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## “On the Waterfront”

by Jim Reed

This month's article is a continuation of the March **Bull Sheet** report from the Keller-Bleisner study on “Designing, Operating, and Maintaining Piping Systems Using PVC Fittings” on installation considerations.



### THREADED FITTINGS

With threaded steel piping, the only problem pipe fitters needed to worry about was to make sure the threaded fitting didn't leak. To make sure, the joint was tightened a little more. With threaded PVC fittings, that technique can lead to fitting failure. The biggest single cause of failure in female threaded PVC fittings is over-tightening. This is easy to do because PVC threads are much smoother than the threads in iron pipe fittings and, with today's lubricating thread sealants, it is very easy to over-tighten a threaded PVC fitting. In addition, the PVC will deform more easily, allowing deeper thread makeup with less torque. In some cases, it is even possible to over-tighten the fittings by hand.

Arriving at a guideline for assembling threaded PVC fitting joints is difficult. The amount of torque required to assemble two fittings will vary with the thread taper and tolerance, the type of sealant used, the temperature, the size of the fitting, etc. The number of exposed threads is even less precise as a guide to proper assembly. The method that seems to work best is to first tighten the fittings “finger tight” and then add another 1 to 2 turns. Although “finger tight” is qualitative, it is a fair measure of the required initial tightness, and will rarely result in over-tightened fittings.

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Tightening a fitting more than 2 turns past “finger tight” can exceed the design strength of the fitting.

Much controversy exists over the type of thread sealant to use. Some manufacturers recommend a liquid or paste sealant and some recommend Teflon tape. As long as care is taken to follow manufacturers' recommendations, either can be used successfully. However, designers and installers should be aware of a few precautions for each type of sealant.

With paste or liquid thread sealants, extreme care must be used in selecting a sealant which is suitable for PVC pipe. Standard pipe dope and even some of the Teflon paste compounds are not compatible with PVC, so be certain that the sealant used has been tested and approved for PVC fittings. For fittings that will be subjected to movement, such as swing joint risers, the paste or liquid sealant must be non-setting. The higher viscosity sealants that do not dry seem to perform better in applications requiring movement.

(continued on page 6)

("On the Waterfront" continued)

With Teflon tape, application is the primary precaution because the thickness of the tape varies widely among manufacturers. With very thin tape, multiple wraps may be required to achieve leak-free joints. However, when applying multiple wraps, the risk of thick and thin areas is increased. Such non-uniform application can cause additional stresses on the fittings. Uneven application can be avoided by using a tape that is at least as wide as the width of the threaded area on the fitting. Multiple wraps are made directly on top of the previous wrap without spiraling, creating a uniform thickness. Sufficient wraps should be used to insure that the threads do not "gall" or "lock-up" on make-up. A few test make-ups should be made as a trial. After make-up, the parts should be adjusted until no evidence is seen of broken tape in the threads.

An additional precaution is necessary when handling threaded fittings. It is a fairly common practice to preassemble sprinkler swing joints as assemblies and stock-pile them for later installation. If this is done, the assemblies should be kept in a shaded, ventilated storage area until installation. Excessive heat on the assembled fittings can cause the PVC to relax and loosen the fitting. Leakage may result, or if the joints are re-tightened, the fittings could become over-stressed when cooled.

**Next Month: System Maintenance Requirements**

## *From the Workbench*

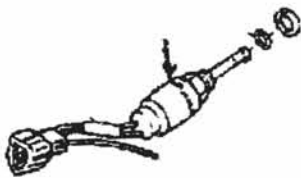
Sponsored by Chicagoland Golf Course Mechanics Assn.

Written by Chuck Totten, CGMA Vice President

**Topic:** Cushman 327 liquid cooled carburetor.

**Problem:** Main fuel solenoid valve (non California) before serial #1S55185 Cushman part #889093.

Fuel coagulation after long periods of storage causes the plunger inside of the valve to stick. The engine will not start typical in GA 60's. By removing the valve, cutting 1/16 of an inch behind the wrench journal, you can remove the plunger from the center of the valve. Seal the end of the valve with epoxy putty. Making sure the 'O' ring is in place and in good shape, the fuel inlet holes on the valve stem are open and clear of debris. Replace the valve. You can then finish by hooking the single wire back up to the throttle solenoid, (Cushman part #83490) and capping the remaining two wires.



**Solution:** All carburetors should be drained of fuel before long periods of storage. This will help for smoother storage startups. \*Not officially recognized by manufacturer.\*

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