

Tubing Qualification

Suitable tubing selection is essential to the performance of every system. When selecting tubing for use with the RCS, Inc. fittings, the tubing material, wall thickness, and working pressure must be considered:

Tubing Material

It is critical for the performance of RCS, Inc. fittings that only the following types of tubing are used:

- ASTM B75/ASTM B280 ACR light-drawn (H55) temper, seamless copper tubing.
- ASTM B280 ACR drawn general purpose (H58) temper, seamless copper tubing.
- ASTM B280 ACR annealed (O60) temper, seamless copper tubing.

Tubing Wall Thickness

Ensure that tube utilized in refrigeration and air conditioning systems complies with all local standards and codes. Tubes manufactured per ASME B75 or ASTM B280 are acceptable.

Size Nominal OD [inches]	Nominal Wall (Wall Thickness) [inches]	WT Tolerance Average (+/-) [inches]
1/4"	0.030	0.003
3/8"	0.030	0.003
1/2"	0.035	0.004
5/8"	0.040	0.004
3/4"	0.042	0.004
7/8"	0.045	0.004
1-1/8"	0.050	0.004
1-3/8"	0.055	0.006
1-5/8"	0.060	0.006

Table 1. Wall Thickness (WT) Requirements

- ⚠ Installers using coiled copper tubing or line sets with RCS, Inc. fittings must ensure that the tubing used complies with ASME B31.5. It must also meet ASTM B75 and/or ASTM B280 standards with the required wall thickness and tolerances.
- ⚠ Annealed coiled copper tubing or line sets larger than 5/8 inch shall NOT be used with RCS, Inc. fittings.
- ⚠ Installers must use the appropriate RCS, Inc. tubing inserts for the tubing selected without exception.
- ⚠ RCS, Inc. will not be held liable for any damages, incidental and/or consequential, resulting from the use of tubing that does not meet ASME B31.5, and ASTM B280 or ASTM B75 standards, or resulting from the use of incorrect tubing inserts.

Working Pressure

RCS, Inc. components are ETL Listed to standard UL-207, and approved for use with seamless copper tubing, and working pressure of 1,167 psi (80 bar). RCS, Inc. mechanically attached fittings are installed without the use of heat; therefore, de-rating of the tube working pressure is not required as mandated by ASME B31.5.

Table 2 shows the maximum working pressures for each tube size and wall thickness for ASTM B75 and ASTM B280 Type L ACR copper.

ASME B31.5	Light Drawn (H55)		Drawn General Purpose (H58)		Annealed (O60)	
Allowable Strength [lb/in ²] (250°F)	10,300		9,000		4,800	
Tube OD [inches]	Nominal Wall [inches]	Max Working Pressure [psi]	Nominal Wall [inches]	Max Working Pressure [psi]	Nominal Wall [inches]	Max Working Pressure [psi]
1/4"	0.030	2735	N/A	N/A	0.030	1274
3/8"	0.030	1761	0.030	1538	0.032	879
1/2"	0.035	1528	0.035	1335	0.032	648
5/8"	0.040	1390	0.040	1214	0.035	563
3/4"	0.042	1208	0.042	1055	Do NOT use Refrigerant Coupling Systems, Inc. (RCS) fittings on these annealed copper tube sizes	
7/8"	0.045	1105	0.045	965		
1-1/8"	0.050	949	0.050	829		
1-3/8"	0.055	851	0.055	744		
1-5/8"	0.060	784	0.060	685		

Table 2. Maximum Working Pressures of Copper Tube
Based on allowable strength shown in ASME B31.5 – 2016, Table 502.3.1

Tube and Fitting Storage

All tubing and fitting parts should be inspected when received, during installation, and after installation completion, ensuring that parts with any manufacturing defects are not installed on the system. Proper handling, both in transit and onsite is critical. At a minimum, the following practices should be followed:

- Store tubing and fittings above ground in a clean, dry, indoor location.
- Ensure all tubes are capped or plugged at all times. If caps are not present, inspect, clean and re-cap.
- Cover tubes to eliminate oxidation and corrosion while allowing sufficient ventilation to avoid condensation.
- Do not store materials directly on or in contact with dissimilar metals, concrete, asphalt, or pavement.
- Never drag tubing across concrete, asphalt, or pavement.
- Never drag tubing out of a tubing rack, on the ground, or across rough surfaces.
- Protect tube and fitting ends from damage.
- Store tubing and fittings in original crates or packages.

Tube Handling Best Practices

Surface finish is very important to ensure proper sealing of mechanical connections. Tubing with any kind of surface defect may not seal properly.

- Always inspect the tube for a clean and smooth surface and concentricity.
- Only use tubing cutter with a sharp cutting wheel. Slowly advance the cutting wheel in small increments to avoid deformation of the tube end and to minimize de-burring time. Never use a hacksaw.
- Remove all burrs from the tubing ID and OD. The de-burred tube end should have a uniform edge break with no burr and the chamfer should not exceed half the wall thickness of the tubing.
- Do not put fingers inside the tool or near the cutting edges, or near sharp tube ends or burrs.
- Do not abrade the tube ends with sand cloth when connecting with RCS, Inc. mechanically attached fittings.



WARNING: Refrigerant Coupling Systems, Inc. fitting assemblies are high precision machined components. The use of any component not supplied or manufactured by RCS, Inc. may result in unreliable and/or unsafe connections, and is expressly prohibited by Refrigerant Coupling Systems, Inc.



WARNING: RCS fittings are single-use permanent fittings and cannot be removed or repaired after installation. If the fitting is deemed not visually acceptable prior to, during, or after the installation, the fitting must be cut out and a new one correctly reinstalled.



WARNING: All RCS fittings installed outdoors, at the outdoor units, on insulated piping located outdoors, in wet/humid environments, or wherever the thermal insulation cannot be installed per the insulation manufacturer's instructions, must be protected from possible corrosion via the use of cold shrink, heat shrink, or other suitable impervious protective cover.