SERVICE MANUAL

MESABI®

ALUMINUM TUBE AIR TO OIL COOLERS

Please read and follow instructions carefully before installing the MESABI® Aluminum Tube Oil Cooler.
For further instructions, prints are enclosed with packaging.

SEPTEMBER 1997

CONTENTS

MESABI® Aluminum Tube Air to Oil

Quick and Simple Service

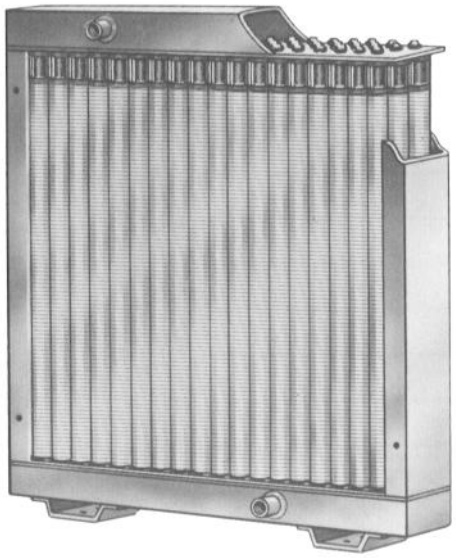
Whether down due to physical damage or for maintenance, MESABI® Aluminum Tube Air to Oil Coolers can be quickly and simply returned to service.

MESABI Oil Coolers use the replaceable tube concept and are similar in design to MESABI core engine radiators. They differ in that cooling tubes are lightweight aluminum with integral circular finning rolled from the tube wall.

Turbulators are placed in tubes to increase heat-transfer rate and are removable for cleaning.

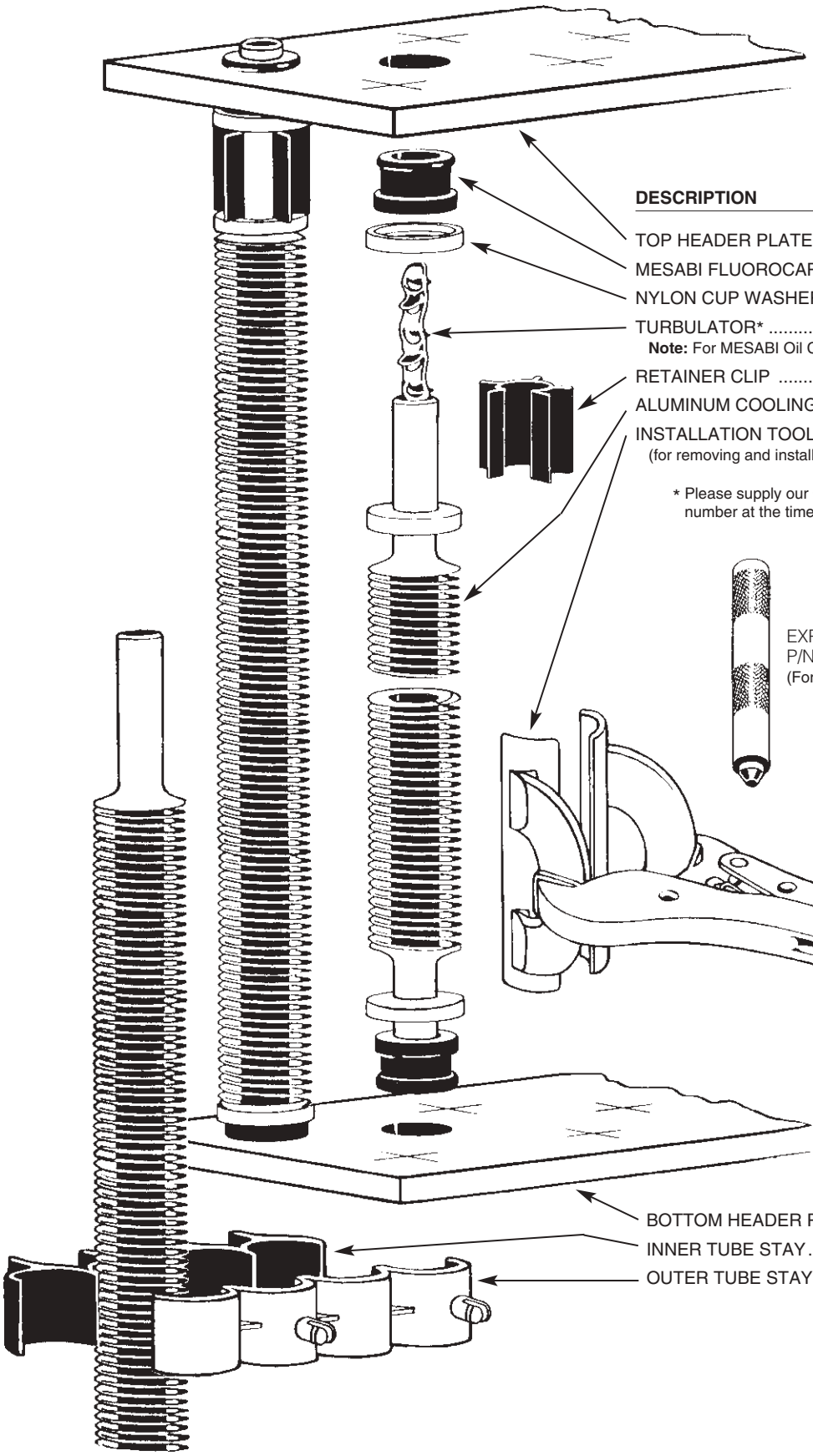
Tubes are held in header sheets with MESABI fluorocarbon rubber seals; a retainer clip at top of the tube locks in place.

Removal of tubes for replacement or cleaning is accomplished in much the same manner as with MESABI core engine radiators.



MESABI® Oil Coolers

MESABI® Aluminum Tube Air to Oil Cooler – Standard Parts



Exploded view of a typical MESABI intercooler and aftercooler core.

DESCRIPTION	PART NO.
TOP HEADER PLATE	_____
MESABI FLUOROCARBON RUBBER SEAL	35780
NYLON CUP WASHER	33569
TURBULATOR*	68478 / 32683
Note: For MESABI Oil Cooler only	
RETAINER CLIP	33567
ALUMINUM COOLING TUBE	_____
INSTALLATION TOOL (for removing and installing tubes)	42146

* Please supply our Customer Service Department with the L&M serial number at the time of order to ensure proper turbulator replacement.

EXPANSION TOOL
P/N–62692
(For Turbulator Removal)

CRIMPING TOOL
P/N–62693

BOTTOM HEADER PLATE	_____
INNER TUBE STAY	33570
OUTER TUBE STAY	33566

MESABI® Aluminum Tube Air to Oil Cooler –

EXTERNAL CLEANING

MESABI Aluminum Tube Air to Oil Cooler

To maintain efficiency and assure maximum life of a MESABI Aluminum Tube Oil Cooler, reasonable care must be taken when cleaning.

For general external cleaning, a high pressure hot water washer, up to 1200 PSI, can be used. Unlike conventional cores, you can and should get right up next to the core with the wand. Starting from the air exit side, place the high pressure washer nozzle next to the fin, concentrating on a small area, slowly working from the top down. Make sure you spray straight into the core, not at an angle. Continue washing until the exit water is free of dirt. Repeat from the opposite side.

In some cases it may be best to blow out any dry dirt with a high pressure (up to 1200 PSI) air gun prior to washing core with the high pressure hot water washer. If there is any doubt about the cleaning method to be used, try the method on a portion of a single tube first, or contact an L&M manufacturing facility.

Many radiator shops use a hot alkaline soap or caustic soda in their boil-out tanks with chemical additives. Soaking in high pH solutions may damage the aluminum alloy depending on the exact characteristics of the solution. Solutions that are either too alkaline (pH>9.0) or too acid (pH<5.0) are not recommended.

Removing MESABI Tubes

After thorough cleaning, as described above, blow dry the core section, then remove retainer clips from top portion of tube, as shown in **Fig. 1**.

With Installation Tool No. 42146, grasp center portion of tube, as shown in **Fig. 2**. Rotate the tool, so as to break the tube free from the seal then raise the tube only enough to clear lower seal and swing tube out just far enough to allow tube to be pulled down and out of its upper seal, as shown in **Fig. 3**

Remove all tubes in the row, repeating the above procedure.

Installing MESABI Tubes

IMPORTANT: Before inserting new or original tubes into header plates, new seals (P/N 35780) must be installed.

After removing old seals, tube holes should be cleaned of any foreign debris. A McMaster Carr Chuck Grip 3/4” brush #63005T42 (L&M P/N 64092) placed in

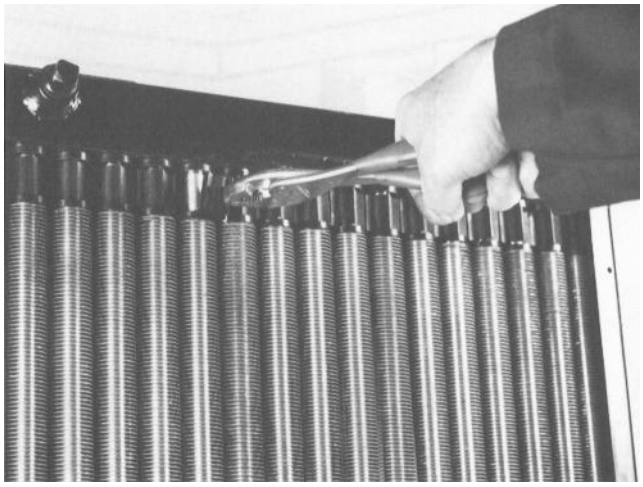


Fig. 1

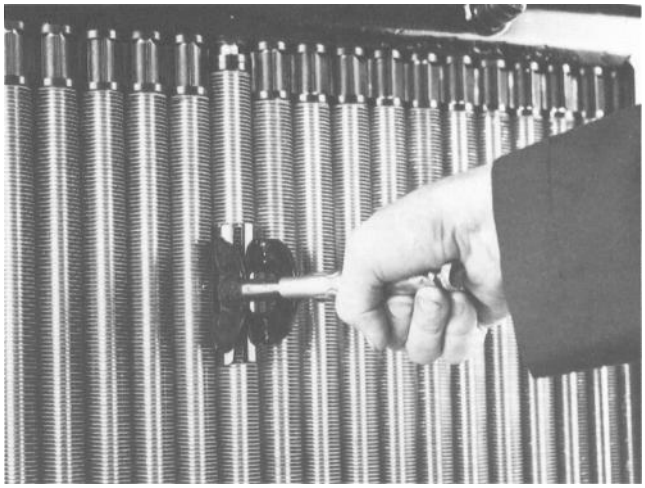


Fig. 2

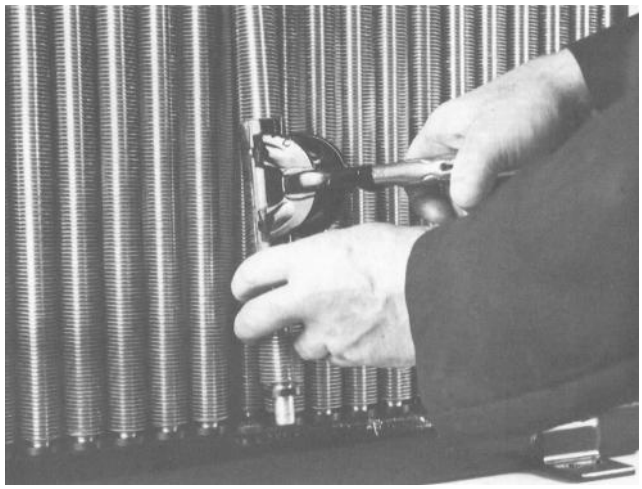


Fig. 3

Tube Removal and Replacement

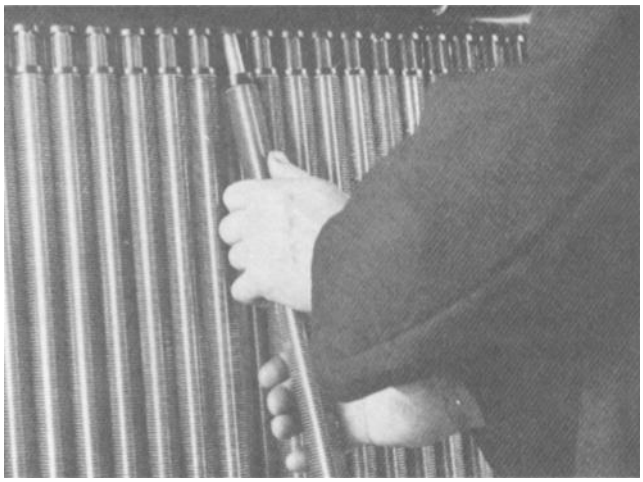


Fig. 4

Fig. 5

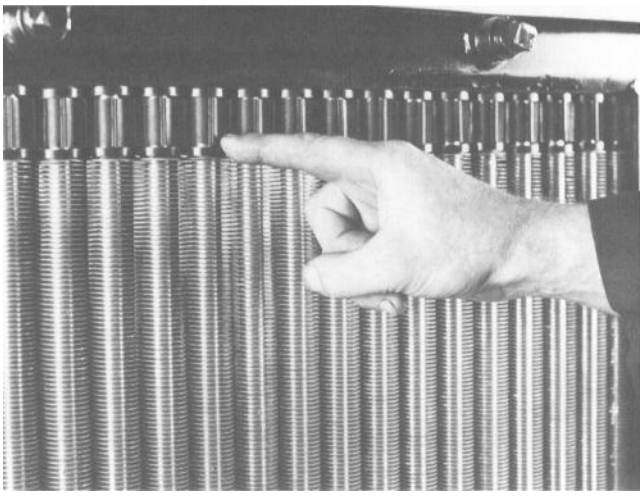


Fig. 6

an electric or air drill can be used for this purpose. **Note: Caution must be taken when cleaning aluminum header plates not to damage hole surface finish.** Be sure to clean the inside of the tanks out with air before installing seals. Place new seals in the clean holes. Then, using a flat bottom rubber mallet, gently tap each seal down so that the shoulder of each seal is resting on the header plate.

ON THE LEFT:
Properly installed 35780 seal.

RIGHT:
35780 seal installed too far into header.

CORRECT INCORRECT

Before original tubes are reinstalled, tube ends must be clean of foreign material. A fine grit emery cloth or buffing wheel can be used. Precaution should be taken when buffing so as to not mar tube. Make sure the tube ends are wiped clean prior to installation.

Coat the inner hole of each seal and the outside ends of each tube with a small amount of #10 hydraulic oil or petroleum jelly. Cupped washers should be installed as shown in the exploded view on page 3, prior to installing tubes. Starting at the end of one of the rows of holes, push the top end of a tube (the top end of the tube is the end with the longest unfinned section) into one upper header plate seal, as shown in **Fig. 4**. Place center bottom end of tube into respective hole in the bottom seal. Push tube down and into seal until the washer is located on top of the lower seal. This may be done by grasping tubes by hand and pulling tube downward until seated, or by using Installation Tool, new style No. 42146, as shown in **Fig. 5**. **Note:** Be sure tube is properly centered in the seal before pushing the tube in place or seal damage could result.

Reinstall retainer clip between upper two washers, as shown in **Fig. 6**. Make sure wings on retainer clips are parallel with each other to block bypassing air.

On some oil coolers (typically when tubes are longer than 35 inches) tube stabilizers will be required. Before starting a second row of tubes, place the center tube stabilizer, Part No. 33570, in position. Stabilizers should be lined up with the support bar location. Proceed with installation of the next row of tubes, using same procedure as when installing first row.

Remember that a center tube stabilizer should be located *BETWEEN* each row of tubes before starting another row of tubes.

When tubes are completely installed, fasten tube stabilizer, Part No. 33566, with support bracket to side members.

MESABI® Oil Cooler – Internal Cleaning

In cases where it is necessary to clean the inside of the oil cooler, the following procedure can be used.

Remove all the tubes and seals from the oil cooler as described on page 4. Flush the inside of the tanks with a high pressure washer (a mild soap can be used but rinse thoroughly). Blow the excess water out with air and make sure the tanks are dry. The tube holes should be clean and dry.

Next remove the turbulators from the tube with the tools shown in **Fig. 1**.

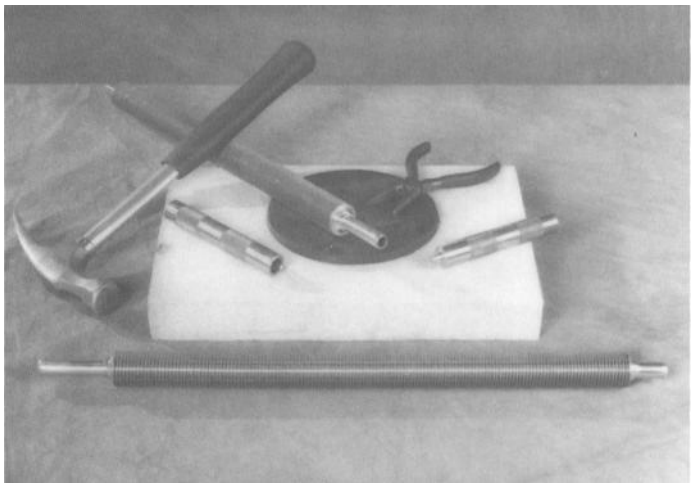


Fig. 1

Note that the tube ends have been crimped at each end to secure the turbulator inside the tube. Also note that there is a long, unfinned portion of the tube and a short, unfinned portion.

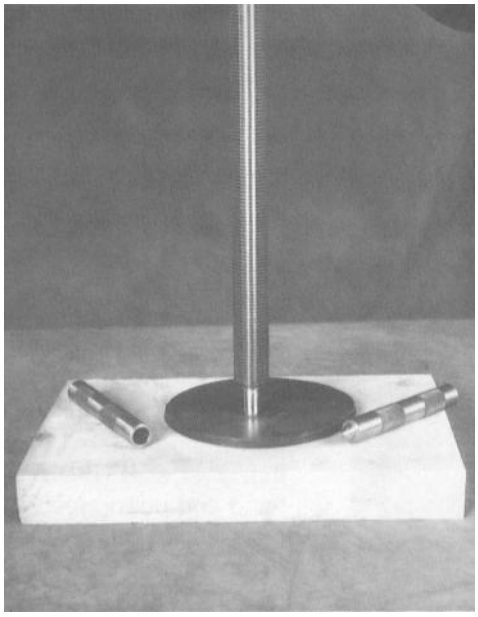


Fig. 2

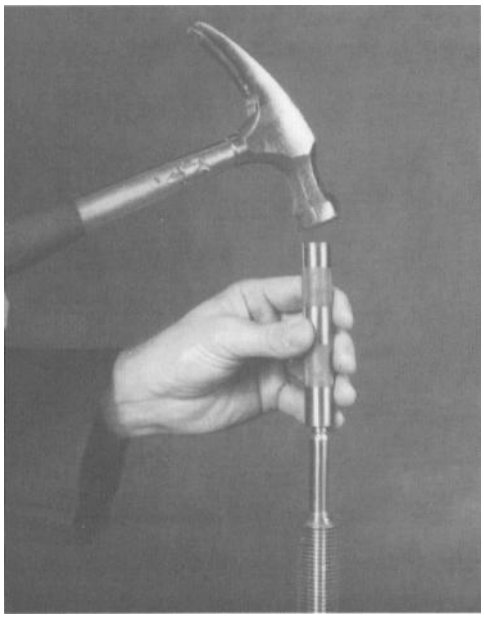


Fig. 3

Place the tube end on a piece of hard industrial rubber as shown in **Fig. 2**. Holding the tube upright, insert tool (P/N 62692) in the end of the tube (see **Fig. 3**), with a hammer lightly tap the tool forcing the end of the tube open just far enough to allow removal of the turbulator. **Care must be taken not to mushroom the tube ends.** Open both ends in this manner.

Typically, turbulators are removed out of the long unfinned end of the tube with a long nose plier. In this case, the tabs are facing downwards (see **Fig. 4**.) **Care should be taken not to kink the turbulators.**

NOTE: *Although rare, you may find turbulators inserted the opposite way because of flow direction. If so, please remove from the short unfinned end.*

Clean and flush the tube with a high pressure washer. Blow off with air and make sure tubes are thoroughly dry.

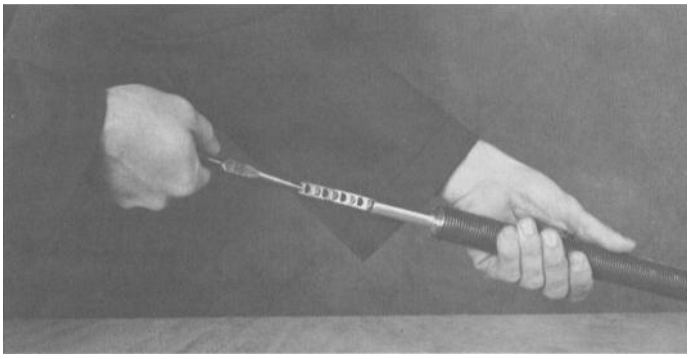


Fig. 4

Replace the turbulator by pushing the turbulator through the short, unfinned end of the tube (see **Fig. 5**). Push the turbulator far enough into the tube to allow for recrimping.

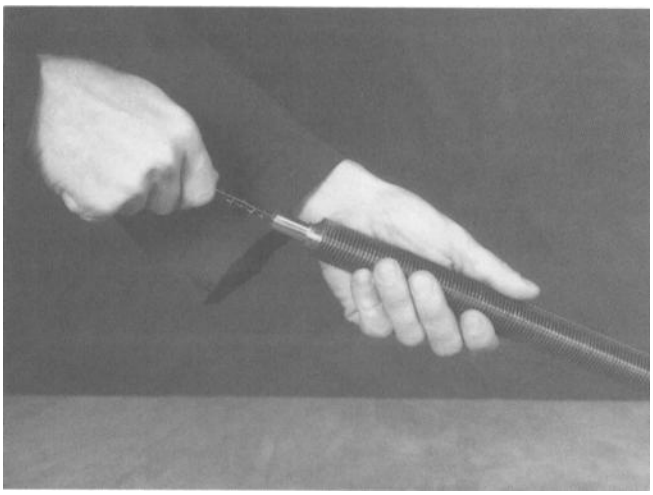


Fig. 5

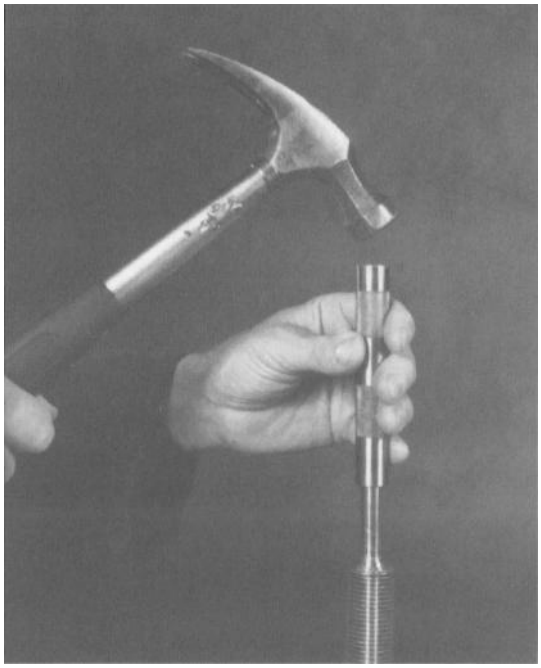


Fig. 6

Note: Depending on tolerances "pushing" the turbulator into the tube may cause kinking. An alternative would be to use a piece of wire with a hook on the end. The turbulator can be pulled into place from the long unfinned end of tube.

Crimp both ends of the tube using tool (P/N 62693) and a hammer (see **Fig. 6**). Lightly tap, forcing the end closed far enough to hold the turbulator securely in place. (Again, care should be taken not to mushroom the tube ends.)

Finally, check the tube ends for burrs, etc. Lightly buff the tube ends or use a fine emery cloth to remove any debris. Make sure the tube ends are wiped clean prior to installing. Follow the installation procedures on pages 4 and 5 to complete the job.

MESABI® OIL COOLER 48-MONTH WARRANTY

L&M Radiator warrants the MESABI Oil Cooler manufactured by L&M for a period of 18 months from date of invoice. Under this warranty, our obligation is limited to the repair or replacement (at our option) of products or parts manufactured by L&M that are proven to be defective in workmanship or material. L&M further warrants the MESABI Oil Cooler against seal leakage during normal use for 48 months from date of invoice on new cores with MESABI® fluorocarbon seals installed. Damage or leakage due to accidents, misuse, or corrosion is not warranted.

Warranty on components not manufactured by L&M Radiator shall be that of the individual manufacturers. Individual manufacturers operational and maintenance requirements must be met and their policies regarding shipment and inspection of claimed defective parts will apply.

L&M is not liable for consequential or incidental damages nor thelr related costs. Consult factory before proceeding with warranty claims. This warranty supersedes all previously published warranties.

We solve big heat transfer problems around the world.







Parts shipped within 48 hours from four plants around the world.

MESABI® Oil Coolers, radiator cores and related cooling components are marketed on a factory direct basis from four L&M Radiator plants around the world.

L&M Radiator is able to give exceptional service to users and OEMs because all service is controlled at the manufacturer level. In emergencies, we can ship complete oil coolers or parts within 48 hours. On site technical and engineering assistance is available nearly anywhere in the world within a few days notice.

L&M Radiator is proud to provide both old and new customers around the world with products known for quality and dependability since 1957.

L&M Radiator manufacturing facilities and parts depots are located in the countries listed below.

Manufactured and distributed by:

L&M RADIATOR

Toll Free: 800-346-3500 (U.S.A. and Canada)

mesabi.com

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