MODINE

ShopTalk

VOLUME 4, NO. 9

FEBRUARY, 1992

TECHTOPICS

Let The Force Be With You In Tank Replacement Work

Modine is pleased to welcome back Larry LePrevost, national sales manager for the Johnson Manufacturing Company, to address another facet of plastic tank repair.

The Johnson organization produces a wide range of products for radiator shop use, and Larry is a frequent speaker at industry seminars nationwide. The

Larry LePrevost

appearance of his observations on these pages does not necessarily imply Modine's endorsement of same. Questions relative to subject matter can be directed to Larry at the Johnson Manufacturing Company, 114 Lost Grove Road, Princeton, Iowa 52768. Or, telephone 319-289-5123.

In the December issue, we discussed the basic procedures for opening and closing tabs for all PTRs (plastic tank radiators). We also touched on differences between PTRs with tabs (including crimping strips) and those that utilize other closure methods, such as the ribbon style header and Modine's Ad-Tech style latching strips.

When it comes to assembling plastic tanks, however, one basic principle applies to all types: *you must properly compress the gasket*. If you don't, you run the risk of having to do the job over. Several years ago, I read a book entitled, *"If You Haven't Got The Time To Do It Right, When Will You Find The Time To Do It Over?"* This catchy, though somewhat lengthy title implies that it's worth taking extra time to do things right the first time. Most people would agree to that, however, there are some tasks, (assembling PTRs is one of them) that can be accomplished in less time the first time, if done correctly. In tank assembly, a good PTR fixture is essential, along with adherence to several basic principles. PTR fixtures may either be of the manual type (screw clamps) or pneumatic type (air-operated cylinders).

Apply Force First

Before closing tabs, setting dimples or engaging latching strips, force must be applied on each tank, creating a seal by compressing the gasket. This seal must be continuous, around the full perimeter of the tank, and should not be disturbed until closure of all the tabs or strips is accomplished. Never try to create a seal as you crimp. Too much crimping force, even in one small spot, can damage the tank or header trough.

Even when working with heavy-duty radiators, you must be aware of the misapplication of force. It is not a good practice to compress one tank end at a time, just because you don't have enough screw-clamps. This can warp the header, making it even more difficult to create a lasting seal.

Gaining Uniformity

Creating a uniform seal depends on two factors: 1) the proper number and placement of screw-clamps, and 2) the application of equal force to all screw-clamps. You can easily tell how many screw-clamps to use (two, three, four or five) based on the length of the gasket,

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CHART 1

Recommended
Pounds of Force to uniformly compress 12 to 16 inches of Gasket Material using one Screw/Clamp

Type of Gasket, Application	Pounds of Force
Round Automotive Gaskets	135
Flat Automotive Gaskets	195
Heavy-Duty PTR Gaskets	395

CHART 2

Maximum
Pounds of Force created by one Pneumatic Cylinder

I.D. of each Air Cylinder	Shop Air Pressure, PSI 90	120	150
1-1/16 inches	71	94	133
* 1-1/2 inches	159	212	265
1-3/4 inches	216	288	360

* most common size for PTR fixtures

Use Proper Application of Force

(continued from page 1)

or tank. Position screw-clamps two to three inches from each end of the tank, and six to eight inches apart between the ends. Each one is capable of compressing 12 to 16 inches of gasket material. Screw-clamps with acme threads are easy to turn and are capable of delivering the full range of force needed to properly compress all types of gaskets. Remember, if you use fewer clamps than are needed (and leave too much space between clamps), the gasket compression will not be uniform, no matter how much force is applied.

The amount of force recommended for each screw-clamp is based on just one factor: the type of gasket you are compressing. It helps to have screw-clamps that are calibrated to show the correct level of force for each type of gasket.

With few exceptions, PTR gaskets fall into three basic categories: 1) round automotive, 2) flat automotive, and 3) heavy-duty. Generally, the round automotive type are the most user-friendly. They compress easily and they can be shortened or spliced. Flat gaskets require more force to compress, and heavy-duty gaskets are in a league by themselves. They require much more force because of their thickness and also because they are used in more rigorous applications (see Chart 1).

More About "Force"

We've used the word "force" to describe the pounds (think of the pounds as actual weight) placed on each screw-clamp. We haven't used the word "pressure" because it is often associated with shop air pressure or PSI (pounds per square inch), which is a term used by builders of pneumatic fixtures.

How does actual pounds of force compare to PSI? To figure the maximum pounds of force created by a typical pneumatic (air) cylinder, use this formula: πR^2 **x PSI = Force.** Example: Divide the inside diameter of the air cylinder by two, which gives you the radius. Square the radius (multiply it by itself) then multiply this total by 3.1416 to determine the surface area in square inches. Multiply the square inches x PSI to determine the maximum pounds of force each cylinder can deliver, based on your shop's air pressure (see Chart 2). Note: Air pressure should be measured at the fixture, rather than at the source.

Clamp Over Ribs

There's another important factor to consider when positioning pneumatic cylinders and/or certain manual clamps onto plastic tanks. Those that use small clamping pads (some are about the diameter of a quarter) should always be placed directly over the nearest reinforcing rib. These are the points on a tank which will transfer the greatest amount of downward force to compress the gasket underneath. They also offer the greatest resistance to distortion or damage when sudden force is applied. In well-made tanks, the potential for distortion/damage is greatly reduced. However, thin tanks which are not reinforced distort quite easily.

Manual screw-clamps which are utilized with the TankMate™ (see photo this page) offer a saddle-like clamping pad that transfers more of the clamping force to the gasket through the side walls of the tank. Spreading force over a larger area, on or close to the shoulders of the tank, minimizes distortion and reduces the likelihood that you will crack the tank.

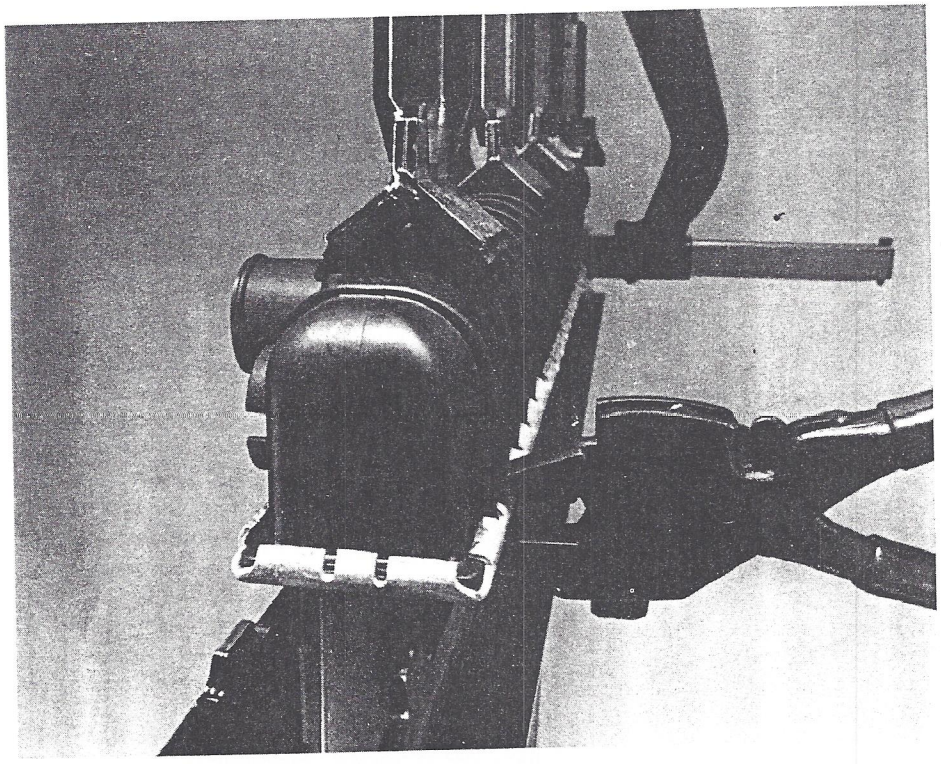
Mastering The Basics

After absorbing the basics, you may no longer need to actually measure a tank to determine how many clamps to use, or to calculate the actual pounds of force. In time, as many readers will attest, it will become second nature to you. You will be able to size up every job just by visual inspection of the tank and gasket.

With the things we've covered, you may have an idea as to the type of fixture you need. Even if you already own one, you may want to consider upgrading it by adding one or more pneumatic cylinders or screw-clamps.

In the next issue, we'll take a closer look at gaskets, headers and tanks. Meanwhile, I hope many of you readers can attend the NARSA National Automotive Radiator Convention in Orlando, Florida. That's where I'll be.

Larry LePrevost



The proper positioning of screw-clamps along the top of the tank, as shown here, assures that uniform pressure is being applied.