Marelon Series 93 Integrated Thru Hull Valve Failure.

On my 1994 MK I Catalina 36 one of the Marlon Series 93 Integrated thu hull valves was installed under the galley sink as a sink drain valve. Access to operate the valve requires that a vertical cabinet door be opened to access the valve which doses provide some degree of difficulty to operate the valve handle.

Several years ago in 2012, I decided to replace that particular ¾ inch Marelon Integrated valve after learning on several sailboat owner’s Forum websites about valve handle breakage if the handle is operated:

* other than “straight back” i.e., outside of their arc of activation applying any significant side force or
* the handle is forced in the wrong direction against the stop

Either could result in a broken Handle rendering the valve inoperable. At that time Forespar claims were that “improvements’ had been made. Responses from Forespar on the forum websites indicated that the “new” Marelon “valve/handle system on todays valves are far stronger than those made a few years ago” so that failures were now at “one valve out of every 1500 shipped “. As the sink drain thru hull was 18 years old, was is in a tight area to access and operate the valve along with this assurance I was comfortable in ordering and installing the new Marelon ¾ “ valve # 932133 valve in 2012.

Now the event with Marelon valve failure. On 8-22-15, when readying to exit a well at a local Municipal Marina, I had a sink drain thru hull valve fail when attempting to close it. Specifically the valve handle “separated” from the valve body resulting in a high rate of flow (gushing) of lake water in the area of the thru hull valve into the boat interior. *The valve is a ¾ inch Forespar Marelon* Integrated Thru Hull Valve, Series 93, Part No. 932133: that I had installed three years earlier.

I initially was able to slow down the flow with my thumb. I had a container of a “playdough” type of product called “Stay A Float“. Due to the water pressure it at best slowed the leak a bit with water still filling the bilge every roughly two minutes. The problem was that the water would find a new leak path thru the material and would continue the leak at another area. We soon called Boat US for assistance.

The Boat US Tow Service arrived thereafter,and towed us over to a hoist adjacent to my home well.

I had arranged to have the Surveyor meet me at the boatWe were both dismayed to see that there was essentially nothing apparent ( other than friction/press fit ) that would keep the valve handle from separating from valve body. There is certainly no plug that would have worked to ward off the leak at the handle to valve location.

I disassembled the failed Forespar Series 93 valve and am not surprised as to why the failure occurred. Refer to the attached photos showing the valve with handle attached and handle removed. Per the photo of the handle front you can see a Philips head screw. The next photo shows that the screw is threaded into an “acorn nut “. That photo also shows an “eight point female spline”. The next photo shows an “eight point male spline” on the end of the stem that receives the female spline of the handle. The next photo shows that the ball valve and stem is a one piece molded part with the end of the stem which is actually the male splined end. Rotation of the handle rotates the ball valve open and closed via the interlocking splines.

See the photo that show the splines along with the acorn nut threaded to the screw on the handle. On the valve body see photo of the valve w/o handle in the area between the splines that shows a “cavity” that appears to be is intended to receive and retain the acorn nut as an insert (as a molded in place press fit in the cavity ). This acorn nut is to act as an insert for the screw on the handle to keep the handle from separating from the valve. Outside of the screw in itself failing (unlikely) the “weakest link “ clearly is the amount of retention of that acorn nut in the cavity of the splined end of the valve stem. Note that the photos shows that acorn nut is still on the screw thread clearly indicating that there was ( contrary to intended design) no retention of the acorn nut into the valve stem end. That acorn nut should not be attached to the screw, it should be in molded in place at the end of the valve stem. Essentially for my valve that failed, there was nothing to hold that acorn nut in the valve body cavity and thus to hold the handle in place. When that handle “separated“ from the valve stem , lake water poured in jeopardizing my sailboat.

Why the inadequate acorn nut retention ? Perhaps a production run molding issue? Was there a pull test in place to test proper embedment of the acorn nut ?

Bottom line is I have replaced the majority of Marelon valves with Bronze Ball Valves