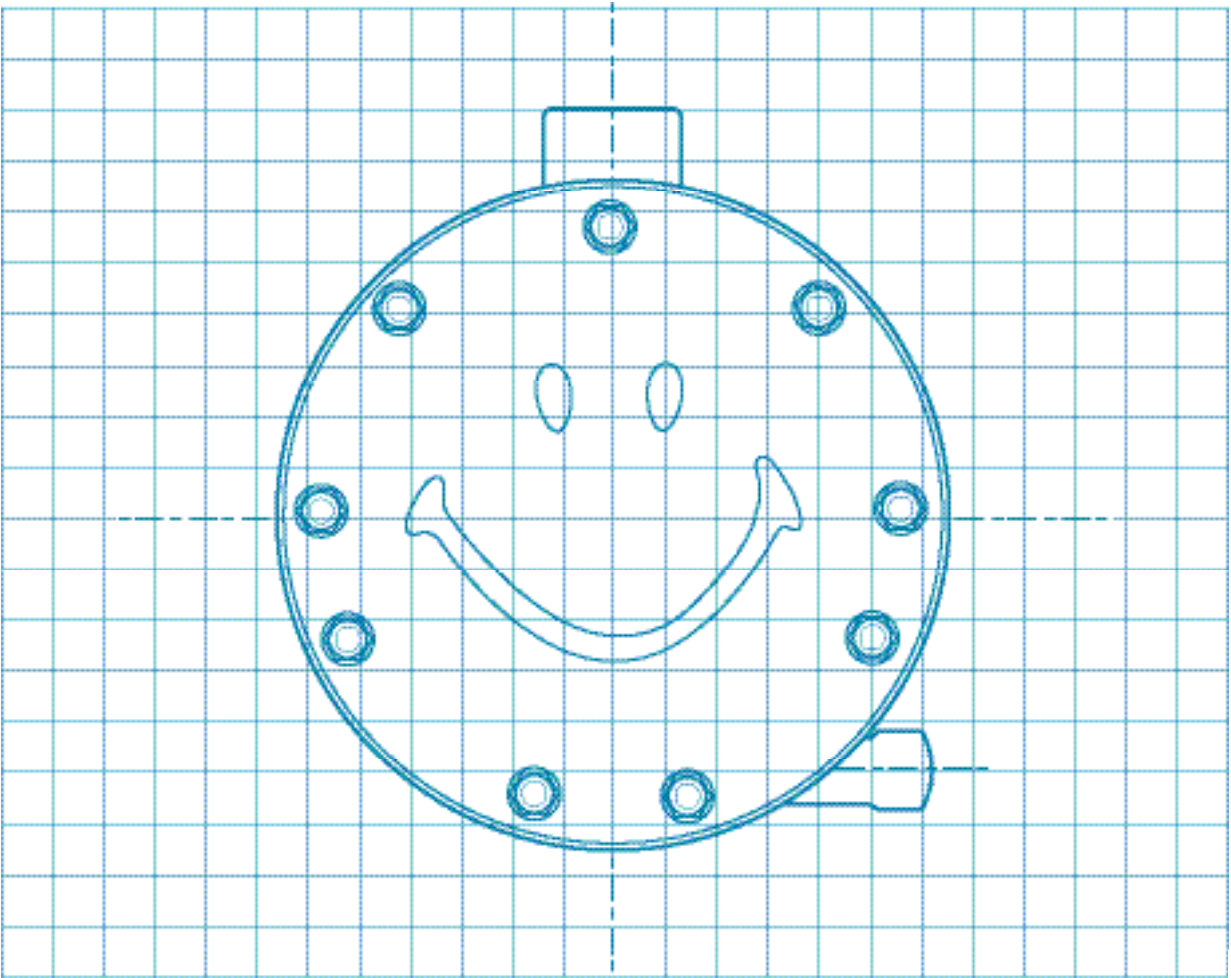




Selection Guide



REFRIGERANT SUBCOOLERS



Subcooling is accomplished by refrigerating the liquid line of a system, using a higher temperature system. Simply stated, subcooling refrigerates the refrigerant.

The effect is to give the refrigerant more heat removal capacity by increasing the number of Btu's each pound of refrigerant can absorb. The lower the refrigerant temperature the more heat removal capacity, resulting in a far more efficient system. Providing you with:

- Up to 20% increase in Btu loading
- Decrease in electrical usage as much as 25%
- Reducing pulldown time up to 50%
- Provide more uniform refrigerating temperatures
- Reduces first costs, by permitting down sizing of compressors in new systems

Application

Mechanical subcooling can be added to existing systems or designed into new ones. It is ideal for any refrigeration process where more capacity may be necessary, or where operating costs must be lowered. Often subcooling can be added using existing air-conditioning equipment to provide the subcooling input. Mechanical subcooling is recommended for:

- Supermarkets. Especially where present capacity is strained or additional loads (refrigerant cases) are being installed.
- Warehousing/Processing. To handle new load requirements or to permit expansion of the facilities.
- Industrial. To produce more capacity for changing product conditions or additional equipment.

Mechanical subcooling has proven cost efficient in a variety of applications. Additional equipment costs required for retrofit installations, in some instances, have been returned within three to six months due to lower energy usage. Further, subcooling has eliminated the need to scrap existing systems which have become overloaded. And in new system design, subcooling not only delivers more uniform, efficient operation, but also allows down sizing of some components like compressors and control valves.

Selection

Selecting the proper subcooler for your application depends on the following basic sizing considerations.

Range The temperature difference of the liquid refrigerant being subcooled, entering, and leaving the subcooler.

Approach Difference between the subcooled liquid leaving the subcooler, and the suction temperature of your dx system.

Capacity The number of tons of refrigeration required to subcool the liquid refrigerant of the lower temperature system.

Select the proper capacity chart identified for your particular range. At the top of the table various approach temperatures are given. Find the approach desired and read down the tons column until you reach the capacity adequate to do the job. The subcooled refrigerant pressure drop (in psi) is listed next to the capacity figure. To determine refrigerant lbs/Min multiply tons by the factor noted below each range chart.

Load Factor table provides a multiplier to your lower temperature system in tons to determine the required capacity of a subcooler. For example, a low temperature system with 18 tons of capacity @ -20°F. evaporating temperature would use the multiplier .18 for a R-22 50° range. The required capacity of the subcooler would be:

$$18 \text{ tons} \times .18 = 3.24 \text{ tons}$$

Load Factors to 50°F.

Evaporating Temperature	from 120°F. = 70° Range	from 110°F. = 60° Range	from 100°F. = 50° Range
	R-22	R-22	R-22
+40	.20	.19	.18
+20	.20	.19	.18
0	.21	.20	.19
-20	.22	.20	.19
-40	.22	.21	.20

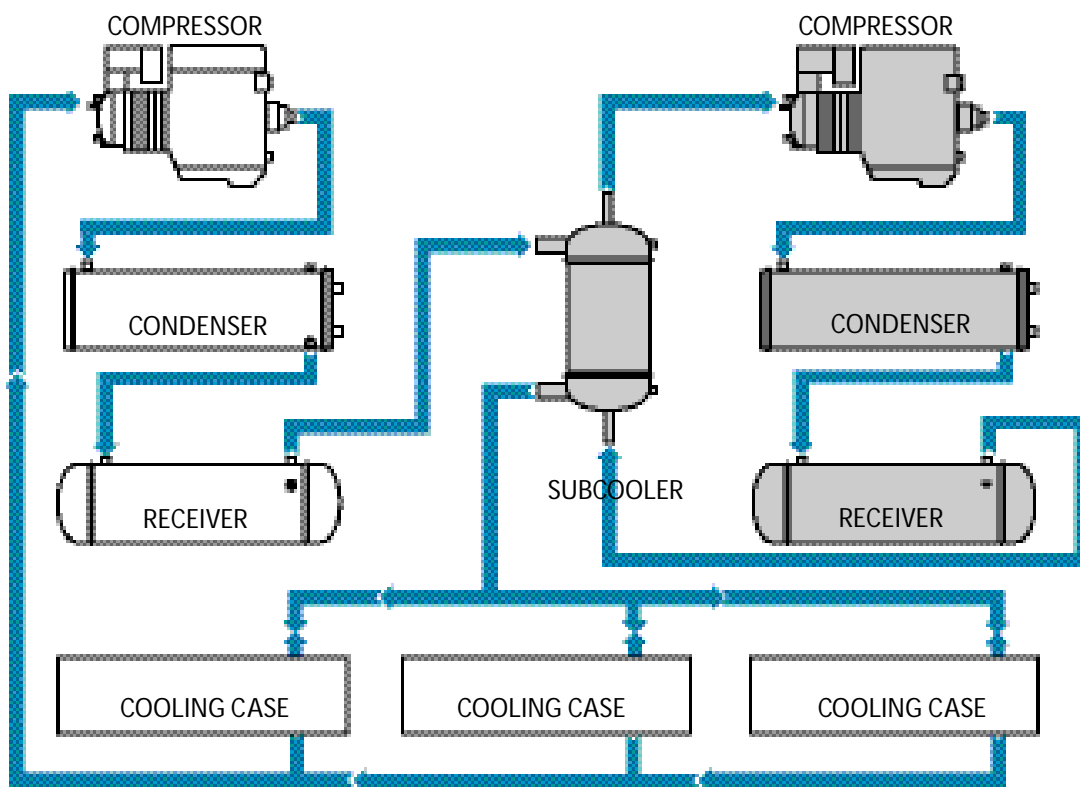
Limitations

1. Minimum incoming suction temperature of 10°F.
2. Maximum incoming refrigeration liquid temperature of 130°F.
3. Do not use solenoid valves to control liquid temperature. We recommend modulating controls only as opposed to on/off controls. This will tend to avoid pressure pulsation and large temperature excursions.
4. It is strongly recommended that the same refrigerant be used on both sides of the subcooler. Failure of tubes caused by vibration or pulsation may result in cross contamination of refrigerants, even though leakage to the atmosphere has not occurred. Use of like refrigerants will eliminate that potential liability. Standard's warranty does not include payment for refrigerant.

typical subcooler installation

Diagram indicates how a subcooling system can be added to an existing refrigeration system in a supermarket installation.

By making some simple piping and control changes, the subcooler unit is installed using the stores present high temperature system to subcool the liquid line. If the existing system is already adequate in size, and the subcooler is being added only for energy savings, the expansion valves at the case should be reduced 25% in size.



40° Range

	APPROACH TEMPERATURE °F													
	6°		7°		8°		9°		10°		11°		12°	
	tons	psi	tons	psi	tons	psi	tons	psi	tons	psi	tons	psi	tons	psi
SCT2	1.0	0.9	1.1	1.4	1.2	1.8	1.4	2.5	1.6	3.0	1.7	3.0	1.7	3.0
SCT4	2.0	0.9	2.2	1.4	2.5	1.8	2.8	2.5	3.2	3.0	3.3	3.0	3.3	3.0
SCT6	3.0	1.0	3.3	1.5	3.7	1.8	4.2	2.5	4.8	3.0	4.9	3.0	4.9	3.0
SCT9	4.5	1.0	5.0	1.5	5.6	1.8	6.3	2.5	7.2	3.0	7.4	3.0	7.4	3.0
SCT12A	6.0	1.0	6.6	1.5	7.4	1.8	8.4	2.5	9.6	3.0	9.8	3.0	9.8	3.0
SCT18A	9.0	0.9	9.9	1.4	11.1	1.8	12.6	2.5	14.4	3.0	14.7	3.0	14.7	3.0

to determine lbs/Min multiply tons by 16.6

50° Range

	APPROACH TEMPERATURE °F													
	6°		7°		8°		9°		10°		11°		12°	
	tons	psi	tons	psi	tons	psi	tons	psi	tons	psi	tons	psi	tons	psi
SCT2	1.1	1.0	1.2	1.5	1.5	2.0	1.8	2.9	2.0	3.4	2.1	3.0	2.3	3.0
SCT4	2.2	1.0	2.5	1.5	3.0	2.0	3.6	2.9	3.9	3.4	4.3	3.0	4.6	3.0
SCT6	3.3	1.0	3.7	1.5	4.5	2.0	5.4	2.9	5.9	3.4	6.4	4.5	6.9	4.5
SCT9	4.5	1.0	5.6	1.5	6.8	2.0	8.1	2.9	8.9	3.4	9.6	3.0	10.3	3.0
SCT12A	6.6	1.0	7.4	1.5	9.0	2.0	10.8	2.9	11.8	3.4	12.8	4.5	13.8	4.5
SCT18A	9.9	1.0	11.1	1.5	13.5	2.0	16.2	2.9	17.7	3.4	19.2	3.0	20.7	3.0

to determine lbs/Min multiply tons by 13.3

60° Range

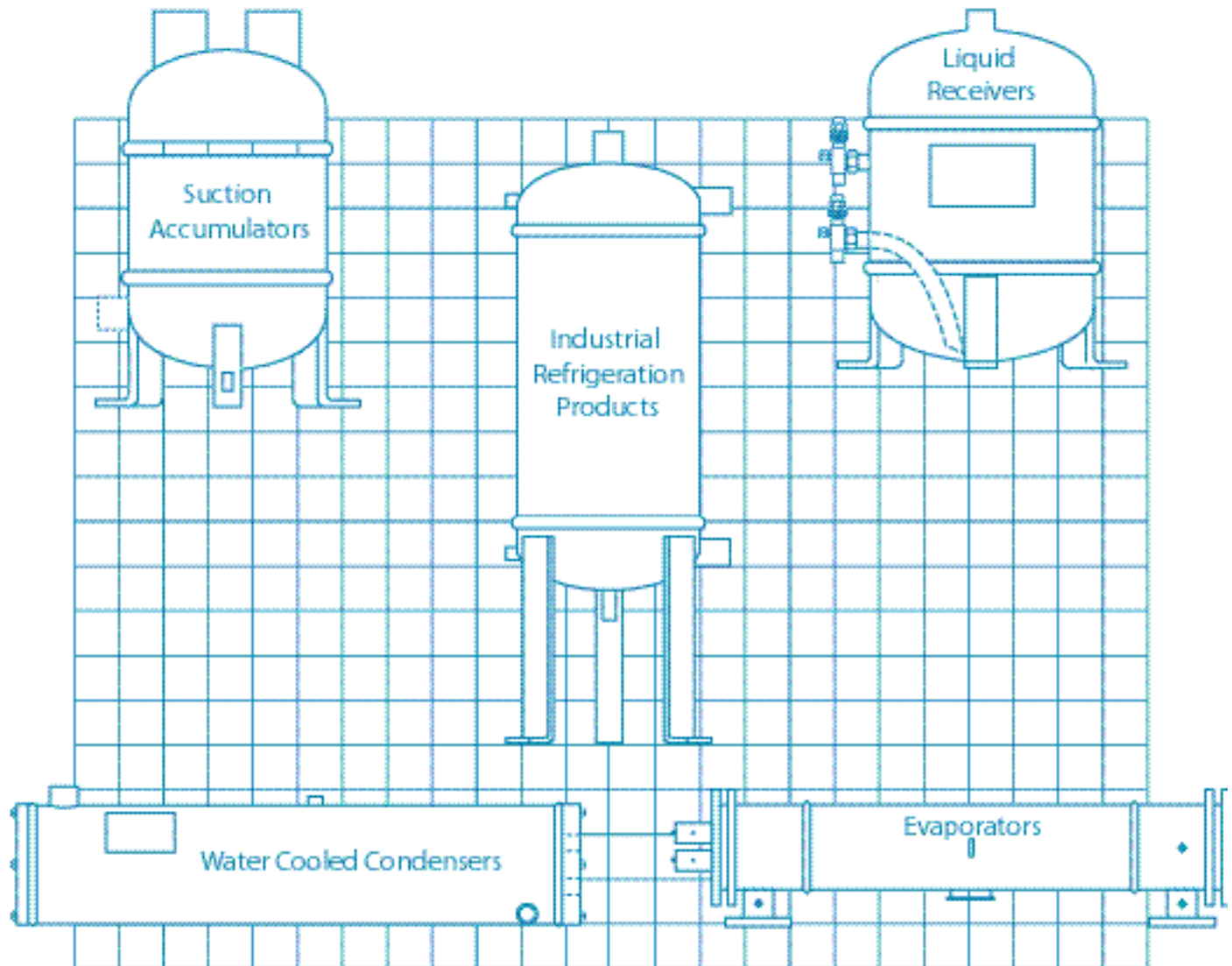
	APPROACH TEMPERATURE °F													
	6°		7°		8°		9°		10°		11°		12°	
	tons	psi	tons	psi	tons	psi	tons	psi	tons	psi	tons	psi	tons	psi
SCT2	1.1	0.9	1.3	1.5	1.6	2.0	2.0	3.0	2.3	3.8	2.4	5.0	2.5	5.2
SCT4	2.2	0.9	2.7	1.5	3.1	2.0	4.0	3.1	4.8	4.0	4.8	5.0	4.9	5.2
SCT6	3.3	1.0	4.0	1.5	4.7	2.0	6.0	3.0	7.1	4.0	7.2	5.0	7.3	5.2
SCT9	5.0	0.9	6.0	1.5	7.1	2.0	9.0	3.0	10.7	4.0	10.8	5.0	11.0	5.2
SCT12A	6.6	1.0	8.0	1.5	9.4	2.0	12.0	3.0	14.2	4.0	14.4	5.0	14.6	5.2
SCT18A	10.2	0.9	12.0	1.5	14.1	2.0	18.0	3.0	21.3	3.8	21.6	5.0	21.9	5.2

to determine lbs/Min multiply tons by 11.1

70° Range

	APPROACH TEMPERATURE °F													
	6°		7°		8°		9°		10°		11°		12°	
	tons	psi	tons	psi	tons	psi	tons	psi	tons	psi	tons	psi	tons	psi
SCT2	1.2	1.0	1.6	1.6	2.2	2.4	2.3	3.0	2.4	3.9	2.5	5.1	2.6	6.0
SCT4	2.4	1.0	3.3	1.6	4.4	2.4	4.6	3.1	4.8	3.9	5.0	5.1	5.4	6.0
SCT6	3.6	1.0	4.9	1.6	6.6	2.4	6.8	3.0	7.1	4.0	7.5	5.0	8.1	6.0
SCT9	5.4	1.0	7.4	1.6	9.9	2.4	10.2	3.0	10.7	3.9	11.3	5.1	12.2	6.0
SCT12A	7.2	1.0	9.8	1.6	13.2	2.4	13.6	3.0	14.2	3.9	15.0	5.0	16.2	6.0
SCT18A	10.8	1.0	14.7	1.6	19.8	2.4	20.4	3.0	21.3	3.9	22.5	5.1	24.3	6.0

to determine lbs/Min multiply tons by 9.4



Engineering specifications in this catalog are current as of the printing date, but are subject to future design changes. Consult factory for latest specification data before ordering.

Product performance is based on ARI standards and nominal operating conditions. Standard Refrigeration Company is not responsible for product failure in nonconforming applications. For assistance, please consult the factory.