CAMBRIDGE-LEE INDUSTRIES LLC

86 Tube Dr, Reading, PA 19605-9274
Phone 610-926-4141 ● Fax 610-926-7317
http://www.camlee.com

Distributor:	**Customer:**
Address:	**Address:**
Order No.:	**P.O. No.:**
Product:	

Lineset Certificate of Conformance

Tube Type	Specification No.*	Specification Title
Type Suction Line	ASTM B280	Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service
Type Liquid Line	ASTM B 280	Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service

Cambridge-Lee Industries, LLC, located in Reading, PA, USA, manufactures seamless copper tubing in the United States of America and is fully compliant with the “Buy American” requirements of Public Law 111–5, the American Recovery and Investment Act of 2009.

Cambridge-Lee Industries, LLC, manufactures seamless copper tubing with recycled scrap. Our production meets the LEED, Leadership in Energy and Environmental Design qualification requirements. The process of scrap recycling entails the purchase of #1 grade copper scrap and converting it in a finished cast form, which meets specification; alloy UNS C12200, for standard product production. To produce finished volume, Operations purchases approximately 65% #1 copper scrap and composes the remaining copper casting requirement with a combination of cathode copper and internal production scrap.

Cambridge-Lee Industries, LLC certifies that the copper tube manufactured is grade UNS C12200 and meets the applicable chemical, mechanical, cleanness and eddy current testing requirements of the current specification(s) indicated above.

All of the specifications require a minimum copper plus silver content of 99.9% and phosphorus content between 0.015 - 0.040%. As indicated by the compositional requirements, the copper tube is essentially lead free. Copper tube manufactured by Cambridge-Lee Industries does not contain mercury or come in contact with mercury, mercury compounds or mercury containing devices at any stage in manufacturing, inspection, packaging or shipping.

When specified at order placement and for an additional cost, product mill test reports can be provided to the current ASTM standard.

The insulation utilized by Cambridge-Lee Industries, LLC meets the ASTM C534 (C534-01a Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form) standard specification.

Cambridge-Lee Industries, LLC
Ashley Stout, P.E. – Director of Applications and Quality
April 2018

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Lineset Informational Sheet - Refrigerants

The three most widely used refrigerants in the market are used in HVAC applications for residential and commercial use are shown below. 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 (oF)	Freezing Point at atmospheric pressure 14.7 psia, 1 bar abs (oF)	Critical Point		
					Temperature (oF)	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.

[4] R-410A is a highly efficient nearly azeotropic mixture (gases evaporate at nearly the same temperatures) of two gasses ideally suited for replacing R-22 in scroll compressor packages. R-410A will not damage the ozone.

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