



Distributor Diaphragm Repair

Materials Needed :

- Liquid Electrical Tape, Black – 4ounce (80ML) StarBrite brand (Home Depot, around \$7.00)
- Electronic Component Spray Cleaner, Inert (or a camera lens dust removal pressurized spray)
- GoofOff cleaner – to clean up the distributor housing
- Acetone – for liquid tape cleanup.

Tools:

- Vacuum Pump, with vinyl or rubber hose
- Eye Dropper - to apply liquid tape
- Tin can - for eye dropper and clean up
- Wrench - To install and remove diaphragm to hose adapters
- Adapter - Diaphragm to threaded tube - 359546-S8
- Gasket - For adapter
- Spring - For adapter
- Stop - For adapter

Not Shown :

- Rags
- Cotton Swabs - for clean up
- Steel Wool
- Razor Blade - for clean up
- Small Wire Brush
- X-Acto Knife - for clean up
- A Small Jar , 2 ounce (40ML) with lid for clean up

With the price of a NOS MotorcraftDD-190, Ford C5AZ-12370-A, Distributor Diaphragm, bouncing around \$100, there had to be a way to repair the most common reason for factory original diaphragm failure, the rubber diaphragm leaking. A friend recommended using Liquid Electrical Tape to seal leaks, even large tears. Here's what I came up with.

Foreword:

Clean up the diaphragm housing before trying to seal the leaks. GoofOff, steel wool and the wire brush should work. I would not use a wire wheel as it may remove too much of the plating. When performing a vacuum test, install the spring and stop to restrict the diaphragm's movement under a vacuum. Two different adapters are shown, the threaded tube type was used on 64-66 diaphragms, the one with the hose adapter was used from 67 on. Use what your diaphragm has. Don't forget the gasket. To test your vacuum gauge, place your finger over the vinyl hose end. You should get and maintain a vacuum.

Possible leaks may be in the rubber at the crimped edge of the housing, in the actual rubber or at the round plate where the control attaches. Leaks may also occur at the rivet that holds the inner and outer discs. Repair is best attempted when the temperature is above 72F (22C). This repair technique was designed to address the original factory type diaphragm that could be adjusted via springs, spaces and washers to conform to a specific distributor advance curve. It may work on the replacement non-adjustable DD-190 diaphragms.

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Step #1

Clean the outside of the diaphragm housing. Enough said.

Step #2

Clean out the inside of the diaphragm from the distributor side with the spray cleaner. No reason to seal dirt and dust inside.

Step #3

Test the diaphragm. Install spring and stop. You should have a steady vacuum around 7-9psi. That's for testing only. Your actual engine will be different. The ones I have leaked slowly, about 15 to 25 seconds to reach zero. Remove the adapter, spring and stop when done.

Step #4

Pour some acetone in the small jar of clean up. Put the lid on both containers. **Acetone is very volatile.**

Use the eye dropper to insert several drops of the liquid tape in the distributor end of the diaphragm. The control arm will be in the way. It's a very tight area and you will be sloppy. Tilt the diaphragm to let the liquid flow to the outer edges.

Start at one end of the slot, drip liquid on both sides— tilt slowly, turn the diaphragm around and dip some more liquid in the other end of the slot – tilt slowly. Watch what you're doing to guess the flow rate of the liquid.

Add some more liquid to the rubber around the round control arm plate, then tilt to let the liquid flow around the plate. When this is completed, set the diaphragm down on the vacuum end so the control arm is straight up. IMMEDIATELY clean the eye dropper with the acetone if you want to use the eye dropper again. Use the small jar with the acetone and a cotton swab.

Liquid tape sets fast. Clean up excess liquid on the arm and in the slot. Close the acetone container lid. Let the diaphragm sit for a couple of hours. Acetone “may” be used as a liquid tape thinner.

Step #5

After a couple of hours, test the diaphragm again. You should have a steady vacuum around 7-9psi. My first try worked. Twenty four hours later it still held a vacuum.

Step #6

After the diaphragm repairs have dried, you may be able to clean up your sloppy application technique with a razor blade or X-Acto knife. The liquid tape sticks to metal, but can be scraped away.

In Conclusion

The question is how long will this repair last?

That I don't know. It depends on the size, location of the leak and repair technique.

However, consider this: Liquid Electrical Tape is flexible; it sticks to rubber, vinyl and metal; it is waterproof; it dries fast and it will not stick to anything when cured.

It may be possible to apply a slight amount of vacuum to draw liquid tape "thru" small pin holes in the rubber. I used a similar process to draw epoxy into electronic component housings.

Supporting Pictures



The four test diaphragms. For reference, I marked the control arms with a felt tip: all permanent markings are on the distributor side

- A "0" for the one with a tear (ID as no 1); permanent marked – "12378", "1"

- A bar across the arm for the dirty housing (ID as no 2); permanent marked – "12378", "6"

- Two parallel bars for the first test subject (ID as no 3); permanent marked "Motorcraft", "4"

- A "X" for the fourth (ID as no 4); permanent marked "12378", "Motorcraft", "7", "MC"

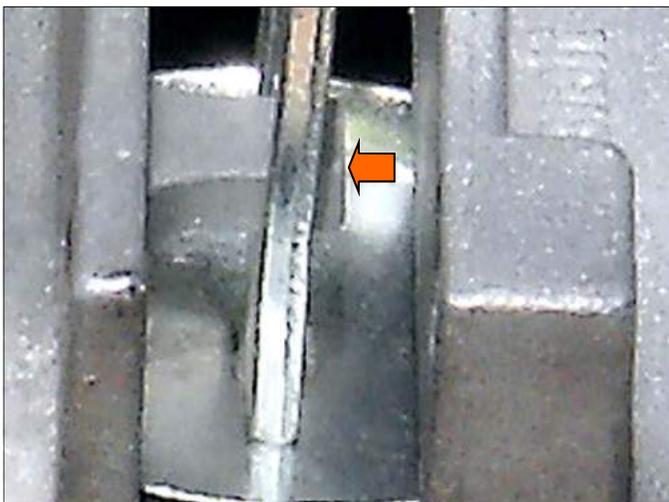
Note the different thicknesses of the lower mounting "bars" to the distributor housing.

Side view of the test subjects. Same number order.



Close up of the tear of No 1.

Supporting Pictures



Close up of No 3 diaphragm's control arm. There's a bar from the internal side of the housing that restricts the movement of the control arm.

Close up of how sloppy this process can be. No 3.



Vacuum testing and maintained on No 3.

Acknowledgement

The guy that came up with this has been in Silicon Valley working with Hi-Tech vacuum devices. He was involved with projects at IBM and the Stanford Linear Accelerator in Palo Alto, CA.

What prompted him to develop a fix for distributor diaphragms was a bad diaphragm on his 71 Torino, 351C. That would be a dual vacuum type which is an indication of more potential fixes. He told me the car is still on the road eight or so years after his fix. He also has repaired several other Ford diaphragms since then and was nice enough to share his technique with me..

I owe him a beer.