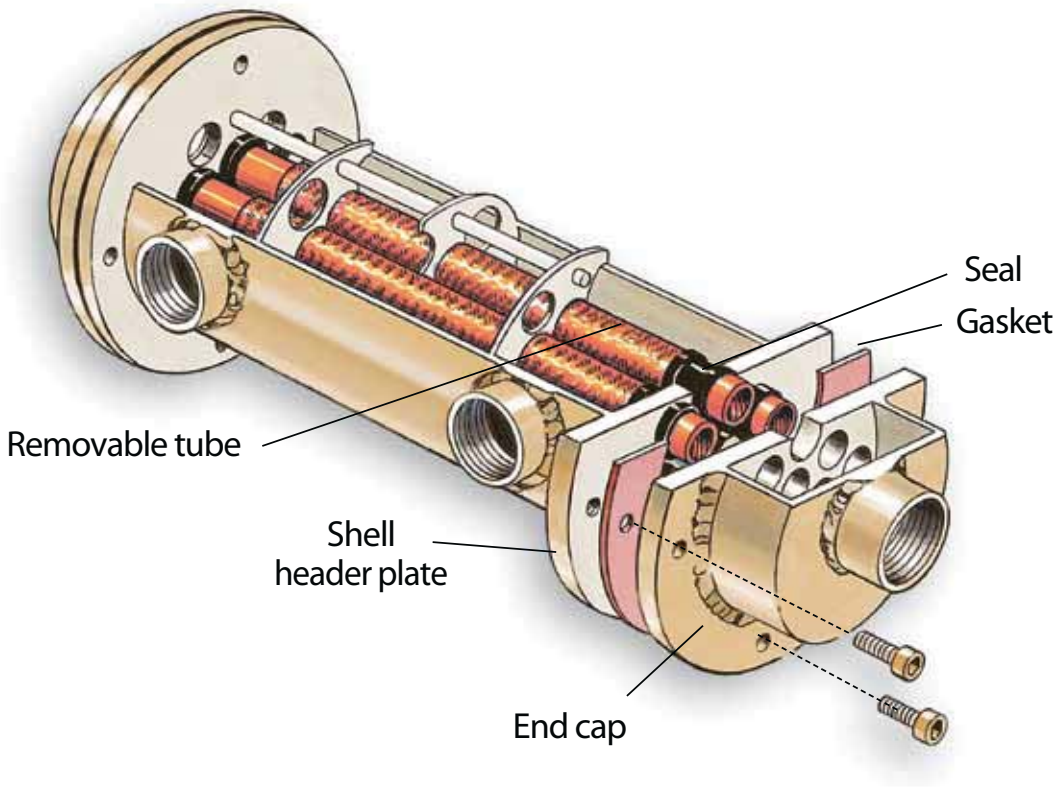
Service Instructions

RTTS®
Tube & Shell Coolers

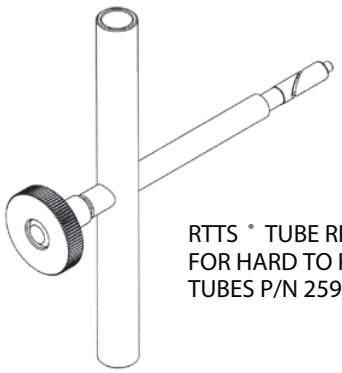


Applicable to Tube and Shell Coolers:
235212,243830 and 249984

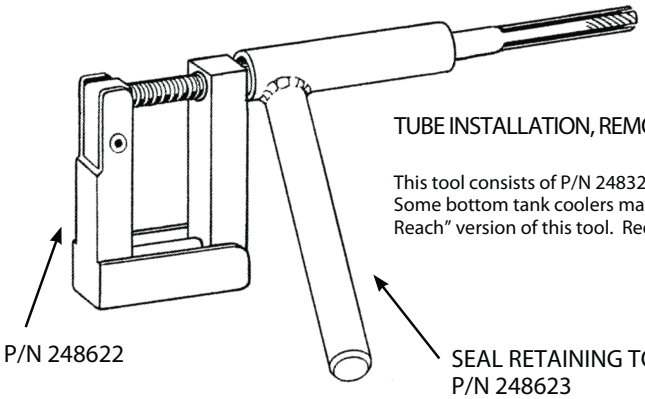
RTTS® Tube & Shell Coolers – Standard Parts & Tool List

TOOL LIST

DESCRIPTION	PART NO.
RTTS® SEAL REAM TOOL (used to drill out seals with the tubes still in place)	259071
RTTS® INTERNAL TUBE CLEANING KIT (NOTE: Kit consists of clean-out rods, brushes, and cleaning instructions)	259072
HEADER PLATE HOLE CLEANING BRUSH	259069
SEAL LUBRICATING BRUSH	259074
SEAL LUBE	252933



RTTS ® TUBE REMOVAL TOOL FOR HARD TO REMOVE TUBES P/N 259075

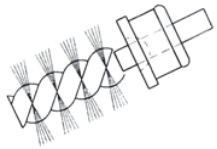


P/N 248622

TUBE INSTALLATION, REMOVAL AND SEAL

This tool consists of P/N 248322 and P/N 248623. Note: Some bottom tank coolers may require the "Extended Reach" version of this tool. Request P/N 259077.

SEAL RETAINING TOOL P/N 248623

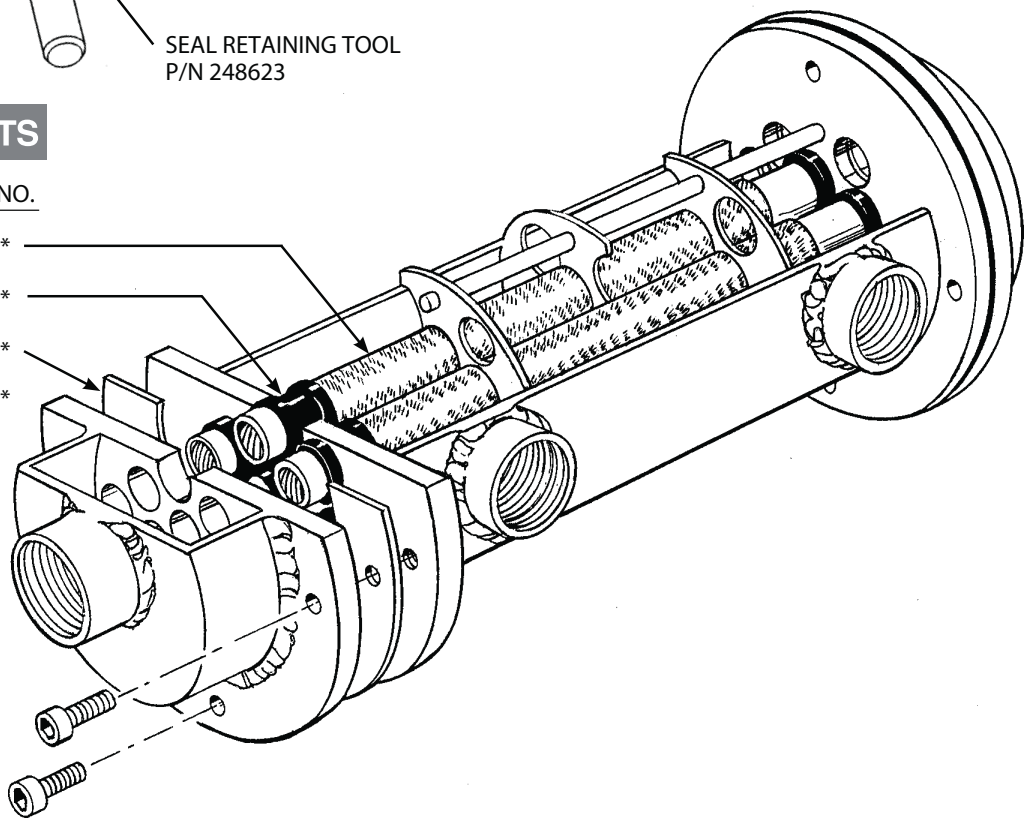


HEADER PLATE HOLE CLEANING BRUSH P/N 259069

STANDARD PARTS

DESCRIPTION	PART NO.
COOLING TUBE	*
SEAL	*
GASKETS	*
FRAME PARTS	*

* Consult the parts page for your cooler for part number.



RTTS Tube & Shell Coolers - Tube Removal & Replacement

Tube Removal

1. For ease of removal, disconnect all plumbing to cooler (or remove cooler from radiator bottom tank, if applicable) and position cooler horizontally on a flat surface.
2. Although most of our units have notches to clearly identify the proper end cap location, if they do not, then mark the end cap and shell for proper alignment on reinstallation.
3. To access the cooler tubes, remove the end cap and retainer plate from each end of the RTTS® Cooler. In many cases, the retainer plate is integral to the end cap (see Fig. 1).

   NOTE: The RTTS® assembly has the letters "L" and "S" stamped on opposite ends of the shell. The "L" designates the end of the cooler that the long unfinned portion of the tube is located. The "S" designates the end of the cooler that the short unfinned portion of the tube is located (see Fig. 1).
4. Insert the installation and removal tool P/N 248622 into a tube from the long (L) side. Make sure that the tool's shoulder contacts the tube. Grip the tube by squeezing the tool's handles together. Using a twisting motion, pull the tube until the short (S) end of the tube (opposite end) is pulled completely out of its seal (see Fig. 2). Repeat for each tube.

   CAUTION: While pulling the tubes, take care to avoid pulling the short end seals into the shell. If a seal is inadvertently pulled into the shell, it MUST be retrieved.

   Hard to remove tubes: If you find tubes hard to remove, use L&M Tube Removal Tool (P/N 259075) shown on page 2. To operate tool, loosen knob, insert the tool, tighten knob, then pull the tube out using a twisting action.
5. Remove all of the seals from the short end header sheet.
6. From the short end, grip the tube with the tube tool. With a twisting motion, pull the tube until the entire tube is removed from the shell. Repeat for each tube (see Fig. 3).
7. Remove all of the seals from the long end header sheet.

WARNING: Do not remove or loosen the bolt located at the center of each header plate. Contact factory for instructions if necessary.

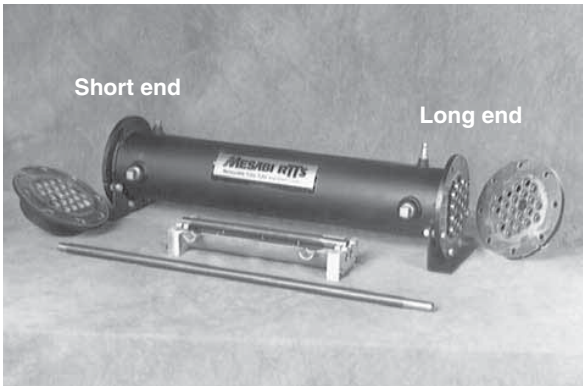


Fig. 1

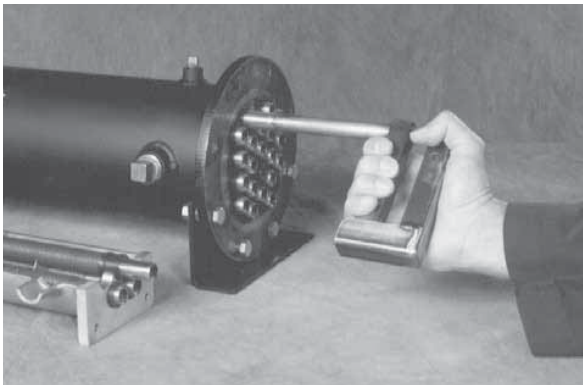


Fig. 2 Long end

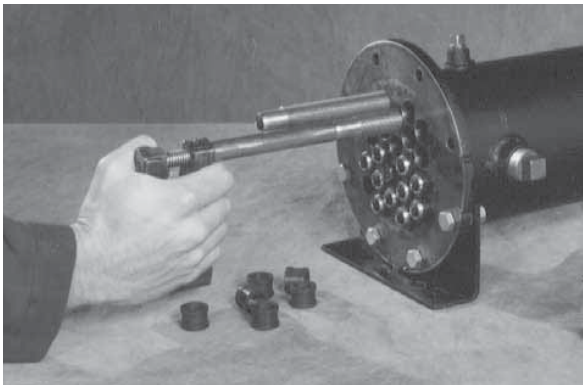


Fig. 3 Short end

Cleaning

Cleaning

1. Clean both header plates and all holes. Try to see that no debris falls into the shell.
2. Stand the cooler vertically and flush with a high pressure hot water washer. Rinse out all con taminants.
3. Dry the inside of the cooler. Use a hot air blower, if available.
4. Inspect the tube ends for burrs. (Remove any burrs using a fine emery cloth.) Clean the machined ends, finning, and inside surface of each tube.

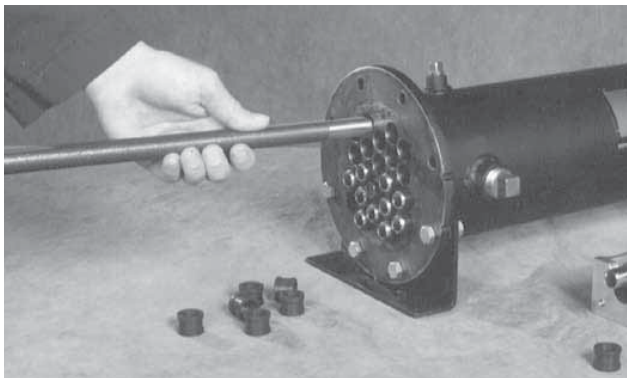


Fig. 4 Short end

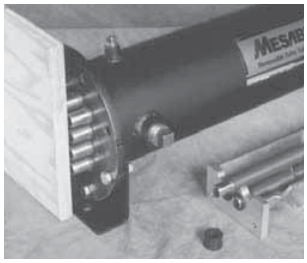


Fig. 5A Short end

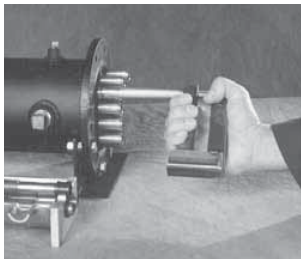


Fig. 5B Long end

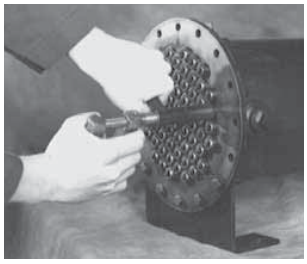
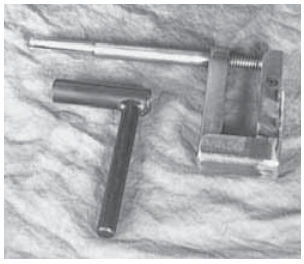


Fig. 6 Short end



Tools required

Tube and Seal Installation

1. Wipe out the long (L) end header plate holes with a small amount of cleaning solvent and inspect each for damage.
2. Install new seals into the long end header plate holes. (Do not use lubricant to install seals.) Make sure the seal's outer lip is pushed flush to the header plate.
3. Prior to tube installation, lube the inner surface of each long end seal, and both tube ends with lube P/N 252933 and lube brush P/N 259074.
4. By hand, push the long end of each tube through the short (S) end header plate until the tube just contacts the long end seal. Repeat for each tube (see Fig. 4).
5. Place a plastic or wood backstop against the short tube ends to keep them from being pushed out during the next step. A metal backstop could cause damage to the tube ends (see Fig. 5A).
6. With a slight twisting motion, push the tube tool through a long end seal until the tool's shoulder contacts the tube. Grip the tube with the tool and with a twisting motion, pull the tube through the long end seal until the short end of the tube clears the short end hole. Make sure the seal lip remains flush to the plate. Repeat for each tube (see Fig. 5B).
7. Remove the backstop.
8. Wipe clean all short end header plate holes, using the same method as in step 1.
9. Install new seals into the short header plate holes. (Do not use lubricant to install seals.) Make sure the seal's outer lip is pushed flush to the header plate.
10. Lube the inner surface of each short end with lube P/N 252933 and lube brush P/N 259074.
11. Insert the installation and removal tool through the seal retaining tool P/N 248623. With a slight twisting motion, push the tube tool through a short end seal until the tool's shoulder contacts the tube. Holding the seal retaining tool firmly against the top of the seal, grip the tube with the tool and with a slight twisting motion, pull the tube through the short end seal until about 1/4" of the tube end sticks outside of the seal. Repeat for each tube (see Fig. 6).

Inspection, Testing and Reinstallation

1. Inspect the tube ends for seal fragments. If you find any chipped seal material on a tube, that tube must be reinstalled with new seals.
2. Inspect each seal to ensure that they are all seated tightly against the header sheet. If a space greater than 1/32" exists between the header sheet and the outer lip of a seal, that seal must be removed, inspected, and reinstalled (see Fig. 7).

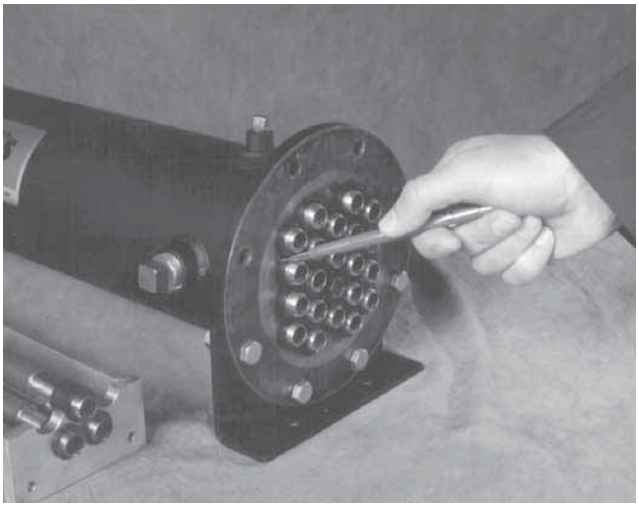


Fig. 7

Fig. 8

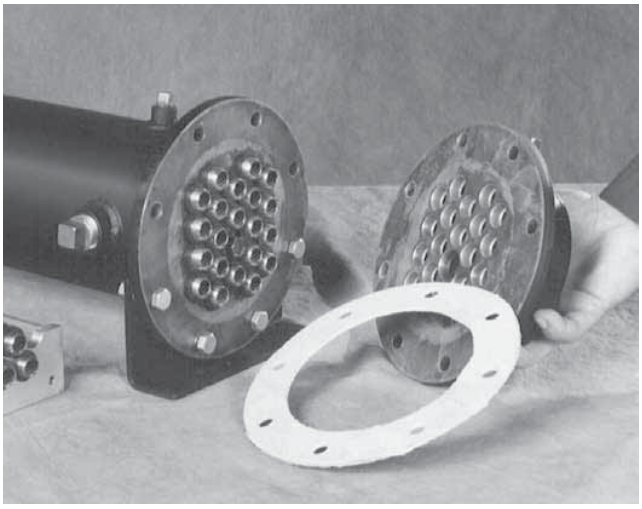


Fig. 9

3. To test for leaks around the seals, apply 50 PSI to the oil side fittings for 15 minutes. Submerge the RTTS® cooler in water (or spray ends with soapy water) and inspect for bubbles (leaks) (see Fig. 8).
4. Reinstall the retainer plates and/or end caps. Use the proper L&M gasket to avoid damage to the seals.

IMPORTANT: Gaskets are made from 1/8" compressed thickness. Use Ameraflex 1521-C or equivalent material. Damage will occur if proper thickness materials are not used.

Apply a small amount of silicone rubber to each side of the gasket. Make sure that notches in tank and shell are properly aligned (see Fig. 9).

Final Pressure Test

Final Pressure Test – out of the water with bleed lines

1. Add a bleed line to one of the shell side ports and put the end of the tube in a can of water (see Fig. 10).
2. Pressure the tube side (tank side) to 50 PSI (345 kPa) and hold for 15 minutes (see Fig. 10). Significant air bubbles coming from the bleed line would normally indicate a seal leak. Tube leaks should have been found during the shell side underwater testing.
3. Following successful tube side testing, install the bleed line in one of the end tanks. (see Fig. 11).
4. Pressurize the shell side to 150 PSI (1034 kPa) for 15 minutes. There should be no significant bubbling.

Fig. 10

RTTS ® bottom tanks

1. Test the tube side per normal bolt-on tank pressure test procedure for the specific tank P/N being tested.
2. Cycle test four cycles as outlined above at the pressure required for the specific P/N tank. Contact Allied Systems Service Department at 503-625-2560 for instruction.

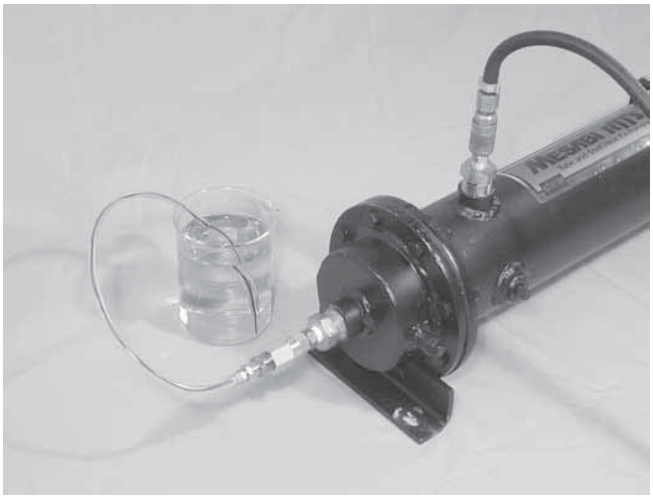


Fig. 11