# ACR-L Bendable H55 Copper Tubing

## OVERVIEW

### PRODUCT

Reftekk's core product: bendable ACR-L copper tubing. By implementing additional steps to the manufacturing and quality control processes, Reftekk's copper tubing is capable of both bending and swaging in the field, reducing the number of brazed joints by roughly 50-80%, greatly decreasing the number of potential leak points and reducing installation time.

While suitable for a wide variety of uses (including potable water), this product is particularly preferred for applications where limiting leaks is a priority, such as:

- OEM Equipment
- VRV/VRF
- Data Centers
- Grocery Refrigeration
- Med Gas[1]

### FEATURES

**Field Bendable:** Typically eliminates purchased elbow fittings and allows for field bending without annealing.

**Bending Consistency:** Springback is a standard aspect of bending that must be taken into account for precision bending, and the amount of springback is sensitive to a number of factors (wall-thickness, eccentricity, temper). Reftekk improves springback consistency by maintaining strict manufacturing tolerances on these critical factors.

**CAD Assisted & Pre-Calibrated Bending:** Precision bending is easy with Reftekk's Bend Designer, a free-to-use mobile app for both Android and iOS. The app acts as a CAD software that allows users to design and dimension bent tubing layouts. When ready to bend, the app accounts for springback of Reftekk tubing with built-in bending calibrations for specific combinations of benders and tube sizes.

**Suitable for Modern Refrigerants:**

- R410A
- A2L such as R-32 and R-454B
- Sub-critical CO2
- And others

**Field Swageable:** Typically eliminates purchased couplings and two brazes per coupling; requires only a single braze for each swaged joint.

**Sockets Meant for Brazing:** Standard, off-the-shelf couplings and elbows are only available with deep sockets intended for soldering. Brazed joints are negatively affected by deep sockets, often leading to long-term leaks that go unnoticed during startup. Reftekk's swaging tools create proper socket depths and tolerances for brazing, adhering to ASME B16.50 while allowing for the depth of Reftekk's internal brazing rings.

**Fewer Leak Opportunities:** By eliminating one brazed joint per coupling and eliminating field brazed elbows, the potential number of leak points is greatly reduced.

**Compatible with On-Site Storage:** Straight Lengths are 19’ long to allow complete closure of job site containers.

**Availability:** Reftekk offers availability of bendable straight length ACR-L as a standard offering instead of special order.

**Qualifies for Buy American:** The lack of domestic manufacturing qualifies Reftekk's ACR-L Bendable H55 Copper Tubing for an exception to the Buy American Act (BAA). Ask Reftekk for the exception document.

| Total Qty | | Product # | Tube OD | Wall Thickness | Tube Length (ea.) | Recommended Bender |
|---|---|---|---|---|---|---|
| Each | Feet | | | | | |
| | | H55L1902 | 1/4" | 0.025” | 19 ft | Reftekk Digi-Bender |
| | | H55L1903 | 3/8" | 0.030” | 19 ft | |
| | | H55L1904 | 1/2" | 0.035” | 19 ft | |
| | | H55L1905 | 5/8" | 0.040” | 19 ft | |
| | | H55L1906 | 3/4" | 0.042" | 19 ft | |
| | | H55L1907 | 7/8" | 0.045” | 19 ft | |
| | | H55L1909 | 1-1/8" | 0.050” | 19 ft | |
| | | H55L1911 | 1-3/8" | 0.055” | 19 ft | |
| | | H55L1913 | 1-5/8" | 0.060” | 19 ft | TBD |
| | | H55L1917 | 2-1/8" | 0.070” | 19 ft | |

*NOTE: Quantities are estimates only. Contractor is responsible for quantities required on project.*

### ⚠ CAUTION

- **Use Reftekk Approved Tools for Bending and Swaging.**
- **Do not use Swing Benders or T-Benders.**
- **Do not flare.**
- **Do not swage 1/4" OD Tubing.**

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## SPECIFICATIONS

## GENERAL

**Suitable for the following uses:**

- Data Centers
- VRV/VRF
- Mini-Splits
- Split Systems
- Grocery Refrigeration
- Med Gas[1]
- OEM Equipment
- Plumbing
- Potable Water
- And Others
- All CFC, HCFC, HFC, HFO, and Class A2L refrigerants and refrigeration oils, including R410A, R-32, R-454B, and others
- R744 (CO2) with proper design pressure considerations
- **NOT** suitable for use with ammonia (R 717) or Methyl Chloride (R40) refrigerants

**Qualifies for Buy American Act:** Ask Reftekk for the exception document.

**Available Sizes:** 19-foot lengths, 1/4" OD through 2-1/8" OD

## PROPERTIES

**Material:** UNS C12200 DHP (Deoxidized High Phosphorus) Seamless Copper

**Bendable:** Yes, with sufficient bend radii

**Swageable:** Yes (except 1/4"), with appropriate tools

| Property | Details / Test Result | Mfg. Standard |
|---|---|---|
| Material Composition | UNS C12200 DHP<br>≥ 99.9% pure copper | Meets the following codes/standards, as applicable:<br><br>ASME B31.5<br>ASTM B75<br>ASTM B88<br>ASTM B280<br>ASTM B819<br>NFPA 99<br>NSF/ANSI 61-G |
| Temper | H55 (Light Drawn), *a subset of: H58 (General Purpose Drawn)* | |
| Dimensions and Tolerances | ACR Type-L | |
| Seamless | Yes | |
| Yield Strength | ≥ 30 ksi (207 MPa) | |
| Tensile Strength | ≥ 36 ksi (248 MPa) | |
| Elongation in 2 inches | ≥ 25% | |
| Eddy Current Testing | Pass | |
| Cleanliness | Pass (ACR / Med / Potable) | |
| Ends Sealed | Yes, with plugs | |
| Incised Markings | Yes | |

| Tube OD (inches) | Nominal Wall Thickness (inches) | Max Working Pressure (psi)[a,b] per Fluid Temperature | | | |
|---|---|---|---|---|---|
| | | 100°F | 150°F | 200°F | 250°F |
| 0.250 | 0.025 | 2,391 | 2,347 | 2,282 | 2,239 |
| 0.375 | 0.030 | 1,880 | 1,846 | 1,794 | 1,760 |
| 0.500 | 0.035 | 1,631 | 1,601 | 1,557 | 1,527 |
| 0.625 | 0.040 | 1,483 | 1,456 | 1,416 | 1,389 |
| 0.750 | 0.042 | 1,289 | 1,266 | 1,231 | 1,207 |
| 0.875 | 0.045 | 1,179 | 1,158 | 1,126 | 1,104 |
| 1.125 | 0.050 | 1,013 | 995 | 967 | 949 |
| 1.375 | 0.055 | 909 | 892 | 867 | 851 |
| 1.625 | 0.060 | 837 | 821 | 798 | 783 |
| 2.125 | 0.070 | 744 | 730 | 710 | 696 |

a) The max allowable working pressure values are based on nominal dimensions and the allowable strength values provided by Table 502.3.1 in ASME B31.5-2016

b) The method for tubing connections (brazed, press, etc.) may affect or govern the max allowable working pressure and should be verified separately

## BENDING DETAILS AND APPROVED TOOLS

| Tube OD (inches) | Minimum Bend CLR |
|---|---|
| 0.250 | 1.00" |
| 0.375 | 1.50" |
| 0.500 | 2.00" |
| 0.625 | 2.50" |
| 0.750 | 3.00" |
| 0.875 | 3.50" |
| 1.125 | 4.50" |
| 1.375 | 4.95" |
| 1.625 | 6.50" |
| 2.125 | TBD |

| Approved Bending Tools[c] | |
|---|---|
| Make | Model |
| Reftekk | Digi-Bender |
| Baileigh | RDB-250 |
| | RDB-325 |
| | RDB-350-TS |
| Ercolina | SB48(-TC) |
| | HB60 |
| | TB60(-TC) |

c) Approval contingent upon the bending formers 1) being designed for OD tubing and 2) maintaining Minimum Bend CLR

| Approved Swaging Tools[d] | |
|---|---|
| Make | Model |
| Reftekk | Swage-X |

d) Approved only for brazing

**View the most up-to-date list of Reftekk Approved Tools:**

https://www.reftekk.com/approvedtools

## ⚠ CAUTION

- **Use Reftekk Approved Tools for Bending and Swaging.**
- **Do not use Swing Benders or T-Benders.**
- **Do not flare.**
- **Do not swage 1/4" OD Tubing.**

1) The codes for **med gas** applications are currently unclear if field-bending and/or field-swaging is allowed. For **med gas** applications, approval should obtained on a case-by-case basis (from the director of the facility, the med gas inspector, or the med gas certifier) to use Reftekk Approved Tools for bending and swaging.

**2) Liability for the following decisions belongs solely to the project's Designer, Specifier, Engineer, Contractor, Purchaser, and/or Commissioning Agent:**

- Suitability of the product for the intended application and pressure requirements
- Proper insulation thickness(es) to **1) avoid condensation**, 2) meet code requirements, and 3) meet manufacturers' installation instructions
- **Compliance with 1) national and local building codes, 2) energy codes, and 3) manufacturers' installation instructions**
- Covering the installed product for protection, concealment, and/or other reasons

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## IMPORTANT INSTALLATION NOTES

### GENERAL

1) Refer to Reftekk's website (http://www.reftekk.com) for additional information
2) Ensure piping is properly insulated and sealed to keep the piping system dry
3) Keep tubing plugged until final installation to maintain cleanliness
4) Store in clean dry environment and protect from mechanical damage
5) Do **NOT** store directly on concrete or bare metal
6) Do **NOT** flare
7) Do **NOT** direct bury (under concrete, earth, water, etc.)
8) Support intalled tubing per local code requirements and per authority having jurisdiction

**Training Videos**

- Bending
- Bending App
- Swaging
- Brazing

https://www.reftekk.com/training

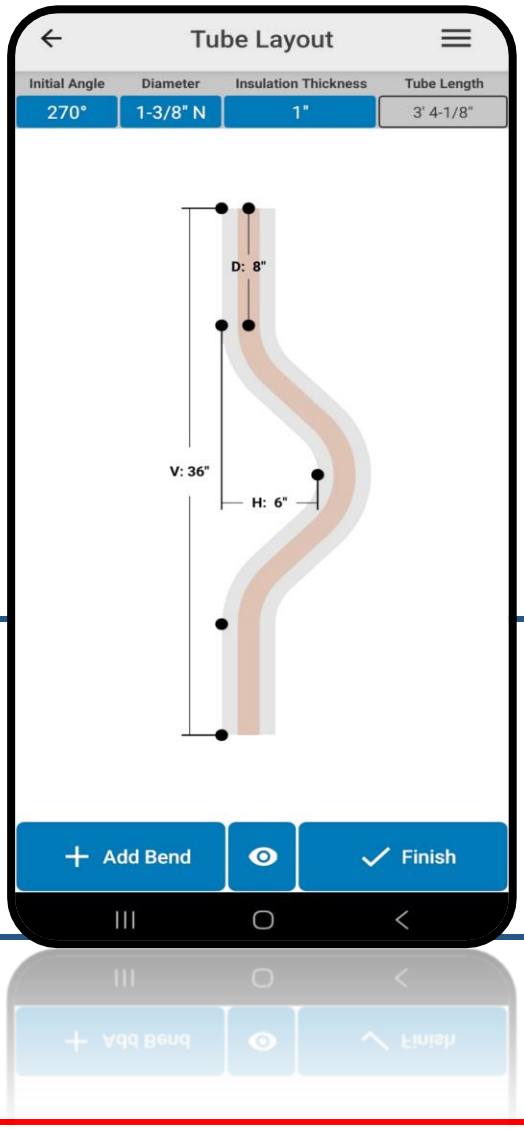
### BENDING

1) Use Reftekk Approved Bending Tools.
   - Check Reftekk's website for the most up-to-date list of Approved Bending Tools.
   - **The use of non-approved tools is at your own risk.**
2) Use bending formers that adhere to the published Minimum Bend CLR.
   - **The use of bending formers with tighter bend radii is at your own risk.**
3) Refer to Reftekk's website for the latest safety and operating instructions.
4) Do **NOT** use any "swing" or "T" style benders.
5) Do **NOT** attempt to un-bend or re-bend any previous bends.

**Download the Free Reftekk Bending App**

GET IT ON Google Play

Download on the App Store




### SWAGING

1) Use Reftekk Approved Swaging Tools.
   - Check Reftekk's website for the most up-to-date list of Approved Swaging Tools.
   - **The use of non-approved tools is at your own risk.**
   - The Reftekk Swage-X tool is only for use on BRAZED joints.
   - Do **NOT** use the Swage-X tool for soldered joints.
2) Refer to Reftekk's website for the latest safety and operating instructions.
3) Tubing **MUST** be cut square with sharp tubing cutter and properly de-burred
4) Do **NOT** expand/swage tubing that has not already been de-burred

### BRAZING

1) Brazing rings are recommended vs traditional brazing methods.

### ⚠ CAUTION

- **Use Reftekk Approved Tools for Bending and Swaging.**
- **Do not use Swing Benders or T-Benders.**
- **Do not flare.**
- **Do not swage 1/4" OD Tubing.**

1) The codes for **med gas** applications are currently unclear if field-bending and/or field-swaging is allowed. For **med gas** applications, approval should obtained on a case-by-case basis (from the director of the facility, the med gas inspector, or the med gas certifier) to use Reftekk Approved Tools for bending and swaging.
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   - **Compliance with 1) national and local building codes, 2) energy codes, and 3) manufacturers' installation instructions**
   - Covering the installed product for protection, concealment, and/or other reasons