

Relief valves operate automatically when system pressure exceeds valve set pressure and overcomes the valve's opposing internal force. As defined by ASME, pressure relief valves must open within +/- 3% of their marked set pressure, with full discharge capacity realized at ≤10% of the marked set pressure. To reduce the probability of leakage/early discharge, ASHRAE Handbook guidelines indicate that relief valves selected for a refrigeration system should be set at ≥25% of maximum system operating pressure (i.e., maximum system operating pressure should not exceed 75% of relief valve setting).

Although Mueller Pressure Relief Valves will reseal if unobstructed, it is recommended that valves be replaced after discharge, refrigerant changes, and system failure/rebuild. System debris from piping, soldering, and maintenance may also impede function by accumulating inside the valve.

Mueller Pressure Relief Valves are certified and manufactured in accordance with ASME, the National Board of Boiler and Pressure Vessel Inspectors, the Canadian Standards Association, European Union Notified Body, and Approved Body in the United Kingdom. Mueller Pressure Relief Valves also conform to the American Standard Safety Code for Mechanical Refrigeration (ANSI/ASHRAE 15)

Discharge Capacity

As specified in ASHRAE Standard 15, the minimum required discharge capacity of a pressure relief device is determined by the following formula:

$C = fDL$ where:

C = minimum required discharge capacity of the relief device, lb. air/min (kg air/sec)

D = outside diameter of vessel, ft (m)

L = length of the vessel, ft (m)

f = factor dependent on the refrigerant indicated in the chart below

Example of relief valve selection:

Information for vessel being protected:

Diameter = 1.33 ft

Length = 3.33 ft

Working Pressure = 350 psi

Information from the table for f values:

Application = R-22

Value of f = 1.6

From the information provided, the required discharge capacity to protect the vessel is determined by solving the minimum discharge capacity formula: $C = f D L$

$C = (1.6) (3.33) (1.33)$

$C = 7.1$ lbs of air/min

Using the calculated discharge 7.1 lbs of air/min and the required pressure of 350 psi, we can select from the product offering.

Using the discharge capacity table, select the row for 350 psi. Valves with capacities that meet the minimum discharge requirement, 7.1, are viable options. Discharge table values A-K allows for selection of a valve based on the inlet and outlet sizes and configurations.

If the desired valve is to have a 3/8" NPTFE inlet and 3/8" Flare outlet, with the outlet being 90°, valve A 15512 is acceptable since it has a discharge table rating of B.

Value of f:

Refrigerant	50 psi	100 psi	150 psi	200 psi	300 psi	400 psi	500 psi	600 psi
R12	1.24	1.38	1.51	1.64	1.91	2.3	—	—
R22	0.98	1.09	1.18	1.26	1.43	1.62	1.88	—
R23	0.95	1.05	1.13	1.21	1.38	1.56	1.84	—
R32	0.73	0.8	0.86	0.91	1.02	1.13	1.26	1.45
R115	1.48	1.69	1.89	2.2	2.7	—	—	—
R134a	1.05	1.18	1.29	1.4	1.65	1.97	—	—
R143a	1.05	1.18	1.3	1.42	1.69	2.1	—	—
R152a	0.84	0.94	1.02	1.1	1.27	1.47	1.79	—
R170	0.7	0.77	0.83	0.89	1.01	1.14	1.33	—
R290	0.78	0.87	0.95	1.03	1.2	1.41	—	—
R401A	1.01	1.12	1.22	1.31	1.51	1.75	2.2	—
R401B	1	1.11	1.21	1.3	1.49	1.72	2.1	—
R401C	1.04	1.16	1.27	1.37	1.6	1.88	2.5	—
R402A	1.11	1.25	1.36	1.48	1.73	2.1	—	—
R402B	1.06	1.18	1.28	1.39	1.6	1.86	2.3	—
R403A	1.05	1.18	1.28	1.38	1.6	1.86	2.4	—
R403B	1.16	1.3	1.42	1.55	1.82	2.2	—	—
R404A	1.12	1.26	1.38	1.51	1.8	2.3	—	—
R405A	1.1	1.22	1.34	1.45	1.7	2.1	—	—
R406A	0.98	1.09	1.19	1.28	1.47	1.7	2.1	—
R407A	0.98	1.09	1.19	1.28	1.48	1.72	2.2	—
R407B	1.08	1.21	1.33	1.44	1.69	2.1	—	—
R407C	0.95	1.05	1.15	1.23	1.41	1.63	1.99	—
R407D	0.97	1.08	1.18	1.27	1.46	1.71	2.2	—
R407E	0.93	1.03	1.12	1.2	1.38	1.58	1.9	—
R407F	0.93	1.03	1.12	1.2	1.37	1.58	1.89	—
R407G	1.03	1.15	1.26	1.37	1.6	1.9	—	—
R407H	0.91	1	1.09	1.16	1.33	1.51	1.79	—
R408A	1.03	1.15	1.25	1.36	1.57	1.84	—	—
R409A	1.02	1.13	1.23	1.32	1.52	1.75	2.2	—
R409B	1.02	1.13	1.23	1.32	1.51	1.74	2.1	—
R410A	0.9	0.99	1.07	1.15	1.31	1.48	1.74	—
R410B	0.92	1.02	1.1	1.18	1.35	1.54	1.82	—
R411A	0.95	1.05	1.14	1.22	1.39	1.58	1.84	—
R411B	0.97	1.07	1.16	1.24	1.41	1.6	1.86	—
R412A	1	1.1	1.2	1.28	1.47	1.68	1.99	—
R413A	1.07	1.2	1.32	1.44	1.71	2.1	—	—
R414A	1.03	1.14	1.25	1.34	1.55	1.81	2.3	—
R414B	1.05	1.17	1.27	1.37	1.58	1.85	2.3	—
R415A	0.94	1.04	1.13	1.21	1.38	1.57	1.83	—
R415B	0.87	0.96	1.05	1.13	1.29	1.49	1.79	—
R416A	1.11	1.25	1.37	1.49	1.77	2.2	—	—
R417A	1.1	1.24	1.36	1.49	1.77	2.2	—	—
R417B	1.17	1.32	1.45	1.59	1.9	2.4	—	—
R417C	1.06	1.19	1.31	1.43	1.69	2.1	—	—
R418A	0.97	1.08	1.17	1.25	1.42	1.61	1.87	—
R419A	1.11	1.24	1.37	1.49	1.76	2.2	—	—
R419B	1.07	1.2	1.32	1.43	1.68	2.1	—	—
R420A	1.05	1.18	1.29	1.4	1.64	1.97	—	—
R421A	1.12	1.26	1.39	1.51	1.8	2.3	—	—
R421B	1.19	1.34	1.48	1.61	1.93	2.5	—	—
R422A	1.19	1.34	1.48	1.62	1.95	2.5	—	—
R422B	1.11	1.26	1.38	1.51	1.8	2.3	—	—

Value of f:

Refrigerant	50 psi	100 psi	150 psi	200 psi	300 psi	400 psi	500 psi	600 psi
R422C	1.16	1.31	1.45	1.59	1.91	2.5	—	—
R422D	1.14	1.28	1.41	1.54	1.85	2.3	—	—
R422E	1.12	1.26	1.39	1.52	1.81	2.3	—	—
R423A	1.19	1.35	1.5	1.65	1.99	2.6	—	—
R424A	1.11	1.24	1.37	1.49	1.78	2.2	—	—
R425A	0.97	1.07	1.17	1.26	1.45	1.69	2.1	—
R426A	1.05	1.18	1.3	1.41	1.66	2	—	—
R427A	0.99	1.1	1.2	1.29	1.5	1.75	2.3	—
R428A	1.18	1.33	1.47	1.61	1.93	2.5	—	—
R429A	0.77	0.86	0.93	1	1.15	1.33	1.6	—
R430A	0.87	0.98	1.07	1.16	1.36	1.62	—	—
R431A	0.81	0.91	0.99	1.07	1.25	1.48	—	—
R432A	0.74	0.82	0.89	0.96	1.1	1.27	1.51	—
R433A	0.77	0.86	0.94	1.01	1.18	1.38	1.75	—
R433B	0.78	0.87	0.95	1.03	1.19	1.41	—	—
R433C	0.77	0.86	0.94	1.02	1.18	1.38	1.76	—
R434A	1.14	1.29	1.42	1.55	1.86	2.4	—	—
R435A	0.74	0.82	0.88	0.95	1.08	1.22	1.4	1.77
R436A	0.79	0.88	0.96	1.05	1.23	1.48	—	—
R436B	0.79	0.88	0.97	1.05	1.24	1.49	—	—
R437A	1.06	1.19	1.31	1.43	1.68	2.1	—	—
R438A	1.04	1.17	1.28	1.38	1.62	1.93	—	—
R439A	0.9	0.99	1.08	1.15	1.31	1.5	1.77	—
R440A	0.84	0.94	1.02	1.1	1.27	1.47	1.8	—
R441A	0.73	0.82	0.89	0.96	1.12	1.33	1.71	—
R442A	0.93	1.03	1.12	1.2	1.38	1.58	1.9	—
R443A	0.76	0.85	0.92	1	1.15	1.34	1.67	—
R444A	1	1.11	1.22	1.32	1.54	1.83	2.4	—
R444B	0.87	0.96	1.04	1.11	1.26	1.43	1.66	2.1
R445A	0.95	1.06	1.16	1.26	1.46	1.73	2.3	—
R446A	0.81	0.89	0.96	1.02	1.15	1.29	1.46	1.73
R447A	0.82	0.9	0.97	1.03	1.16	1.29	1.47	1.74
R447B	0.82	0.9	0.97	1.03	1.16	1.3	1.48	1.76
R448A	0.97	1.08	1.18	1.27	1.46	1.7	2.1	—
R449A	0.98	1.09	1.19	1.28	1.48	1.73	2.2	—
R449B	0.97	1.08	1.18	1.27	1.46	1.7	2.2	—
R449C	1	1.11	1.21	1.31	1.52	1.79	2.4	—
R450A	1.1	1.24	1.36	1.49	1.77	2.2	—	—
R451A	1.19	1.35	1.5	1.65	2.1	—	—	—
R451B	1.19	1.35	1.5	1.65	2.1	—	—	—
R452A	1.11	1.24	1.36	1.48	1.74	2.2	—	—
R452B	0.83	0.92	0.99	1.06	1.2	1.35	1.55	1.96
R452C	1.1	1.23	1.35	1.46	1.72	2.1	—	—
R453A	0.97	1.07	1.17	1.26	1.45	1.69	2.1	—
R454A	0.96	1.07	1.16	1.25	1.44	1.68	2.1	—
R454B	0.83	0.91	0.99	1.05	1.19	1.34	1.54	1.92
R454C	1.02	1.14	1.24	1.35	1.57	1.88	—	—
R455A	0.98	1.09	1.19	1.28	1.48	1.74	2.2	—
R456A	1.04	1.16	1.27	1.38	1.62	1.94	—	—
R457A	1	1.11	1.22	1.32	1.53	1.83	—	—
R458A	0.96	1.07	1.17	1.26	1.45	1.68	2.1	—
R459A	0.83	0.91	0.99	1.05	1.19	1.33	1.53	1.9
R459B	1.02	1.14	1.24	1.34	1.57	1.87	2.6	—

Value of f:

Refrigerant	50 psi	100 psi	150 psi	200 psi	300 psi	400 psi	500 psi	600 psi
R460A	1.05	1.17	1.28	1.38	1.61	1.91	2.6	—
R460B	0.95	1.05	1.14	1.22	1.4	1.61	1.93	—
R500	1.11	1.24	1.35	1.47	1.71	2.1	—	—
R501	1.04	1.15	1.25	1.34	1.53	1.75	2.1	—
R502	1.2	1.34	1.47	1.6	1.87	2.3	—	—
R503	1.14	1.27	1.38	1.49	1.72	2	—	—
R504	0.99	1.1	1.2	1.29	1.48	1.72	2.2	—
R507A	1.13	1.27	1.4	1.53	1.83	2.3	—	—
R508A	1.25	1.41	1.55	1.69	2.1	2.6	—	—
R508B	1.21	1.36	1.49	1.62	1.91	2.4	—	—
R509A	1.29	1.46	1.62	1.77	2.2	2.8	—	—
R510A	0.73	0.81	0.88	0.94	1.07	1.22	1.41	—
R511A	0.77	0.87	0.95	1.02	1.19	1.4	—	—
R512A	0.85	0.95	1.03	1.11	1.28	1.49	1.82	—
R513A	1.14	1.29	1.42	1.56	1.87	2.4	—	—
R513B	1.14	1.29	1.43	1.57	1.88	2.4	—	—
R515A	1.16	1.32	1.46	1.6	1.94	2.5	—	—
R1150	0.69	0.76	0.81	0.87	0.98	1.1	1.27	—
R1234yf	1.21	1.37	1.53	1.69	2.1	—	—	—
R1234ze(E)	1.14	1.29	1.42	1.56	1.87	2.4	—	—
R1270	0.75	0.84	0.91	0.98	1.13	1.31	1.58	—