89
0.3	0.82
0.4	0.71
0.5	0.63
0.6	0.58

Correction factor for circulation rate ( $f_{rec}$ )

Circulation rate	Correction factor
2	0.77
3	0.90
<b>4</b>	<b>1</b>
6	1.13
8	1.20
10	1.25

US units

Capacity table for nominal conditions,  $Q_N$  [Tons of Refrigeration], circulation rate = 4,  $\Delta P = 3$  psi

R 404A

Type	$C_v$ USgal/min	Evaporating temperature $T_e$							
		-60 °F*	-40 °F	-20 °F	0 °F	20 °F	40 °F	60 °F	80 °F
NRVA 15	6	1.3	1.6	1.9	2.3	2.6	2.9	3.3	3.5
NRVA 20	7	1.6	1.9	2.3	2.7	3.1	3.5	3.9	4.2
NRVA 25	22	4.9	6.1	7.3	8.6	9.9	11.2	12.4	13.4
NRVA 32	23	5.2	6.4	7.7	9.0	10.4	11.8	13.1	14.1
NRVA 40	51	11.4	14.1	16.9	19.9	22.9	25.9	28.8	31.1
NRVA 50	51	11.4	14.1	16.9	19.9	22.9	25.9	28.8	31.1
NRVA 65	87	19.4	24.1	28.8	33.9	39.1	44.1	49.1	52.9

\* 2 °F below min. operating temperature.

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

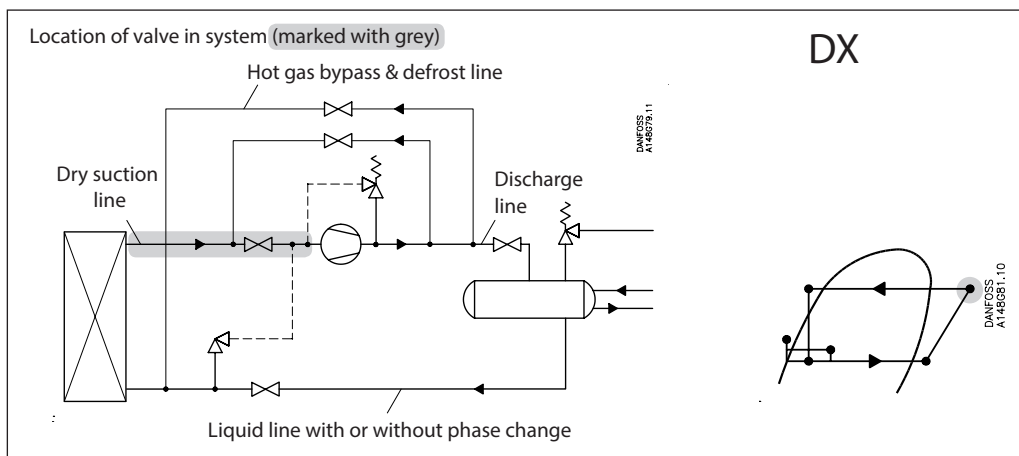
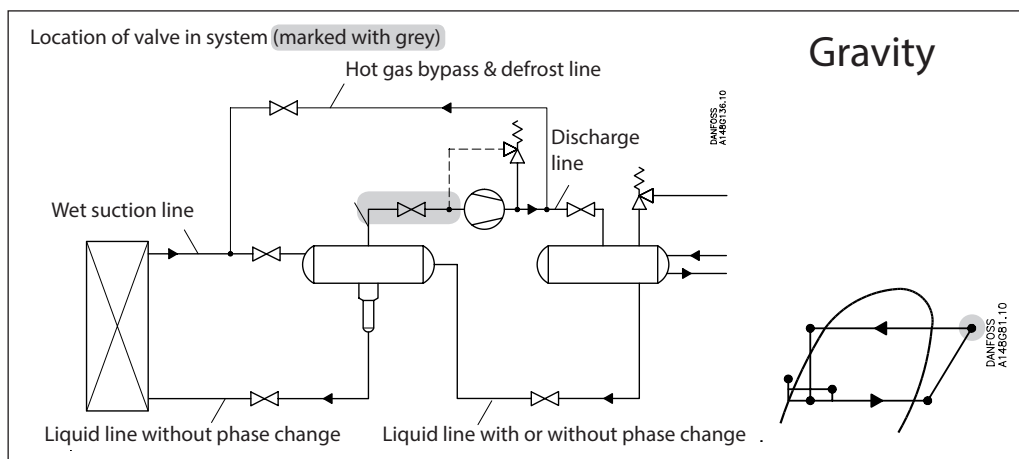
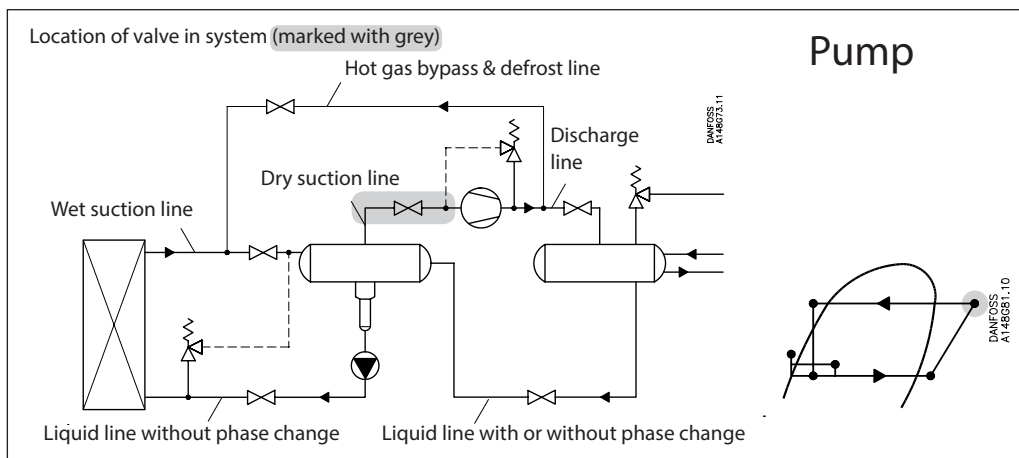
$\Delta P$ (psi)	Correction factor
<b>3</b>	<b>1.00</b>
4	0.87
5	0.79
6	0.72
7	0.66
8	0.62

Correction factor for circulation rate ( $f_{rec}$ )

Circulation rate	Correction factor
2	0.77
3	0.90
<b>4</b>	<b>1</b>
6	1.13
8	1.20
10	1.25

Nominal capacities

Dry suction line





Nominal capacities

Dry suction line

SI units

Calculation example (R 134a capacities):

Running conditions in a plant are as follows:

$$\begin{aligned} T_e &= -20\text{ °C} \\ Q_0 &= 90\text{ kW} \\ T_{liq} &= 10\text{ °C} \\ T_s &= 6\text{ °C} \\ \text{Max. } \Delta P &= 0.3\text{ bar} \end{aligned}$$

The capacity table is based on nominal conditions (pressure drop  $\Delta P = 0.2\text{ bar}$ ,  $T_{liq} = 30\text{ °C}$ ),  $T_s = 10\text{ °C}$

The actual capacity must therefore be corrected to a nominal condition by multiplication with correction factors.

Correction factor for  $\Delta P\ 0.3\text{ bar}$   $f_{\Delta P} = 0.82$   
 Correction factor for liquid temperature  $f_{T_{liq}} = 0.82$   
 Correction factor for superheat ( $T_s$ ) = 1,0

$$Q_n = Q_0 \times f_{\Delta P} \times f_{T_{liq}} \times f_{T_s} = 90 \times 0.82 \times 0.82 \times 1.0 = 60.5\text{ kW}$$

From the capacity table a NRVA 40 or NRVA 50 with  $Q_n = 65\text{ kW}$  is the correct selection depending on connections for the application.

US units

Calculation example (R 134a capacities):

Running conditions in a plant are as follows:

$$\begin{aligned} T_e &= 0\text{ °F} \\ Q_0 &= 23\text{ TR} \\ T_{liq} &= 50\text{ °F} \\ T_s &= 10\text{ °F} \\ \text{Max. } \Delta P &= 5\text{ psi} \end{aligned}$$

The capacity table is based on nominal conditions (pressure drop  $\Delta P = 3\text{ psi}$ ,  $T_{liq} = 90\text{ °F}$ ),  $T_s = 14\text{ °F}$

The actual capacity must therefore be corrected to a nominal condition by multiplication with correction factors.

Correction factor for  $\Delta P\ 5\text{ psi}$   $f_{\Delta P} = 0.79$   
 Correction factor for liquid temperature  $f_{T_{liq}} = 0.81$   
 Correction factor for superheat ( $T_s$ ) = 1,0

$$Q_n = Q_0 \times f_{\Delta P} \times f_{T_{liq}} \times f_{T_s} = 23 \times 0.79 \times 0.81 \times 1.0 = 14.7\text{ TR}$$

From the capacity table a NRVA 40 or NRVA 50 with  $Q_n = 19.3\text{ TR}$  is the correct selection depending on connections for the application.

Nominal capacities

Dry suction line

SI units

Capacity table for nominal conditions,  $Q_N$  [kW],  
 $T_{liq} = 30\text{ }^\circ\text{C}$ ,  
 $\Delta P = 0.2\text{ bar}$

R 717

Type	$k_v$ m <sup>3</sup> /h	Evaporating temperature $T_e$							
		-50 °C	-40 °C	-30 °C	-20 °C	-10 °C	0 °C	10 °C	20 °C
NRVA 15	5	12.9	17.0	21.8	27.5	33.7	41.0	49.0	57.9
NRVA 20	6	15.5	20.4	26.2	32.9	40.5	49.2	58.9	69.5
NRVA 25	19	49.0	64.7	82.8	104.3	128.2	155.7	186	220
NRVA 32	20	51.6	68.1	87.2	109.8	135	164	196	232
NRVA 40	44	113.5	149.7	192	242	297	361	432	510
NRVA 50	44	113	150	192	242	297	361	432	510
NRVA 65	75	193	255	327	412	506	615	736	869

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

$\Delta P$ (bar)	Correction factor
<b>0.2</b>	<b>1.00</b>
0.25	0.89
0.3	0.82
0.4	0.71
0.5	0.63
0.6	0.58

Correction factor for superheat ( $T_s$ )

$T_s$	Correction factor
6 °C	1.00
8 °C	1.00
10 °C	1.00
12 °C	1.00

Correction factor for liquid temperature ( $T_{liq}$ )

Liquid temperature	Correction factor
-20 °C	0.82
-10 °C	0.86
0 °C	0.88
10 °C	0.92
20 °C	0.96
<b>30 °C</b>	<b>1.00</b>
40 °C	1.04
50 °C	1.09

US units

Capacity table for nominal conditions,  $Q_N$  [Tons of Refrigeration],  
 $T_{liq} = 90\text{ }^\circ\text{F}$ ,  
 $\Delta P = 3\text{ psi}$

R 717

Type	$C_v$ USgal/min	Evaporating temperature $T_e$							
		-60 °F*	-40 °F	-20 °F	0 °F	20 °F	40 °F	60 °F	80 °F
NRVA 15	6	3.6	4.9	6.4	8.2	10.4	12.8	15.4	18.3
NRVA 20	7	4.3	5.9	7.7	9.8	12.4	15.4	18.5	22.0
NRVA 25	22	13.6	18.7	24.4	31.2	39.4	48.6	58.5	69.7
NRVA 32	23	14.3	19.7	25.7	32.8	41.4	51.2	61.5	73.3
NRVA 40	51	31.5	43.2	56.5	72.2	91.2	112.6	135.4	161
NRVA 50	51	31.5	43.2	56.5	72.2	91.2	113	135	161
NRVA 65	87	53.6	73.7	96.3	123	155	192	231	275

\* 2 °F below min. operating temperature.

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

$\Delta P$ (psi)	Correction factor
<b>3</b>	<b>1.00</b>
4	0.87
5	0.79
6	0.72
7	0.66
8	0.62

Correction factor for superheat ( $T_s$ )

$T_s$	Correction factor
10 °F	1.00
14 °F	1.00
18 °F	1.00
20 °F	1.00

Correction factor for liquid temperature ( $T_{liq}$ )

Liquid temperature	Correction factor
-10 °F	0.82
10 °F	0.85
30 °F	0.88
50 °F	0.92
70 °F	0.96
<b>90 °F</b>	<b>1.00</b>
110 °F	1.04
130 °F	1.09

Nominal capacities

Dry suction line

SI units

Capacity table for nominal conditions,  $Q_N$  [kW],  
 $T_{liq} = 30\text{ }^\circ\text{C}$ ,  
 $\Delta P = 0.2\text{ bar}$

R 22

Type	$k_v$ m <sup>3</sup> /h	Evaporating temperature $T_e$							
		-50 °C	-40 °C	-30 °C	-20 °C	-10 °C	0 °C	10 °C	20 °C
NRVA 15	5	5.1	6.6	8.3	10.4	12.7	15.3	18.2	21.4
NRVA 20	6	6.1	7.9	10.0	12.5	15.2	18.3	22	26
NRVA 25	19	19.3	25	32	40	48	58	69	81
NRVA 32	20	20	26	33	42	51	61	73	85
NRVA 40	44	45	58	73	92	112	134	160	188
NRVA 50	44	45	58	73	92	112	134	160	188
NRVA 65	75	76	99	125	156	190	229	272	320

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

$\Delta P$ (bar)	Correction factor
<b>0.2</b>	<b>1.00</b>
0.25	0.89
0.3	0.82
0.4	0.71
0.5	0.63
0.6	0.58

Correction factor for superheat ( $T_s$ )

$T_s$	Correction factor
6 °C	1.00
8 °C	1.00
10 °C	1.00
12 °C	1.00

Correction factor for liquid temperature ( $T_{liq}$ )

Liquid temperature	Correction factor
-20 °C	0.71
-10 °C	0.75
0 °C	0.80
10 °C	0.86
20 °C	0.92
<b>30 °C</b>	<b>1.00</b>
40 °C	1.09
50 °C	1.22

US units

Capacity table for nominal conditions,  $Q_N$  [Tons of Refrigeration],  
 $T_{liq} = 90\text{ }^\circ\text{F}$ ,  
 $\Delta P = 3\text{ psi}$

R 22

Type	$C_v$ USgal/min	Evaporating temperature $T_e$							
		-60 °F*	-40 °F	-20 °F	0 °F	20 °F	40 °F	60 °F	80 °F
NRVA 15	6	1.4	1.9	2.4	3.1	3.8	4.7	5.7	6.8
NRVA 20	7	1.7	2.2	2.9	3.7	4.6	5.6	6.8	8.1
NRVA 25	22	5.3	7.1	9.2	11.7	14.5	17.7	22	26
NRVA 32	23	5.6	7.5	9.7	12.3	15.3	18.6	23	27
NRVA 40	51	12.3	16.4	21	27	34	41	50	60
NRVA 50	51	12.3	16.4	21	27	34	41	50	60
NRVA 65	87	21	28	36	46	57	70	86	102

\* 2 °F below min. operating temperature.

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

$\Delta P$ (psi)	Correction factor
<b>3</b>	<b>1.00</b>
4	0.87
5	0.79
6	0.72
7	0.66
8	0.62

Correction factor for superheat ( $T_s$ )

$T_s$	Correction factor
10 °F	1.00
14 °F	1.00
18 °F	1.00
20 °F	1.00

Correction factor for liquid temperature ( $T_{liq}$ )

Liquid temperature	Correction factor
-10 °F	0.73
10 °F	0.77
30 °F	0.82
50 °F	0.87
70 °F	0.93
<b>90 °F</b>	<b>1.00</b>
110 °F	1.09
130 °F	1.20

Nominal capacities

Dry suction line

SI units

Capacity table for nominal conditions,  $Q_N$  [kW],  
 $T_{liq} = 30\text{ }^\circ\text{C}$ ,  
 $\Delta P = 0.2\text{ bar}$

R 134a

Type	$k_v$ m <sup>3</sup> /h	Evaporating temperature $T_e$							
		-50 °C	-40 °C	-30 °C	-20 °C	-10 °C	0 °C	10 °C	20 °C
NRVA 15	5	4.3	5.7	7.4	9.4	11.7	14.3	17.3	21.4
NRVA 20	6	5.2	6.9	8.9	11.2	14.0	17.2	21	26
NRVA 25	19	16.4	22	28	36	44	54	66	81
NRVA 32	20	17.3	23	30	37	47	57	69	85
NRVA 40	44	38	50	65	82	103	126	153	188
NRVA 50	44	38	50	65	82	103	126	153	188
NRVA 65	75	65	86	111	140	175	215	260	320

Correction factor for  $\Delta P$  ( $f_p$ )

$\Delta P$ (bar)	Correction factor
<b>0.2</b>	<b>1.00</b>
0.25	0.89
0.3	0.82
0.4	0.71
0.5	0.63
0.6	0.58

Correction factor for superheat ( $T_s$ )

$T_s$	Correction factor
6 °C	1.00
8 °C	1.00
10 °C	1.00
12 °C	1.00

Correction factor for liquid temperature ( $T_{liq}$ )

Liquid temperature	Correction factor
-20 °C	0.66
-10 °C	0.70
0 °C	0.76
10 °C	0.82
20 °C	0.90
<b>30 °C</b>	<b>1.00</b>
40 °C	1.13
50 °C	1.29

US units

Capacity table for nominal conditions,  $Q_N$  [Tons of Refrigeration],  
 $T_{liq} = 90\text{ }^\circ\text{F}$ ,  
 $\Delta P = 3\text{ psi}$

R 134a

Type	$C_v$ USgal/min	Evaporating temperature $T_e$							
		-60 °F*	-40 °F	-20 °F	0 °F	20 °F	40 °F	60 °F	80 °F
NRVA 15	6	1.2	1.7	2.2	2.8	3.6	4.6	5.6	6.8
NRVA 20	7	1.5	2.0	2.6	3.4	4.3	5.5	6.7	8.1
NRVA 25	22	4.6	6.3	8.3	10.8	13.7	17.3	21	26
NRVA 32	23	4.9	6.6	8.8	11.4	14.4	18.3	22	27
NRVA 40	51	10.7	14.6	19.3	25	32	40	49	60
NRVA 50	51	10.7	14.6	19.3	25	32	40	49	60
NRVA 65	87	18.3	25	33	43	54	68	84	102

\* 2 °F below min. operating temperature.

Correction factor for  $\Delta P$  ( $f_p$ )

$\Delta P$ (psi)	Correction factor
<b>3</b>	<b>1.00</b>
4	0.87
5	0.79
6	0.72
7	0.66
8	0.62

Correction factor for superheat ( $T_s$ )

$T_s$	Correction factor
10 °F	1.00
14 °F	1.00
18 °F	1.00
20 °F	1.00

Correction factor for liquid temperature ( $T_{liq}$ )

Liquid temperature	Correction factor
-10 °F	0.64
10 °F	0.68
30 °F	0.74
50 °F	0.81
70 °F	0.89
<b>90 °F</b>	<b>1.00</b>
110 °F	1.15
130 °F	1.35

Nominal capacities

Dry suction line

SI units

Capacity table for nominal conditions,  $Q_N$  [kW],  
 $T_{liq} = 30\text{ }^\circ\text{C}$ ,  
 $\Delta P = 0.2\text{ bar}$

R 404A

Type	$k_v$ m <sup>3</sup> /h	Evaporating temperature $T_e$							
		-50 °C	-40 °C	-30 °C	-20 °C	-10 °C	0 °C	10 °C	20 °C
NRVA 15	5	3.8	5.1	6.7	8.6	10.7	13.2	16.1	19.4
NRVA 20	6	4.6	6.1	8.0	10.3	12.8	15.8	19.3	23.3
NRVA 25	19	14.5	19.4	25.3	32.5	40.6	50.2	61.2	73.7
NRVA 32	20	15.3	20.4	26.7	34.3	42.8	52.8	64.4	77.6
NRVA 40	44	33.6	44.9	58.7	75.4	94	116	142	171
NRVA 50	44	33.6	44.9	59	75	94	116	142	171
NRVA 65	75	57.3	77	100	128	160	198	241	291

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

$\Delta P$ (bar)	Correction factor
<b>0.2</b>	<b>1.00</b>
0.25	0.89
0.3	0.82
0.4	0.71
0.5	0.63
0.6	0.58

Correction factor for superheat ( $T_s$ )

$T_s$	Correction factor
6 °C	1.00
8 °C	1.00
10 °C	1.00
12 °C	1.00

Correction factor for liquid temperature ( $T_{liq}$ )

Liquid temperature	Correction factor
-20 °C	0.55
-10 °C	0.60
0 °C	0.66
10 °C	0.74
20 °C	0.85
<b>30 °C</b>	<b>1.00</b>
40 °C	1.23
50 °C	1.68

US units

Capacity table for nominal conditions,  $Q_N$  [Tons of Refrigeration],  
 $T_{liq} = 90\text{ }^\circ\text{F}$ ,  
 $\Delta P = 3\text{ psi}$

R 404A

Type	$C_v$ USgal/min	Evaporating temperature $T_e$							
		-60 °F*	-40 °F	-20 °F	0 °F	20 °F	40 °F	60 °F	80 °F
NRVA 15	6	1.0	1.4	1.9	2.5	3.2	4.0	5.1	6.2
NRVA 20	7	1.2	1.7	2.3	3.0	3.8	4.8	6.1	7.4
NRVA 25	22	3.9	5.4	7.3	9.5	12.2	15.3	19.3	23.5
NRVA 32	23	4.1	5.7	7.6	10.0	12.8	16.1	20.3	24.7
NRVA 40	51	9.1	12.5	16.8	22.0	28.2	35.4	44.6	54.4
NRVA 50	51	9.1	12.5	16.8	22.0	28.2	35.4	44.6	54.4
NRVA 65	87	15.5	21.4	28.7	37.5	48.0	60	76	93

\* 2 °F below min. operating temperature.

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

$\Delta P$ (psi)	Correction factor
<b>3</b>	<b>1.00</b>
4	0.87
5	0.79
6	0.72
7	0.66
8	0.62

Correction factor for superheat ( $T_s$ )

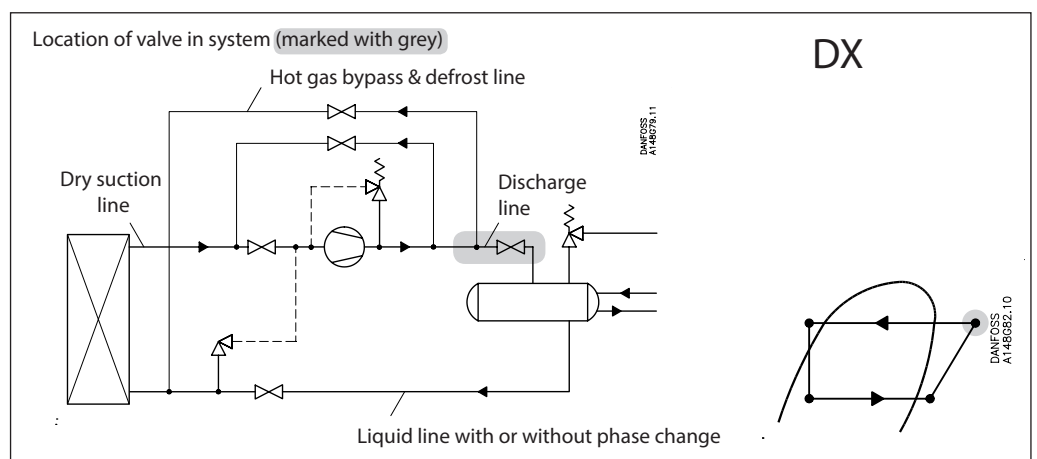
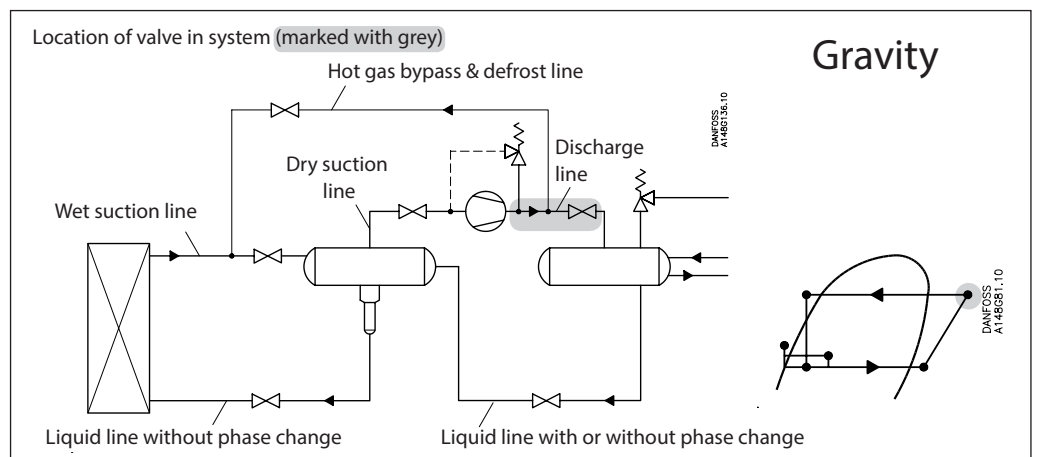
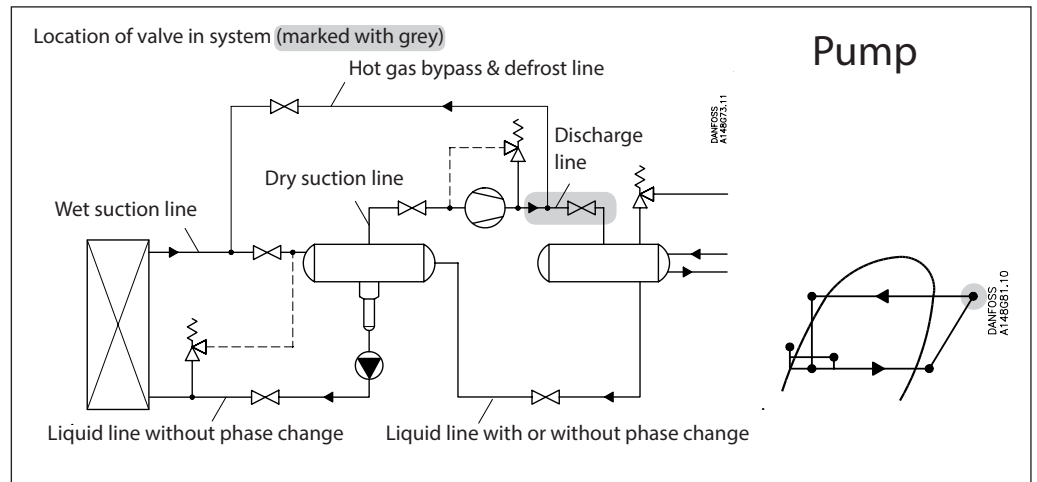
$T_s$	Correction factor
10 °F	1.00
14 °F	1.00
18 °F	1.00
20 °F	1.00

Correction factor for liquid temperature ( $T_{liq}$ )

Liquid temperature	Correction factor
-10 °F	0.52
10 °F	0.57
30 °F	0.63
50 °F	0.72
70 °F	0.83
<b>90 °F</b>	<b>1.00</b>
110 °F	1.29
130 °F	1.92

Nominal capacities

Discharge line



Nominal capacities

Discharge line

SI units

Calculation example (R 717 capacities):

Running conditions in a plant are as follows:

$$\begin{aligned} T_e &= -20\text{ }^\circ\text{C} \\ Q_o &= 90\text{ kW} \\ T_{liq} &= 10\text{ }^\circ\text{C} \\ \text{Max. } \Delta P &= 0.4\text{ bar} \\ T_{disch} &= 60\text{ }^\circ\text{C} \end{aligned}$$

The capacity table is based on nominal conditions ( $\Delta P = 0.2\text{ bar}$ ,  $T_{liq} = 30\text{ }^\circ\text{C}$ ,  $P_{disch} = 12\text{ bar}$ ,  $T_{disch} = 80\text{ }^\circ\text{C}$ ).

The actual capacity must therefore be corrected to a nominal condition by multiplication with correction factors.

Correction factor for  $\Delta P$  0.4 bar  $f_{\Delta P} = 0.72$ .  
 Correction factor for liquid temperature  $f_{T_{liq}} = 0.92$ .  
 Correction factor for  $T_{disch}$  60 °C,  $f_{T_{disch}} = 0.97$ .  
 Correction factor for  $P_{disch}$  12 bar,  $f_{P_{disch}} = 1.0$ .

$$\begin{aligned} Q_n &= Q_o \times f_{\Delta P} \times f_{T_{liq}} \times f_{T_{disch}} \times f_{P_{disch}} \\ &= 90 \times 0.72 \times 0.92 \times 0.97 \times 1.0 = 58\text{ kW} \end{aligned}$$

From the capacity table a NRVA 20 with  $Q_n = 67.5\text{ kW}$  is the correct selection for the application.

US units

Calculation example (R 717 capacities):

Running conditions in a plant are as follows:

$$\begin{aligned} T_e &= 0\text{ }^\circ\text{F} \\ Q_o &= 18\text{ TR} \\ T_{liq} &= 50\text{ }^\circ\text{F} \\ \text{Max. } \Delta P &= 7\text{ psi} \\ T_{disch} &= 120\text{ }^\circ\text{F} \end{aligned}$$

The capacity table is based on nominal conditions ( $\Delta P = 3\text{ psi}$ ,  $T_{liq} = 90\text{ }^\circ\text{F}$ ,  $P_{disch} = 185\text{ psi}$ ,  $T_{disch} = 180\text{ }^\circ\text{F}$ ).

The actual capacity must therefore be corrected to a nominal condition by multiplication with correction factors.

Correction factor for  $\Delta P$  7 psi  $f_{\Delta P} = 0.67$ .  
 Correction factor for liquid temperature  $f_{T_{liq}} = 0.92$ .  
 Correction factor for  $T_{disch}$  120 °F,  $f_{T_{disch}} = 0.95$ .  
 Correction factor for  $P_{disch}$  185 psi,  $f_{P_{disch}} = 1.0$ .

$$\begin{aligned} Q_n &= Q_o \times f_{\Delta P} \times f_{T_{liq}} \times f_{T_{disch}} \times f_{P_{disch}} \\ &= 18 \times 0.67 \times 0.92 \times 0.95 \times 1.0 = 10.5\text{ TR} \end{aligned}$$

From the capacity table a NRVA 15 with  $Q_n = 16.4\text{ TR}$  is the correct selection for the application.

Nominal capacities

Discharge line

SI units

Capacity table for nominal conditions,  $Q_N$  [kW],

$T_{liq} = 30\text{ }^\circ\text{C}$ ,  
 $P_{disch.} = 12\text{ bar}$ ,  
 $\Delta P = 0.2\text{ bar}$ ,  
 $T_{disch.} = 80\text{ }^\circ\text{C}$

R 717

Type	$k_v$ m <sup>3</sup> /h	Evaporating temperature $T_e$							
		-50 °C	-40 °C	-30 °C	-20 °C	-10 °C	0 °C	10 °C	20 °C
NRVA 15	5	53.9	54.8	55.5	56.3	56.9	57.5	58.0	58.4
NRVA 20	6	64.7	65.7	66.6	67.5	68.3	69.0	69.6	70.1
NRVA 25	19	205	208	211	214	216	218	220	222
NRVA 32	20	216	219	222	225	228	230	232	234
NRVA 40	44	475	482	489	495	501	506	510	514
NRVA 50	44	475	482	489	495	501	506	510	514
NRVA 65	75	809	821	833	844	854	862	870	876

Correction factor for discharge pressure ( $P_{disch.}$ )

$P_{disch.}$ (bar)	Correction factor
12	1.00
16	0.87
20	0.78

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

$\Delta P$ (bar)	Correction factor
0.2	1.00
0.4	0.72
0.6	0.59
0.8	0.52
1	0.46
1.5	0.39
2	0.34
4	0.27

Correction factor for discharge temperature ( $T_{disch.}$ )

Discharge temperature	Correction factor
50 °C	0.96
60 °C	0.97
80 °C	1.00
90 °C	1.01
100 °C	1.03
110 °C	1.04
120 °C	1.06

Correction factor for liquid temperature ( $T_{liq}$ )

Liquid temperature	Correction factor
-20 °C	0.82
-10 °C	0.86
0 °C	0.88
10 °C	0.92
20 °C	0.96
30 °C	1.00
40 °C	1.04
50 °C	1.09

US units

Capacity table for nominal conditions,  $Q_N$  [Tons of Refrigeration],

$T_{liq} = 90\text{ }^\circ\text{F}$ ,  
 $\Delta P = 3\text{ psi}$ ,  
 $P_{disch.} = 185\text{ psi}$ ,  
 $T_{disch.} = 180\text{ }^\circ\text{F}$

R 717

Type	$C_v$ USgal/min	Evaporating temperature $T_e$							
		-60 °F*	-40 °F	-20 °F	0 °F	20 °F	40 °F	60 °F	80 °F
NRVA 15	6	15.8	16.0	16.3	16.4	16.5	16.7	16.7	16.8
NRVA 20	7	19.0	19.2	19.5	19.7	19.8	20.1	20.1	20.2
NRVA 25	22	60.1	60.9	61.8	62.3	62.8	63.5	63.6	63.9
NRVA 32	23	63	64	65	66	66	67	67	67
NRVA 40	51	139	141	143	144	145	147	147	148
NRVA 50	51	139	141	143	144	145	147	147	148
NRVA 65	87	237	241	244	246	248	251	251	252

\* 2 °F below min. operating temperature.

Correction factor for discharge pressure ( $P_{disch.}$ )

$P_{disch.}$ (psi)	Correction factor
185	1.00
240	0.87
300	0.78

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

$\Delta P$ (psi)	Correction factor
3	1.00
5	0.79
7	0.67
10	0.56
15	0.47
20	0.41
30	0.35
60	0.28

Correction factor for discharge temperature ( $T_{disch.}$ )

Discharge temperature	Correction factor
120 °F	0.95
140 °F	0.97
180 °F	1.00
200 °F	1.02
210 °F	1.02
230 °F	1.04
250 °F	1.06

Correction factor for liquid temperature ( $T_{liq}$ )

Liquid temperature	Correction factor
-10 °F	0.82
10 °F	0.85
30 °F	0.88
50 °F	0.92
70 °F	0.96
90 °F	1.00
110 °F	1.04
130 °F	1.09



Nominal capacities

Discharge line

SI units

Capacity table for nominal conditions,  $Q_N$  [kW],

$T_{liq} = 30\text{ }^\circ\text{C}$ ,  
 $P_{disch.} = 12\text{ bar}$ ,  
 $\Delta P = 0.2\text{ bar}$ ,  
 $T_{disch.} = 80\text{ }^\circ\text{C}$

R 22

Type	$k_v$ m <sup>3</sup> /h	Evaporating temperature $T_e$							
		-50 °C	-40 °C	-30 °C	-20 °C	-10 °C	0 °C	10 °C	20 °C
NRVA 15	5	17.3	17.9	18.4	18.9	19.4	19.8	20	21
NRVA 20	6	21	21	22	23	23	24	24	25
NRVA 25	19	66	68	70	72	74	75	77	78
NRVA 32	20	69	71	74	76	78	79	81	82
NRVA 40	44	152	157	162	166	171	175	178	181
NRVA 50	44	152	157	162	166	171	175	178	181
NRVA 65	75	260	268	276	284	291	297	304	309

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

$\Delta P$ (bar)	Correction factor
<b>0.2</b>	<b>1.00</b>
0.4	0.72
0.6	0.59
0.8	0.52
1	0.46
1.5	0.39
2	0.34
4	0.27

Correction factor for discharge temperature ( $T_{disch.}$ )

Discharge temperature	Correction factor
50 °C	0.96
60 °C	0.97
<b>80 °C</b>	<b>1.00</b>
90 °C	1.01
100 °C	1.03
110 °C	1.04
120 °C	1.06

Correction factor for liquid temperature ( $T_{liq.}$ )

Liquid temperature	Correction factor
-20 °C	0.71
-10 °C	0.75
0 °C	0.80
10 °C	0.86
20 °C	0.92
<b>30 °C</b>	<b>1.00</b>
40 °C	1.09
50 °C	1.22

Correction factor for discharge pressure ( $P_{disch.}$ )

$P_{disch.}$ (bar)	Correction factor
<b>12</b>	<b>1.00</b>
16	0.87
20	0.78

US units

Capacity table for nominal conditions,  $Q_N$  [Tons of Refrigeration],

$T_{liq} = 90\text{ }^\circ\text{F}$ ,  
 $\Delta P = 3\text{ psi}$ ,  
 $P_{disch.} = 185\text{ psi}$ ,  
 $T_{disch.} = 180\text{ }^\circ\text{F}$

R 22

Type	$C_v$ USgal/min	Evaporating temperature $T_e$							
		-60 °F*	-40 °F	-20 °F	0 °F	20 °F	40 °F	60 °F	80 °F
NRVA 15	6	5.0	5.1	5.3	5.5	5.6	5.8	5.9	6.0
NRVA 20	7	5.9	6.2	6.4	6.6	6.7	6.9	7.1	7.2
NRVA 25	22	18.8	19.5	20	21	21	22	22	23
NRVA 32	23	19.8	21	21	22	22	23	24	24
NRVA 40	51	44	45	47	48	49	51	52	53
NRVA 50	51	44	45	47	48	49	51	52	53
NRVA 65	87	74	77	79	82	84	86	88	90

\* 2 °F below min. operating temperature.

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

$\Delta P$ (psi)	Correction factor
<b>3</b>	<b>1.00</b>
5	0.79
7	0.67
10	0.56
15	0.47
20	0.41
30	0.35
60	0.28

Correction factor for discharge temperature ( $T_{disch.}$ )

Discharge temperature	Correction factor
120 °F	0.95
140 °F	0.97
<b>180 °F</b>	<b>1.00</b>
200 °F	1.02
210 °F	1.02
230 °F	1.04
250 °F	1.06

Correction factor for liquid temperature ( $T_{liq.}$ )

Liquid temperature	Correction factor
-10 °F	0.73
10 °F	0.77
30 °F	0.82
50 °F	0.87
70 °F	0.93
<b>90 °F</b>	<b>1.00</b>
110 °F	1.09
130 °F	1.20

Correction factor for discharge pressure ( $P_{disch.}$ )

$P_{disch.}$ (psi)	Correction factor
<b>185</b>	<b>1.00</b>
240	0.87
300	0.78

Nominal capacities

Discharge line

SI units

Capacity table for nominal conditions,  $Q_N$  [kW],

$T_{liq} = 30\text{ }^\circ\text{C}$ ,  
 $P_{disch.} = 12\text{ bar}$ ,  
 $\Delta P = 0.2\text{ bar}$ ,  
 $T_{disch.} = 80\text{ }^\circ\text{C}$

R 134a

Type	$k_v$ m <sup>3</sup> /h	Evaporating temperature $T_e$						
		-40 °C	-30 °C	-20 °C	-10 °C	0 °C	10 °C	20 °C
NRVA 15	5	13.5	14.2	14.8	15.4	16.0	16.6	17.2
NRVA 20	6	16.2	17.0	17.7	18.5	19.2	19.9	21
NRVA 25	19	51	54	56	59	61	63	65
NRVA 32	20	54	57	59	62	64	66	69
NRVA 40	44	119	125	130	136	141	146	151
NRVA 50	44	119	125	130	136	141	146	151
NRVA 65	75	203	212	222	231	240	249	257

Correction factor for discharge pressure ( $P_{disch.}$ )

$P_{disch.}$ (bar)	Correction factor
<b>8</b>	<b>1.00</b>
12	0.82
16	0.70
20	0.62

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

$\Delta P$ (bar)	Correction factor
<b>0.2</b>	<b>1.00</b>
0.4	0.72
0.6	0.59
0.8	0.52
1	0.46
1.5	0.39
2	0.34
4	0.27

Correction factor for discharge temperature ( $T_{disch.}$ )

Discharge temperature	Correction factor
50 °C	0.96
60 °C	0.97
<b>80 °C</b>	<b>1.00</b>
90 °C	1.01
100 °C	1.03
110 °C	1.04
120 °C	1.06

Correction factor for liquid temperature ( $T_{liq.}$ )

Liquid temperature	Correction factor
-20 °C	0.66
-10 °C	0.70
0 °C	0.76
10 °C	0.82
20 °C	0.90
<b>30 °C</b>	<b>1.00</b>
40 °C	1.13
50 °C	1.29

US units

Capacity table for nominal conditions,  $Q_N$  [Tons of Refrigeration],

$T_{liq} = 90\text{ }^\circ\text{F}$ ,  
 $\Delta P = 3\text{ psi}$ ,  
 $P_{disch.} = 185\text{ psi}$ ,  
 $T_{disch.} = 180\text{ }^\circ\text{F}$

R 134a

Type	$C_v$ USgal/min	Evaporating temperature $T_e$						
		-40 °F	-20 °F	0 °F	20 °F	40 °F	60 °F	80 °F
NRVA 15	6	3.9	4.1	4.4	4.6	4.7	5.0	5.1
NRVA 20	7	4.7	5.0	5.2	5.5	5.7	5.9	6.2
NRVA 25	22	14.9	15.7	16.5	17.3	18.0	18.8	19.5
NRVA 32	23	15.7	16.6	17.4	18.2	19.0	19.8	21
NRVA 40	51	35	36	38	40	42	44	45
NRVA 50	51	35	36	38	40	42	44	45
NRVA 65	87	59	62	65	68	71	74	77

\* 2 °F below min. operating temperature.

Correction factor for discharge pressure ( $P_{disch.}$ )

$P_{disch.}$ (psi)	Correction factor
<b>120</b>	<b>1.00</b>
185	0.83
240	0.71
300	0.64

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

$\Delta P$ (psi)	Correction factor
<b>3</b>	<b>1.00</b>
5	0.79
7	0.67
10	0.56
15	0.47
20	0.41
30	0.35
60	0.28

Correction factor for discharge temperature ( $T_{disch.}$ )

Discharge temperature	Correction factor
120 °F	0.95
140 °F	0.97
<b>180 °F</b>	<b>1.00</b>
200 °F	1.02
210 °F	1.02
230 °F	1.04
250 °F	1.05

Correction factor for liquid temperature ( $T_{liq.}$ )

Liquid temperature	Correction factor
-10 °F	0.64
10 °F	0.68
30 °F	0.74
50 °F	0.81
70 °F	0.89
<b>90 °F</b>	<b>1.00</b>
110 °F	1.15
130 °F	1.35

Nominal capacities

Discharge line

SI units

Capacity table for nominal conditions,  $Q_N$  [kW],

$T_{liq} = 30\text{ °C}$ ,  
 $P_{disch.} = 12\text{ bar}$ ,  
 $\Delta P = 0.2\text{ bar}$ ,  
 $T_{disch.} = 80\text{ °C}$

R 404A

Type	$k_v$ m <sup>3</sup> /h	Evaporating temperature $T_e$							
		-50 °C	-40 °C	-30 °C	-20 °C	-10 °C	0 °C	10 °C	20 °C
NRVA 15	5	12.6	13.5	14.4	15.3	16.1	16.9	17.6	18.3
NRVA 20	6	15.2	16.2	17.3	18.4	19.4	20.3	21.2	22.0
NRVA 25	19	48.0	51.5	54.8	58.1	61.3	64.3	67.0	69.5
NRVA 32	20	50.6	54.2	57.7	61.2	64.5	67.7	70.6	73.2
NRVA 40	44	111.3	119.2	127.0	134.6	141.9	148.9	155.3	161.0
NRVA 50	44	111.3	119.2	127.0	134.6	141.9	148.9	155.3	161.0
NRVA 65	75	189.7	203.1	216.4	229.4	241.9	253.7	264.7	274.4

Correction factor for discharge pressure ( $P_{disch.}$ )

$P_{disch.}$ (bar)	Correction factor
<b>12</b>	<b>1</b>
16	0.87
20	0.78

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

$\Delta P$ (bar)	Correction factor
<b>0.2</b>	<b>1.00</b>
0.4	0.72
0.6	0.59
0.8	0.52
1	0.46
1.5	0.39
2	0.34
4	0.27

Correction factor for discharge temperature ( $T_{disch.}$ )

Discharge temperature	Correction factor
50 °C	0.96
60 °C	0.97
<b>80 °C</b>	<b>1.00</b>
90 °C	1.01
100 °C	1.03
110 °C	1.04
120 °C	1.06

Correction factor for liquid temperature ( $T_{liq.}$ )

Liquid temperature	Correction factor
-20 °C	0.55
-10 °C	0.60
0 °C	0.66
10 °C	0.74
20 °C	0.85
<b>30 °C</b>	<b>1.00</b>
40 °C	1.23
50 °C	1.68

US units

Capacity table for nominal conditions,  $Q_N$  [Tons of Refrigeration],

$T_{liq} = 90\text{ °F}$ ,  
 $\Delta P = 3\text{ psi}$ ,  
 $P_{disch.} = 185\text{ psi}$ ,  
 $T_{disch.} = 180\text{ °F}$

R 404A

Type	$C_v$ USgal/min	Evaporating temperature $T_e$							
		-60 °F*	-40 °F	-20 °F	0 °F	20 °F	40 °F	60 °F	80 °F
NRVA 15	6	3.5	3.8	4.0	4.3	4.6	4.8	5.1	5.3
NRVA 20	7	4.2	4.5	4.9	5.2	5.5	5.8	6.1	6.3
NRVA 25	22	13.2	14.3	15.4	16.4	17.4	18.3	19.3	20.0
NRVA 32	23	13.9	15.1	16.2	17.3	18.3	19.3	20.3	21.0
NRVA 40	51	30.7	33.2	35.6	38.0	40.3	42.5	44.6	46.2
NRVA 50	51	30.7	33.2	35.6	38.0	40.3	42.5	44.6	46.2
NRVA 65	87	52.2	56.5	60.7	64.8	68.7	72.4	76.0	78.8

\* 2 °F below min. operating temperature.

Correction factor for discharge pressure ( $P_{disch.}$ )

$P_{disch.}$ (psi)	Correction factor
<b>185</b>	<b>1</b>
240	0.87
300	0.78

Correction factor for  $\Delta P$  ( $f_{\Delta P}$ )

$\Delta P$ (psi)	Correction factor
<b>3</b>	<b>1.00</b>
5	0.79
7	0.67
10	0.56
15	0.47
20	0.41
30	0.35
60	0.28

Correction factor for discharge temperature ( $T_{disch.}$ )

Discharge temperature	Correction factor
120 °F	0.95
140 °F	0.97
<b>180 °F</b>	<b>1.00</b>
200 °F	1.02
210 °F	1.02
230 °F	1.04
250 °F	1.05

Correction factor for liquid temperature ( $T_{liq.}$ )

Liquid temperature	Correction factor
-10 °F	0.52
10 °F	0.57
30 °F	0.63
50 °F	0.72
70 °F	0.83
<b>90 °F</b>	<b>1.00</b>
110 °F	1.29
130 °F	1.92

