



SERVICE MANUAL



3" S-FIN HIGH TEMP AIR-TO-AIR COOLERS

PLEASE READ AND FOLLOW INSTRUCTIONS AND WARRANTY CAREFULLY BEFORE PROCEEDING WITH ANY SERVICE WORK AND/OR REPAIRS. CONSULT FACTORY BEFORE PROCEEDING WITH ANY POSSIBLE WARRANTY CLAIMS. ONLY USE GENUINE MESABI™ PARTS.

ALWAYS CONSULT NAMEPLATE FOR MAX PRESSURE RATING.

IF YOU HAVE ANY QUESTIONS REGARDING THE PROCEDURES DESCRIBED IN THIS MANUAL, PLEASE CONTACT L&M RADIATOR, INC. AND ASK FOR CUSTOMER SERVICE.

L&M RADIATOR, INC. GENERAL WARRANTY

Consult L&M Radiator, Inc. before proceeding with warranty claims or repairs. Failure to do so may void this limited warranty. This limited warranty allocates the risk of failure of the product(s) between the Buyer and L&M Radiator, Inc. and is reflected in the purchase price.

L&M Radiator, Inc. warrants that MESABI® products will conform to the L&M Radiator, Inc. written quotation specifications and drawings. MESABI® framework components are warranted for 18 months from the date of invoice against defects in materials and workmanship during normal usage. The L&M Radiator, Inc. warranty against seal leakage during normal operation is stated in individual product literature.

L&M Radiator, Inc. liability is limited to the rework or replacement (at L&M Radiator, Inc. sole option) of products or parts manufactured by L&M Radiator, Inc. that are determined by L&M Radiator, Inc. to be defective in workmanship or material or do not meet L&M Radiator, Inc. quoted specifications.

The L&M Radiator, Inc. product warranty does not apply if the product has been subjected to abnormal use or conditions, unauthorized modifications or repair, corrosion, misuse, neglect, abuse, accident, improper installation, or other facts which are not the fault of L&M Radiator, Inc., including damage caused by shipping.

L&M Radiator, Inc. does not warrant products incorporated into L&M Radiator, Inc. products that are not manufactured by L&M Radiator, Inc. Buyer's sole recourse with respect to such products will be subject to the warranty of the individual manufacturer.

Other than as stated herein, L&M Radiator, Inc. makes no representation or warranty of any kind, expressed or implied, as to the merchantability or fitness for a particular purpose, or any other matters with respect to the sale of L&M Radiator, Inc. products(s) and all implied warranties of merchantability or fitness for a particular purpose are hereby disclaimed. In no event will L&M Radiator, Inc.'s liability include any special, incidental, consequential, or punitive damages, even if L&M Radiator, Inc. knew of the likelihood of such damages.

Any action or lawsuit for breach of the limited warranty in these L&M Radiator, Inc. terms and conditions must commence in Minnesota. This warranty supersedes all previously published warranties.

MESABI® PRODUCT SPECIFIC WARRANTY S-FIN COOLERS

Consult L&M Radiator, Inc. before proceeding with warranty claims or repairs. 3" S-Fin General Warranty is 18 months from the date manufactured. Contact L&M Radiator Customer Service for more details.

MESABI® HEAT EXCHANGERS ARE THE WORLD STANDARD FOR HEAT EXCHANGER RELIABILITY

If you have any questions regarding the procedures described in this Service Manual, please contact L&M Radiator Customer Service.

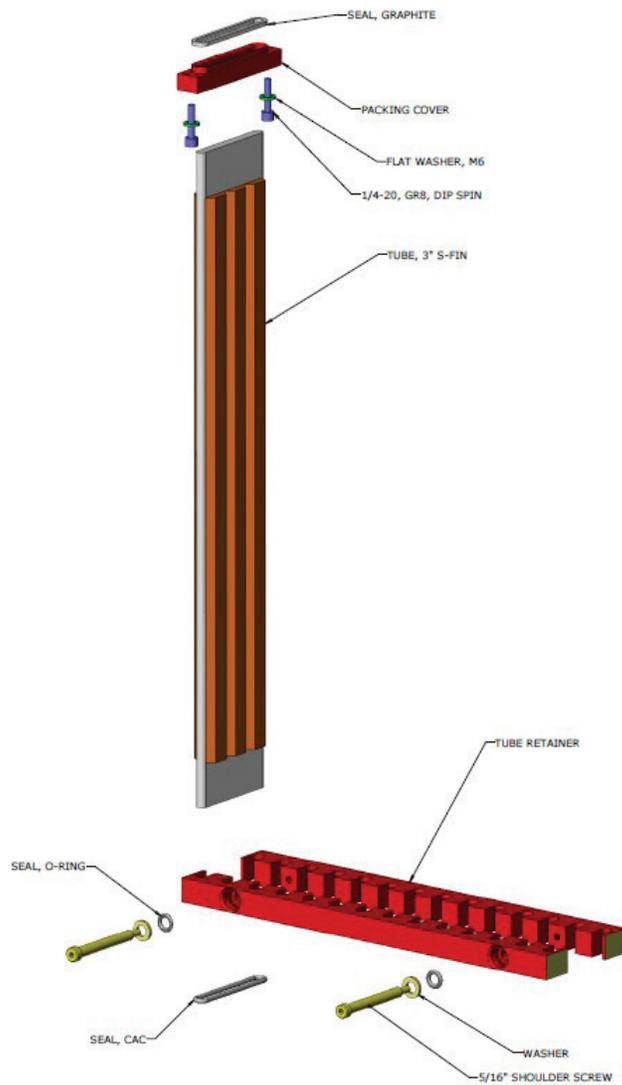
All information, illustrations, and specifications in this Service Manual are based on the latest information at the time of publication or posting online at www.MESABI.com. L&M Radiator reserves the right to make changes at any time without notice.

CONTENTS

WARRANTY	PAGE 1
GENUINE MESABI® PARTS	PAGE 2
GENUINE MESABI® TOOLS	PAGE 3
EXTERNAL CLEANING	PAGE 4
REMOVING MESABI® TUBES & SEALS	PAGE 5
HEADER PREPARATION	PAGE 6
TUBE PREPARATION	PAGE 7
SEAL INSTALLATION	PAGE 8
TUBE INSTALLATION	PAGE 9-10
MANUFACTURING & PARTS FACILITIES	PAGE 11

STANDARD PARTS

INLET SIDE



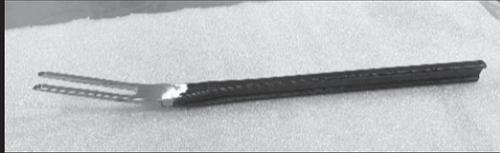
OUTLET SIDE

When purchasing parts, contact L&M Customer Service to ensure correct genuine Mesabi® parts.



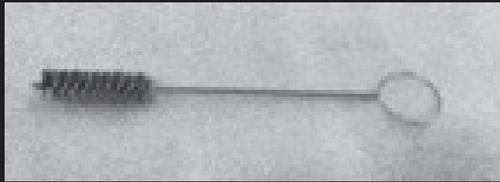
O-RING TOOL

#97892 Used for the removal of o-rings.



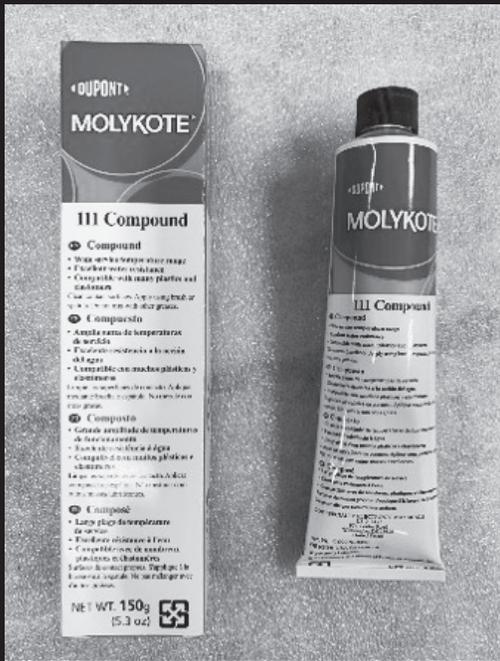
S-FIN TUBE TOOL

#317596 Used to assist in removal of the S-Fin tubes away from the Cover Blocks.



BRUSH

#63451 Used in header preparation.



SILICONE LUBRICANT

#100276 Used in tube preparation.



A



B

A ANTI-SEIZE LUBRICANT

#118555 Used for the installation of Shoulder Screws

B THREADLOCKER

#122054 Used for the installation of packing covers

EXTERNAL CLEANING & TUBE AND SEAL REMOVAL



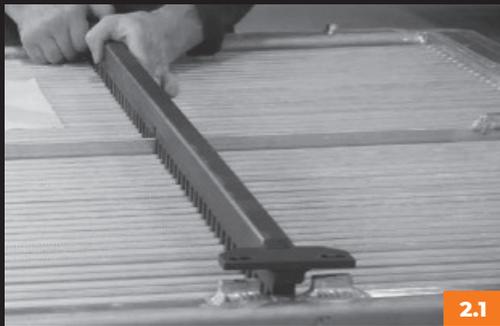
1 EXTERNAL CLEANING

To maintain efficiency and assure maximum life of MESABI® S-Fin Coolers, reasonable care must be taken when cleaning.

- 1.1** In some cases, it may be best to blow out any dry dirt with shop air prior to washing the core with a high-pressure washer. If there is any doubt on what cleaning method to use, try the method on a small portion of a single tube first, or contact L&M Customer Service.
- 1.2** For general external cleaning, high pressure hot water (with or without soap) can be used at pressures up to 1200 PSI (8274 kPa.) Spray straight into the core; do not spray at an angle and stay at least 6 inches away from the tubes. It is important to start on the air exit side first. Work from top to bottom. Concentrate on small areas and work slowly. Keep washing until the water exiting the opposite side is free from dirt and debris. Complete this side and then repeat the process on the other side.
- 1.3** Blow dry the core section.

NOTE: Many radiator shops use a hot alkaline soap or caustic soda with additives in their boil-out tanks. 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) or acidic (pH<5) are not recommended.

REMOVING MESABI® TUBES & SEALS



2 REMOVING MESABI® TUBES & SEALS

Removing tubes will require two people. Be sure to note fin orientation when removing tubes.

2.1 Remove support bar if equipped.

2.2 Mark the tank from which the retainer bar is removed. Remove the tube retainer bars by using a Standard 3/16" Allen wrench to remove 5/16" shoulder screws.

2.3 Using Tube Tool (#317596) Pry packing cover with tube away from the header plate pushing the tube into the opposite tank.

NOTE: Do not force the tube out or the tube could become damaged. Remember to remove the tube at the smallest angle possible. If experiencing trouble removing the tubes; or if there is excessive damage or wear to tubes, contact L&M Customer Service for evaluation.

2.4 When removing the seals from the header, use the pick end of the O-Ring tool (#97892) and gently place it between the seal and the seal groove to pull the seal out slightly. Be careful not to scratch the seal groove.

NOTE: Seals that are inadvertently dropped into the tank must be removed.

HEADER PREPARATION



3 HEADER PREPARATION



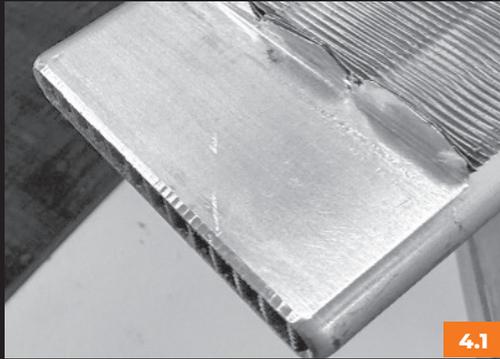
3.1

- 3.1** Clean the seal pockets with a dry non-lubricant fiber brush (#63451) in good condition. **DO NOT** use a steel or brass brush as the tube holes could be damaged.



3.2

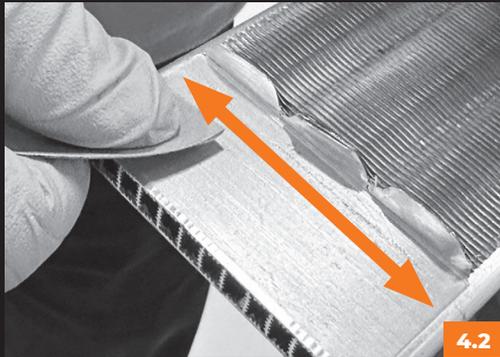
- 3.2** Using compressed air, blow the header plate end tanks out to remove all debris loosened by the brush. Inspect the sealing pockets to make sure there are no nicks, scratches, weld BB's, or other contamination especially in the sealing groove.



4 TUBE PREPARATION

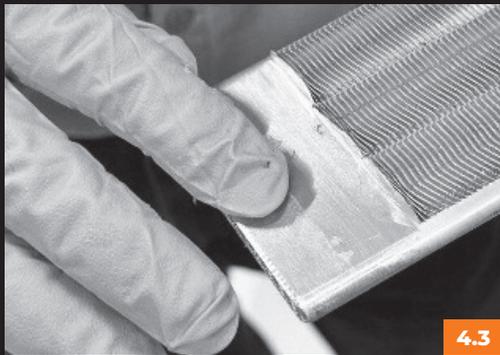
Before installing new or original tubes into the header plates, new seals must be installed properly as described in 5.0 seal installation.

- 4.1** Inspect the tubes for scratches, nicks, and other defects. Make sure the tube ends are clean and free from debris.

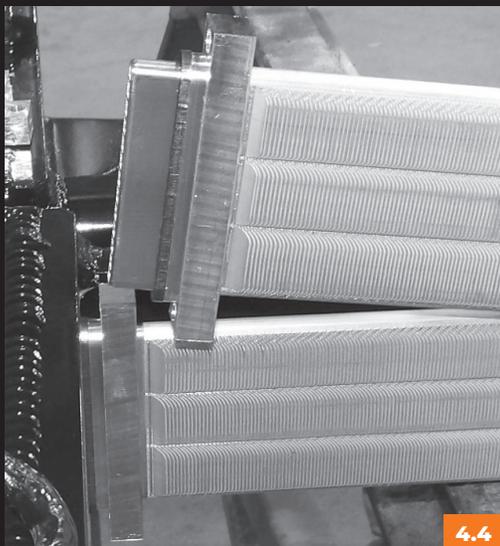


- 4.2** If any burrs or scratches are noticed, use 280 grit or finer sandpaper to clean the tube surface.

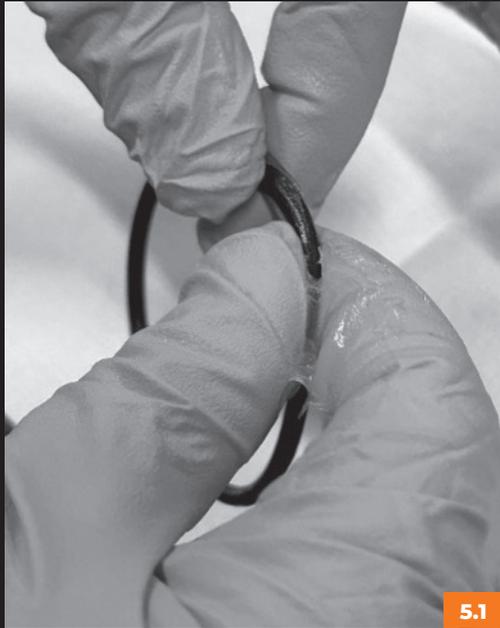
NOTE: Be sure to sand the full width in the direction shown to prevent low spots and valleys which can result in leak pathways.



- 4.3** Apply a small amount of lubricant (P/N 100276) to only a 1/4" area around the outlet end of the tubes.



- 4.4** Install packing cover block to inlet tube end. Carefully slide the graphite seal over the inlet end of tube.

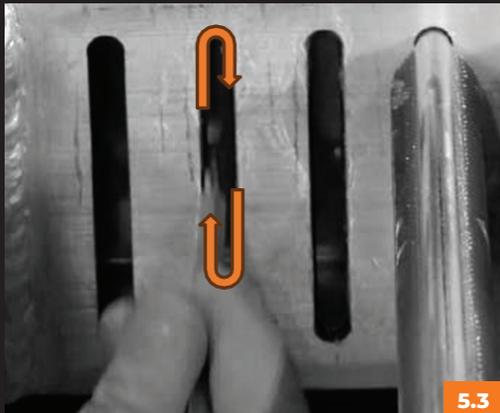


5 SEAL INSTALLATION

- 5.1** Apply lubricant (#100276) to seals ensuring that the entire seal is covered with lubricant but not too excessive.

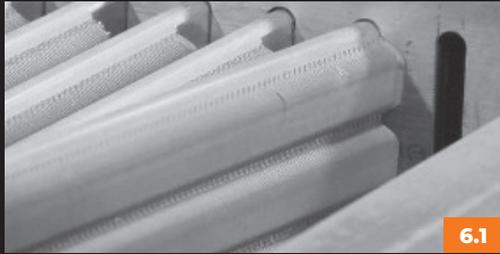


- 5.2** On the outlet end of tank use the flat hooked end of the O-Ring tool to pull the seal into an oval shape and insert one end of the seal into the seal groove. With your finger, push the opposite end of the seal into the groove while controlling the opposite end with the flat end of the O-Ring tool.



- 5.3** Use the back end of the O-Ring tool to press the seal firmly into the groove. To avoid pinching the seal between the tube and the groove, a small amount of lubricant may be needed to assist the seal in resting on the long side of the groove.

NOTE: Use the O-Ring tool to remove any excess lubricant and to ensure that the seal is completely seated in grooves in order for the tubes to be properly installed.



6 TUBE INSTALLATION

- 6.1** Push the outlet end of the tube into the outlet header plate seal (the tank marked earlier in 2.2). Minimize the angle and do not force the tube. Be careful not to scratch or damage the tube hole or tube end.

NOTE: The gilling direction on print and tilt the tube into the core and center



- 6.2** Carefully insert the graphite seal / packing cover block end of tube into the header plate(inlet end)



- 6.3** Apply high temp thread locker (#122054) on the 1/4 / 20, GR8, dip spin bolts, inserting the tapped tube when tightening the cover block bolts. Alternate between the two bolts to prevent the packing cover from binding. Torque the packing cover to the header plate (Front and Back) to 8ft-lbs (10.85 NM) uniformly.



- 6.4** Apply anti seize (#118555) to threads of 5/16" shoulder screws and install the retainer bar assembly on the outlet tank by bolting the front and back sections together using retainer bolts, washers, and O-rings.

NOTE: The threaded section goes on the back and the bolt section on the front.



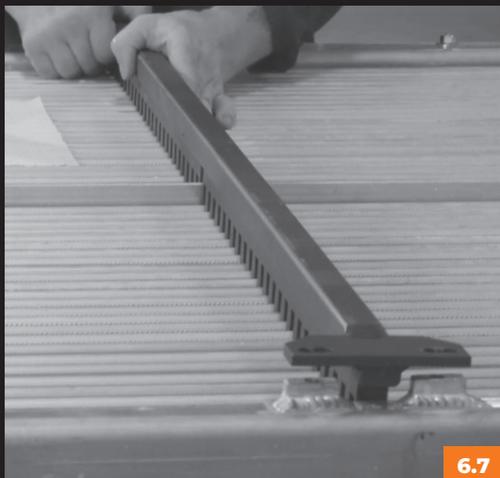
TUBE INSTALLATION



- 6.5** Use a 3/16" (4.76mm) Allen wrench to tighten 5/16" shoulder screws to 45 INCH-lb (5.08NM) of torque.



- 6.6** After all tube and seals are installed, use a light and an inspection mirror to check each seal making sure none protrude into the tank.



- 6.7** Re-install support bars if equipped. Make sure the support material is not touching the tubes in the valleys. There should be a nominal 1/8" (+/- 1/16") gap between the support valley and the round part of the tube.

WORLD HEADQUARTERS / USA

L&M RADIATOR, INC.
1414 EAST 37TH STREET
HIBBING, MINNESOTA 55746 U.S.A.

TELEPHONE: 218.263.8993
TOLL FREE: 1.800.346.3500
FAX: 218.263.8234

WEB: mesabi.com
EMAIL: cool@mesabi.com

MEXICO

L Y M DE MEXICO S.A. DE C.V.
CALLE DE LA PLATA Y LOS NOGALES
PARQUE INDUSTRIAL
HERMOSILLO, SONORA, MEXICO

TELEPHONE: 011.52.662.251.0480
FAX: 011.52.662.251.0638

EMAIL: ventas@lym.com.mx

CHILE

L&M INDUSTRIAL RADIATOR
SUDAMERICA LTDA.
AVENIDA ANTONIO RENDIC 6930,
ANTOFAGASTA- CHILE

TELEPHONE: +56 55 2 893231

EMAIL: ventas@mesabi.com

AUSTRALIA

L&M RADIATOR PTY.LTD.
245 STAR STREET
WELSHPOOL, WESTERN AUSTRALIA 6016

TELEPHONE: 011-61-8 92304400
FAX: 011-61-8 92304400

EMAIL: cool@mesabi.com.au



L&M QUALITY POLICY

The Quality Policy of L&M Radiator is to produce a quality engineered, quality manufactured product through continuous improvement that we deliver to the customer's satisfaction.

CSC™, ITS™, MESABI®, and RTTS® are registered trademarks of L&M Radiator, Inc.