



# Hydraulics

## Aluminum E-Z Clip™ Lifesaver™ Instructions

Introduction – The Aluminum E-Z Clip Lifesaver System

The Aluminum E-Z Clip Lifesaver system is designed to rework failed OEM aluminum air conditioning tubing and hose assemblies in sizes 10mm to 18mm (-6 to -12). The system allows the installer to reuse unique OEM terminal connections while replacing the failed OEM hose, with a braze-on E-Z Clip Lifesaver nipple, GH134 veneer hose and the E-Z Clip attachment system.

**Note:** The E-Z Clip System can only be used with Aeroquip or Weatherhead GH134 hose and metric aluminum tubing.

There are three (3) main advantages to using the Aluminum E-Z Clip System for A/C repairs. First, the technician avoids the cost and lead-time associated with ordering OEM air conditioning lines, and secondly, the system provides the end-user with a proven,

Figures 1 and 2 illustrate the E-Z Clip Lifesaver concept:



Figure 1. Failed Hose Assembly. Note crimp fittings.

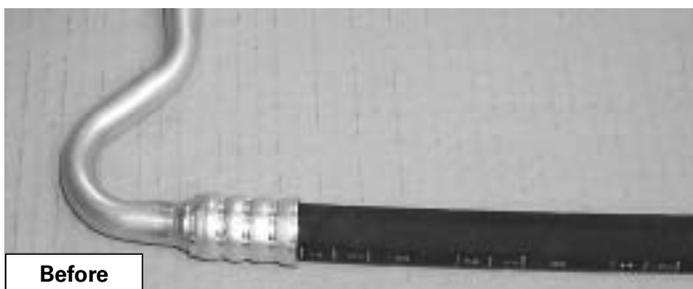


Figure 2. Completed hose assembly. Note E-Z Clip Fittings.

high-quality replacement part. Finally, the E-Z Clip components are assembled by hand, using a patented assembly system that provides a suitable replacement connection.

If you are unfamiliar with the Aluminum E-Z Clip system, be certain to review this instruction booklet and the E-Z Clip System Assembly Instructions (Doc. No. A-HC-T1-0001-E or W-HOAC-T1001-S) before beginning any work on the hoses.

**The system is nonetheless intended for professional A/C service personnel who have experience with torch brazing aluminum.** If you lack the proper skills and certification, then it is best to leave this type of work for specialists.



# Aluminum E-Z Clip Lifesaver Instructions

## Step 1 – Evaluating the Failed Assembly

### Preparation

Remove the failed A/C assembly from the vehicle. Remove all deposits from the tubing and hose with a stiff nylon brush and suitable solvent. Note all failure locations. Be certain to inspect the tubing carefully since aluminum can corrode, especially under steel brackets.

Next, add a scribe line on the tube, approximately 5mm (3/16 inch) from where the hose interfaces with the tube assembly. Add a second scribe line on the opposite tube assembly. Record the distance between the primary scribe lines. This is the overall length which will be used in Step 7.

For a hose assembly containing bent tubes on both ends, add a secondary scribe line perpendicular to the initial scribe line at one end of the tube (see Figure 3). Place a second perpendicular scribe mark in line with the first line at the other end of the hose assembly. This will assist in determining the phase angle needed in final assembly in Step 7.

Next, measure and record the hose and tube size. Typically the hose inside diameter (ID) is labeled on the hose. If this is not the case, then the hose must be cut in half and the hose ID directly measured (see Figure 4). The tube outside diameter (OD) must also be measured according to Figure 4, however, don't cut the tube at this time. Calipers are the preferred method of measurement for both components.

Finally, confirm whether the OEM has used standard tube-sized fittings for the hose assembly by referencing the below chart. For example, a standard size -8 hose assembly will have a metric tube OD size of 12mm with a corresponding hose ID of 11mm.

**TABLE 1  
STANDARD CONFIGURATIONS**

Size *	Tube OD mm (in)	Hose ID mm (in)
-6	10 (.39)	8 (.32)
-8	12 (.47)	11 (.42)
-10	16 (.63)	13 (.51)
-12	18 (.71)	16 (.64)

\*Note: This (-) size label will be referenced throughout the instructions.

## Step 2 – Cutting the Tube Assembly

Cut one side of the tubing with a tube cutter or hacksaw along the primary scribe line. Attempt to keep as much tubing as possible in case rework is necessary (see Rework section, page 4). If using a hacksaw, attempt to create a square cut. Also, be certain that there is at least 7mm (1/4 inch) of straight, undistorted tubing between the cut and the next tube bend. This is important since this length is needed for attaching the nipple. Repeat the above procedure for the opposite tube assembly.

## Step 3 – Preparing the Tube for Brazing

Remove any burrs from the cut tube. Avoid removing excess material on the outside of the tube as this could compromise the braze joint integrity. Attempt to create a flat and square surface at the cut. Regardless of the cutting tool used, a round file

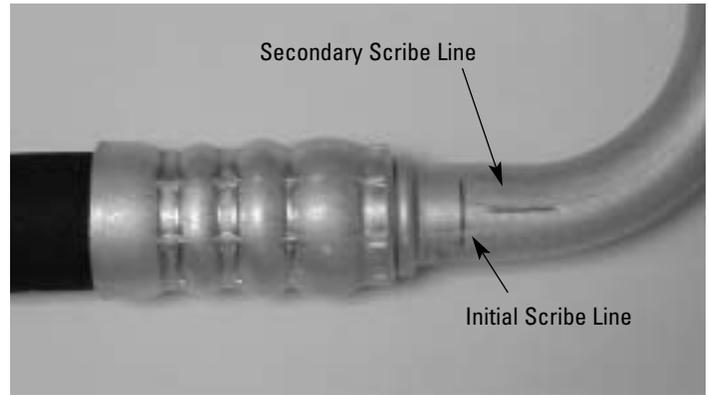


Figure 3 - Adding Scribe Lines

will be needed in order to remove internal burrs. Next, clean the outside of the tube assembly with a residue-free degreasing agent.

Finally, blow out all tube assemblies with compressed air. Avoid exposing the tube to oil and other contaminants as they tend to reduce the effectiveness of the flux and could lead to leaks at the braze joint.

## Step 4 – Part Selection

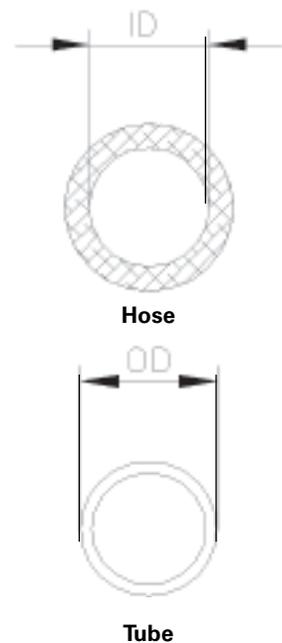
### Standard Sizes – Nipple and Braze Ring

Use the size designation found in Step 1 and Figure 4 to determine the proper nipple and braze ring.

**TABLE 2**

Braze Ring Part Number	Hose Size
GA7000579-10	-6
GA7000579-12	-8
GA7000579-16	-10
GA7000579-18	-12

Figure 4 - Hose and Tube Measurement



# Aluminum E-Z Clip Lifesaver Instructions

## Step 4 – Part Selection (continued) Hose

Match the failed hose ID (Step 1) to the replacement hose. Table 3 provides characteristics needed to match the hoses:

**Table 3. HOSE SELECTION.**

Size	Aeroquip or Weatherhead Hose	ID (inch)	ID (mm)
-6	GH134-6	5/16	8
-8	GH134-8	7/16	11
-10	GH134-10	1/2	13
-12	GH134-12	5/8	16



**Figure 5 - Braze ring installation**



**Figure 6 - Adding flux**

## Step 5 – Brazing the nipple to the tube

### Aluminum Brazing Tips

Unlike steel brazing, aluminum brazing occurs just below the melting point of the aluminum-base metal. As previously noted on page 1, if you are not an experienced aluminum brazer, defer this work to the Auto Service Industry Expert.

### Brazing Procedures using Braze Rings

Place the tube assembly into a vise or other suitable device (be certain not to over-tighten the jaws). As shown in Figure 5, insert the braze ring into the nipple counterbore, making sure the ring seats against the bottom of the counterbore.

Using a brush, add aluminum brazing flux (corrosive type) to both the inside and outside of the nipple counterbore. Next add the flux to the outside of the tube as shown in Figure 6.

Finally insert the nipple onto the cut tube. The nipple should fit loosely over the tube.

Use a torch according to the manufacturer's instructions. Attempt to heat the nipple and tube so that both regions reach brazing temperature simultaneously. Bear in mind that the counterbore area of the nipple will require more heat than the tube (see Figure 7).

As the ring melts, the nipple should "fall on the tube" and a fillet of brazing alloy should appear around the tube (see Figure 7). The nipple may cock as the ring melts. This means the ring is not completely melted and heat must be applied to the canted region. Be sure to remove the flame as soon as a uniform braze fillet appears and the nipple is straight. Allow the nipple and tube assembly to cool for 5 to 10 seconds. Then, while wearing gloves and using pliers, place the fitting into a clean container of water. Be sure that the fitting is completely immersed in water.

**Caution!** Steam may be directed through the fitting ends causing severe burns!

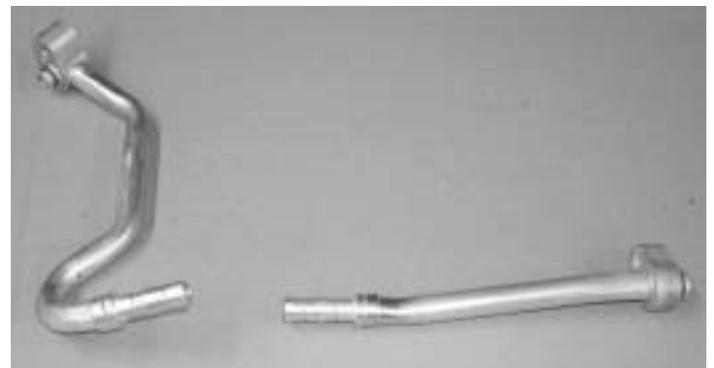
Once the unit is sufficiently cool enough to handle, use a stiff nylon brush or scratch pad to remove all flux and other debris. Flux removal is much easier if the assembly is still warm. Removal is essential since flux left on the tube/nipple will eventually corrode the aluminum and could lead to potential A/C system failure.

### Braze Joint Inspection:

First, lightly bend and twist the nipple and tubing by hand. A poor quality braze joint will result in breakage. Second, inspect the braze joint. A successful braze joint will display a uniform fillet without deep voids.



**Figure 7 - Brazing**



**Figure 8 - Completed tube assemblies**

## Rework

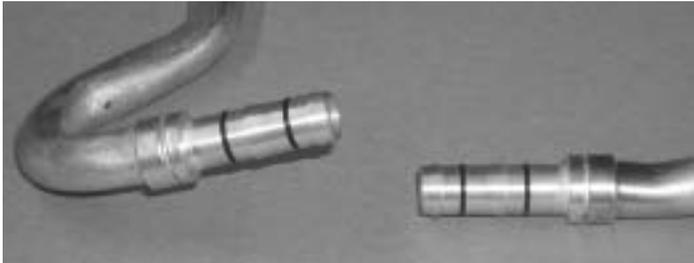
If the fillet area contains deep voids, then it should be reworked. To rework, clean the braze area with a scratch pad and water. Add more flux around the braze joint. Reheat to brazing temperature and attempt to create a uniform fillet. Additional braze alloy is unnecessary providing none was lost during the initial brazing process.

## Step 6 - Nipple O-ring Installation

Select the proper nipple o-ring according to Table 5. Add a few drops of A/C system lubricant (e.g. PAG oil) to the o-rings (2). Install the first o-ring by pushing it over the cone-shaped portion of the nipple. The first o-ring assembly is complete when the o-ring "snaps" into the groove nearest the point of assembly. The second o-ring will slide over the first o-ring and will fit into the second groove. The completed o-ring assembly is shown in Figure 9 below:

**TABLE 5  
O-RING AND NIPPLE CROSS-REFERENCE**

Size	O-Ring	Nipple
-6	1F40106-06	GW1172-1006AL
-8	1F40106-08	GW1172-1208AL
-10	1F40106-10	GW1172-1610AL
-12	1F40106-12	GW1172-1812AL



**Figure 9 - Finished tube assemblies with o-rings**

If the o-rings were inadvertently installed prior to brazing, then these o-rings must be removed and any residue on the nipple must be cleaned with a suitable solvent. A smooth, debris free nipple surface is essential for proper sealing and a leak-free connection. Don't scratch the nipple surface during o-ring removal. Finally, replace the o-rings according to Table 5.

## Step 7 - Hose Assembly Fabrication

Cut the GH134 hose approximately 150mm (6 inches) longer than the overall length calculated in Step 1. Install one reworked tube assembly onto the hose according to the E-Z Clip System Assembly Instructions (Doc. No. A-HC-T1-0001-E). Determine the necessary phase angle (secondary scribe lines should line-up) of the remaining piece of tubing, and install the final tube assembly according the E-Z Clip System Assembly Instructions.

## Figure 9 - O-rings

Only the o-rings supplied in the kit, part number FF13727 or o-ring part number 1F40106-size, can be used, along with the proper A/C system oil. Improper o-rings or improper lube of the o-ring, could result in refrigerant leakage and A/C system failure.

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