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Lineset Informational Sheet – R410A Refrigerant

Three most widely used refrigerants in the market today are used in HVAC applications for residential and commercial use. The major gas, R-22 refrigerant, is used widely in the residential and commercial markets followed by R-134A, which is used in commercial applications for chillers and in wide use in car air conditioning systems. The R-134A replaced R-12 for automobile air conditioning systems. R-410A is currently being phased in for residential use for R-22. Based on its vapor pressure characteristic of refrigerant, the 410A high pressures refrigerant gas systems should be designed in accordance with the safe internal working pressure of lineset tubing. The **Refrigerant Gas Data** table and **Allowable Internal Pressure** table are listed below.

Table 1. Refrigerant Gas Data

Refrigerant No.	Name	Molecular Mass	Boiling point at atmospheric pressure 14.7 psia, 1 bar abs (°F)	Freezing Point at atmospheric pressure 14.7 psia, 1 bar abs (°F)	Critical Point		
					Temperature (°F)	Pressure (psia)	Specific Volume (Cu.Ft./lb.)
R-12	Dichlorodifluoromethane ⁽¹⁾	120.91	-21.8	-252	234	597	0.0287
R-22	Chlorodifluoromethane ⁽²⁾	86.468	-41.3	-256	205	722	0.0305
R-134a	Tetrafluoroethane ⁽³⁾	102.03	-15	-142	214	590	0.0290
R-410A	R-32 Difluoromethane (50% weight), R-125 Pentafluoroethane (50% weight)	72.6	-55.4		162	690	

¹⁾ Production of R12 or CFC-12 (Freon) was halted by the clean air act on January 1, 1996.

²⁾ R22 or HCFC-22 is a single component HCFC refrigerant with low ozone depletion potential. It has long been used in a variety of air-conditioning and refrigeration applications in a variety of markets, including appliance, construction, food processing, and supermarkets.

³⁾ Refrigerant R134a or HFC-134a is a commercially available hydro fluorocarbon (HFC) refrigerant for use as a long-term replacement for R-12 in new equipment and for retrofitting medium temperature CFC-12 systems.

Table 2. Allowable Internal Pressure, PSI

The values in this table are based on the formula in the American Standard Code for Pressure Piping, ASA B31.

Lineset OD Standard Size, In.	100°F S=6000	200°F S=5900	300°F S=5000	400°F S=2500
1/8	3130	3090	2620	1310
3/16	1990	1950	1650	820
1/4	1450	1420	1200	600
5/16	1230	1200	1020	510
3/8	1010	990	840	420
1/2	740	730	610	300

S= allowable stress in material due to internal pressure, at operating temperature, in pounds per square inch.

The ASTM standard for Lineset Copper Tubing is currently in review with the ASTM committee. The standard sizes listed above are referenced sizes from the ASTM standard B280- Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service.