White Paper
Permanent Gas Tank Repair

There are a number of challenges when you are trying to repair a damaged gas tank. Plastic gas tanks, seventy-five percent of the US market, greatly increases the degree of difficulty in the repair. Why? Plastic gas tanks are made from either polypropylene or HDPE, both polymers. Adhesives, including epoxies, do not readily bond to polymers

The second major issue in gas tank repair is the thirty percent of US vehicles which use premium gas. In scientific terms, premium gas and diesel are called aromatic fuels. Aromatic fuels dissolve most epoxies very quickly. If you use premium fuels, don't even attempt to use an epoxy to repair your damaged tank.

One last issue is that epoxy repairs are rigid. Rigidity is a problem, over time a major problem. Any effective repair methodology for gas tanks must have a little flexibility. Why: Gas tanks expand and contract as they are filled/emptied and with changes in temperature. Vibration and/or a bumpy ride can also impact a rigid epoxy fix.

There is a cumulative effect, a tipping point if you will, with these issues. When that point is reached, the rigid repair will start is leaking and gas will leak out. A repair system with even minimal flexibility will withstand all or most of these conditions. An effective system will even the cumulative effects of these problems over time.

When you consider all the above issues, any repair methodology to permanently seal gas tanks must:

1. bond to polypropylene, HDPE and any other polymer uses to make gas tanks. (Internationally, there are some nylon gas tanks. Nylon is a polymer.)
2. have excellent resistance to aromatic fuels.
3. be flexible to be able to withstand normal wear and tear.

Beyond these repair specific issues, there are market forces at play, as follows:

- For almost every make and model, replacement gas tanks are, at best, scarce. Often, they are simply not available.
- Like everything else, costs for a replacement gas tank have increased substantially. When you add the labor costs, the invoice to replace many tanks will be over $ 1,000.00.

Let us now introduce you to a 21st century solution to the above problems, the Tech-Patch.

Tech-Patches

Tech-Patches are made using flexible polymer, specifically fluorosilicone (FVMQ). For high stress environments in the automotive, aerospace and aviation industries, fluorosilicone has been the polymer of choice. Why? FVMQ's excellent resistance to weather, salt, sleet, oil, gas, water and most chemicals. As an elastomer, fluorosilicone flexes but also elongates. Changes in the contour of a tank due to weather, load level and/or vibration will not impact FVMQ, even with the cumulative impact of all stresses.

Next challenge? Bonding a polymer Tech-Patch to the polymer gas tanks. Our patented Polymer Bonding Process (Process) will permanently bond any polymer to itself, to any other polymer and to almost any other substrate. When a Tech-Patch is bonded onto a polypropylene or HDPE gas tank with the Process, that patch will not fail under normal conditions.

Since we have all been told for over five decades that nothing will stick to these slick plastics, we know that you will be skeptical of our assertion of a Tech-Patch's permanence. Back in 2016, when we finalized the Process, we had the same skepticism. However, test after test, done by us and scientists and engineers from around the world, has confirmed the effectiveness of the Process.

In layman's terms, the Process always works. Somewhat surprisingly, we found that polymer-to-polymer bonds, comparatively, are equal to the wood-to-wood bonds created by Titebond. Tech-Patches are one of the best examples of the strength, durability and the quality of a poly-to-poly bond.

G Series vs PTFE Tech-Patches

For repairing gas tanks where either regular gas or standard diesel is the only fuel used, our recommendation is the G Series Tech-Patch. Though FVMQ has excellent resistance to these lower octane versions, fluorosilicone only has fair resistance to higher octane gasolines and diesel fuels, aromatic fuels. These premium fuels will dissolve fluorosilicone.

For repairing tanks holding higher end fuels, a better patch was needed. Research revealed that PTFE, Teflon, has excellent resistance to aromatic fuels. Since the Process will bond PTFE to FVMQ easily, we began evaluating the PTFE/fluorosilicone combination.

Checking domestically, we found Teflon coated fiberglass tape was promising, but not the answer. Looking overseas, we found eighteen mil PTFE tape. Eighteen mils provide the needed thickness for the Teflon. to be effective. Once the application issues were worked out, we found PTFE patches successfully sealed holes and cracks in gas tanks that store higher octane gasoline and higher cetane diesel fuels.

Since Tech-Patches are a modern technology, we have had the pleasure of collaborating with customers who have shared their experiences with us. There were, of course, some challenges as we worked through the learning curve. For example, we learned that there could not be, of course, a fold in the patch, but, if the hole or crack was in a corner or other difficult location, a patch could be cut and either abutted or layered. The key is to not have a pathway for the gas to get out.

Plus Patches.

We found that there was one other issue that needed addressed. Often, the outside of a Tech-Patch needed coated for one or both of the following reasons:

- to protect against abrasion
- to restrict the elasticity of the patch.

Working with clients and testing proved that the best time to apply the coating is after the patch is on the tank. When the patches are manufactured, we prepare the outer side of the PTFE so that the exterior can be coated with our SI adhesive. Applied according to the directions, these layers of adhesive produce a coating harder than many metals.

Proven technologies

Both the Polymer Bonding Process and G Series patches are proven technologies. They both have been validated over the last five years. Under normal conditions, neither the Process nor G Series patches fail. We are confident that testing will prove that PTFE patches are equally as good in stopping aromatic fuels from leaking..

Tech-Bond Solutions

381 S. 30th St. Unit L, Heath, OH 43056

877 565 7225 · Fax: 866 411 0032 · sales@tech-bond.net · tbbonding.com