

Tech-Bond and the Polymer Bonding Process

The end of the beginning

Whenever a “Eureka!” moment, the first discovery of a breakthrough technology, occurs, the journey to bring that innovation to market begins. With any new technology, one of the first steps of the journey is to educate the public on the benefits of the new solution. With our now patented Polymer Bonding Process (Process), this journey to gain market acceptance has been substantially more difficult than the norm.

Why? For over five decades we all have been told that you can’t glue Teflon, HDPE, or any of the other slick plastics. Technicians, mechanics, anyone who has attempted to glue a polymer, like silicone rubber, has failed. Different adhesives have made the claim that they could glue polymers. Most have failed miserably.

Bottom line. Innovators and other end users trying to make a repair or develop a polymer-based solution to a long-standing problem has found out that you simply can’t glue polymers. This failure of glues to adhere polymers has caused many entrepreneurial dreams to die.

As we started to introduce the Process into the marketplace, we found the belief that “nothing sticks to Teflon” has been hard wired into the consciousness of Americans. This widely held belief has made reaching our goal much harder. Minds had to be changed to gain acceptance. Having to transform a strongly held belief is a much harder task than just introducing a new product or technology to an unknowing populace.

With over twenty years of experience in the adhesive industry, we knew that gaining acceptance for the Process would be difficult. Knowing that the written word would not change hearts and minds, we started shooting videos immediately. Those YouTube videos drove initial sales.

To further help overcome the prevailing doubt, we offered a money back guarantee on our website, tbbonding.com. That assurance led to a number of phone calls asking, “Would we really give back their money if the Process didn’t work?” Our answer was always, “Yes, we will!”

In over six years, we’ve made one refund. That was from a person who just emailed his request. We sent him a refund. It would be a guess as to what really happened. Our point is that the Process has worked thousands of times for all types of repairs and/or bonding situations. Hence our 4.8 Google rating.

Until now there has not been an adhesive solution that would even glue, let alone bond polymers. With the Process, a client is not gluing, but rather using the hard sciences of Chemistry and Physics to create a bond. With the Process, you can bond any polymer to itself, to any other polymer and/or to almost any other substrate.

With every client posting about the Process on an online forum, on our website, or on Google reviews, contributes to the effort to change public opinion. Every convert has been one small step in Tech-Bond and the Process gaining acceptance. Recently, a new client reported that a Hobby Lobby in the state of Washington recommended Tech-Bond for bonding a cell phone holder to her dash. Importantly, this growing support in the consumer marketplace has led to increased interest from the business and manufacturing sectors.

As we pursue those markets, Tech-Bond and the Process faces two challenges. Our first goal is to communicate what the Process can accomplish to the relevant communities, manufacturing companies, businesses and individuals with a repair or bonding issue. Weekly, we get calls, requests and emails from here in the US and from foreign entities on how to bond polymers and/or to repair plastics from around the world. A sign of progress, but the task to gain acceptance for Tech-Bond and the Process throughout the US is still formidable.

The second challenge for Tech-Bond is to provide companies interested in the Process with proper documentation, i.e., the relevant engineering data. Management in these companies need these reports that validate the performance and durability of the Tech-Bond Molecular Bonding System and the Process. These reports provide support for management's decisions in order to incorporate Tech-Bond and/or the Process into their operations.

By meeting those challenges, we can become a worldwide company in a short period of time. We are really at the end of the beginning. Bigger and better things await.

Case Studies

Given the ability to bond polymers, entrepreneurs will find innovative ways to use the Process to develop new solutions. As with the consumer market, gaining acceptance in each industry will take time. One fact, however, is a certainty. Since there's no alternative to the Process, Tech-Bond, ultimately, will be the answer for many companies and markets.

There are already many small companies where Tech-Bond is being used. In addition, there are a number of companies using the Process during proof of concept trials. If and when these companies go into full production, they will be large volume customers. A review of some of these technologies is given below and affirms the worldwide potential of Tech-Bond and the Process. .

Pvillion

Pvillion has developed flat solar cells that can be placed on a tent or canopy. These cells provide enough power to charge cell phones, run computers and even to heat, or cool, enclosed spaces. Initially, Pvillion attached the solar cells to vinyl and glued the vinyl or metal posts.

Since vinyl is not very durable, Pvillion had to find a way to use poly sheeting. Pvillion's challenge was to permanently attach the poly sheeting to plastic poles. Initially, Pvillion tried adhesives from every big-name company, 3M, Loctite, Henkel, Permabond, etc. None worked. Then Pvillion found Tech-Bond.

When Pvillion tested Tech-Bond, every poly sheet tore when they tried to pull it off the poles. Over the last six plus years, Tech-Bond and the Process has been subjected to numerous tests by individuals and companies from around the world. Every such test has been passed with flying colors.

Pvillion's initial customer is the US military. In the initial tests, the Army's representatives were impressed with the quality of the bonds between the sheeting and the pole structure. Currently, Pvillion is in the midst of a larger test.

Hopefully, production of the units will start upon completion of this second phase. Realistically, not every new technology created by Tech-Bond will go into mass production, but it's a numbers game. Enough of these new technologies will reach mass production for Tech-Bond to be a success.

Testing requirements to support Pvillion's use of Tech-Bond.

No additional testing is needed for Tech-Bond to be used by Pvillion. To gain widespread acceptance of the Process, however, a number of engineering tests will need to be performed. Therein lies a problem.

Since there hasn't been a glue that bonds polymers, no one has developed the testing apparatus needed for testing. We are working with Intertek, a worldwide engineering firm, to develop the apparatus and techniques for the needed testing.

OriginClear

OriginClear is developing technologies and units to purify water onsite. Companies that use a lot of water can recycle the water they use with OriginClear's equipment. This recycling reduces a company's reliance on overwhelmed municipal water suppliers. Water is already a scarce resource and the supply situation for clean is worsening by the day.

OriginClear is using plastic sandwich panels to make their massive purification units. With the size of the units, robots can't be used so welders must fusion weld the units. There are significant problems with manually welding plastic.

When OriginClear originally contacted Tech-Bond, their problem was that they needed to have a stronger base for the units. One layer of plastic sandwich board bowed with the weight of the water. Bowing of the base is not acceptable.

The size of the sandwich boards precludes fusion welding. OriginClear sent us some plastic sandwich boards which we used to make a video on how to bond sandwich boards. A link to the video is below. Needless to say, OriginClear was impressed with everything they saw.

<https://www.youtube.com/watch?v=DhYpHyn2eEo>

Of course, Tech-Bond and the Process passed OriginClear's initial tests with flying colors. The next tests will occur soon. Based on this first round of testing, Tech-Bond will also ace this second round.

Bonding the plastic sandwich board bases with Tech-Bond is really the only workable solution. Our goal should be to expanding the use of Tech-Bond on these units. Tensile strength of most construction polymers is about 4,000 psi.

Testing the strength of a poly-to-poly Tech-Bond bond by a qualified engineer produced a psi rating in excess of 2,000 psi. If we can get a psi rating for Tech-Bond bonds in the range of 3,000 psi, we will be highly successful. Even with a rating of 2,000 psi, we will have a winner.

OriginClear fusion welds the sides and the top of these units. Given the size of the units, Origin cannot use robots to fusion weld the pieces together. Welding by humans is expensive and dicey. In addition, the art of fusion welding plastic has often been called a crapshoot.

Testing requirements to support Origin Clear's use of Tech-Bond.

We are working with Intertek to test the strength of three different types of bonds created through the Process, as follows:

- Simple bonding of the test pieces with Tech-Bond.
- Bond the test pieces. Then run two beads of Tech-Bond around the entire seam.
- Bond the test pieces. Then fusion weld the seam.

Each of these methodologies will produce a different result. The RFQ for that testing is included with this presentation.

Tech-Bond will do the bases for the purification units. Testing will decide whether or not OriginClear will use Tech-Bond for making the entire unit. If the results show that none of the bonding options are strong enough to build Origin's purification units in their entirety, there will be projects where the tensile strength of the bonds is sufficient for the task at hand. Once the test results are in, we will have the documentation needed for OriginClear and other companies to consider Tech-Bond.

Houston Poly Tank

Houston Poly Tank is working with OriginClear. Houston makes large polypropylene pipes. By large, we mean 6 – 8 feet in diameter, with the walls being two to three inches thick. Houston is currently fusion welding the pipes together.

Houston owner's first question to us was, "Would Tech-Bond stop leaks?" Remember our comment on fusion welding being a crapshoot? Leaks indicate the weld was poorly done. Tech-Bond can own the ability to butt weld polypropylene, HDPE and other poly pipes if we have the proper documentation.

Testing requirements to support Houston's use of Tech-Bond.

The same as with OriginClear

Dental labs

Dental labs make dental plates and dentures. These labs are making numerous transitions at the moment. One of the most significant changes is moving from resin to thermoplastic fixtures. The industry's hope is to 3D print the plates and teeth.

For dental labs, 3D printing of these fixtures is years away. Until then, the Process is the most effective solution for the thermoplastic devices. Where the Tech-Bond Molecular Bonding System can make an immediate impact in the dental industry is in the manufacture of the resin plates and dentures.

Currently, dental labs are trying to use superglue and an alcohol-based accelerator to manufacture thermoplastic plates and dentures. The adhesive industry has long known that alcohol based accelerators weaken most glue joins. Tech-Bond's Poly Kits have proven to be effective to on thermoplastic devices.

For dental labs, savings will come in two ways. First is the cost savings on product. Secondly, will be the reduction in labor costs because of the speed of the Process. Tech-Bond's bonding system works far more quickly than any other adhesive on the market.

Testing requirements to support the dental lab industry's use of Tech-Bond.

Dental plates, dentures and medical devices have to be biocompatible. Biocompatibility means that the body will not have an adverse reaction to the device. Many medical devices are polymer based.

Over the six years, we have received numerous calls asking if Tech-Bond is biocompatible. Unfortunately, we could not respond positively. Our SI adhesives are premium superglues. Several superglue brands have been rated as biocompatible. Getting that rating for Tech-Bond will not be difficult. Once that designation is granted, many opportunities will arise.

RV industry

Late last year, a gentleman by the John contacted me. John has long been a mechanic/technician in the RV industry. After a lengthy discussion, John purchased some Tech-Bond and we sent Tech-Patch samples.

In the last week, an excited John contacted us. Tech-Bond and the patches worked better than all other adhesives he had ever tried. In my opinion, John would be an ideal candidate for building and servicing a base in the RV industry.

Governments and related entities.

The entity that has the greatest need for Tech-Patches is the US government. Federal agencies, the military, states, large cities and other municipalities all have aging water and waste removal infrastructures. Given that budgets are tight and growing tighter, municipalities will be looking for ways to repair damaged pipes and tanks instead of replacing them.

Current users of Tech-Patches include:

- The city of Seattle keeps Tech-Patches on hand so that problems can be fixed immediately.
- Kansas city's Fed offices ordered six feet of patch to repair damaged infrastructure.
- Collier county, the county for Naples, Florida ordered seven feet of patch to connect two HDPE pipes that did not meet properly.

An important component of the municipal market is sewer repair and rehabilitation. Sewer repair and rehabilitation is a \$ 2 billion dollar industry. SWERP, a leading sewer rehab company described Tech-Patches as “the best tool in the toolbox” for HDPE pipe repair. HDPE has been the pipe of preference for the last twenty years.

Beyond the patches, there are numerous other polymer-based Global Solutions to be discovered and developed. For maximum success, Tech-Bond's culture must focus on the question, “What's next?”.

Other industries that need Tech-Bond, Tech-Patches or both

- Oil and gas industry
- Energy industry
- Marine industry

Case Studies Conclusion

Pvillion, Origin, Houston, the RV industry, US dental labs, municipalities, et al, are examples of organizations with problems. Some of these entities look for a way to bond polymers or to use a polymer to solve a problem. Some do not.

In my experience, each year in the US there are hundreds of companies and entrepreneurs looking for a way to use a polymer to solve a problem. Most of these individuals have not found Tech-Bond. When we create more awareness, they will. When they find us, it's a win-win situation.

Tech-Patches, the first Global Solution

In January of 2017, Tech-Bond was presented with its first polymer challenge, finding a way to seal Hazmat gas leaks. This request from the Hazmat supervisor of Alleghany County. Apparently, leaking fuel tankers is a common occurrence. This request started us on a journey to find a flexible polymer which would be impervious to gas.

We were successful and even built a prototype that would seal hazmat gas leaks, but didn't pursue the quest beyond the prototype. This quest led to the development of Tech-Patches. At this time, there is not a product on the market that will quickly and permanently seal holes or cracks in all common metal and plastic pipes or tanks.

At this time, there is not any way to permanently seal holes or cracks in poly tanks. Common in many industries, poly tanks store water, other liquids and even farm products. If they get a hole or crack, damaged tanks thrown away.

In 2023, there are two problems with that approach. First, like many other items, poly tanks used to be cheap. No longer. Poly tank replacement has gone up a minimum of two hundred percent. Secondly, supply chain issues have caused a shortage in replacement tanks.

For plastic gas tanks, problems are multiplied. Currently, auto parts stores sell epoxies to repair gas tanks. Unfortunately, epoxies do a poor job of repairing either plastic or metal gas tanks.

Using an epoxy to try and fix a damaged fuel tank is a doomed effort. Depending on the octane/cetane level of the fuel, some failures occur immediately, others take longer. Bottom line, epoxies will usually fail.

Compounding the supply chain issues for replacement gas tanks is the fact that with the conversion to EV's, there will simply not be enough demand for replacement tanks for manufacturers to build them. Without an effective gas tank repair system, millions of gas-powered vehicles will face an early and unnecessary demise.

Tech-Patch Options

By June of 2017, we had a solution that would repair almost any damaged tank or pipe. Tech-Patches PERMANENTLY repairs holes and cracks in all common pipe and tank substrates. Since 2017, the success rate for ALL Tech-Patches is over 99%.

After four years of R & D, there are now three types of Tech-Patches, as follows:

- G Series Tech-Patch
For the repair of non-pressurized metal and plastic tanks and pipes.
- XT Tech-Patch
For the repair of pressurized (up to 150 psi) plastic and metal tanks and pipes.
- PTFE Tech-Patches
PTFE is the chemical symbol for Teflon. Our PTFE Tech-Patch has Teflon tape bonded onto one side. Teflon is impervious to all grades and octane/cetane levels of gas and diesel fuels.

“Plussed” PTFE Tech-Patches should reach a 240 psi rating or greater for metal tanks and pipes. Ratings for poly tanks and pipes should be higher. .

Importantly, we have found that poly-to-poly bonds created by the Process are always extremely durable

Worldwide Opportunities

From the beginning, it was apparent that the Process was a technology that the entire world needed. Once the fact that the Process worked on all polymers was verified, a patent application was filed. In 2020, that application was approved. Shortly thereafter, we filed for worldwide protection of the Process patent under the Patent Cooperation Treaty (PCT).

We have just been notified that the patent for the Tech-Patch has been granted. Our next step will be to file for worldwide protection for the Tech-Patch under PCT. Finally, we will make an application for a continuing patent for the PTFE Tech-Patch. Once that application for Tech-Patches is approved, we will file for PCT coverage.

Immediate objectives

Tech-Bond's initial goal must be to reach a monthly running rate of \$ 500,000 in sales. With two markets, that are "low hanging fruit", the \$ 500K figure is obtainable in the next six to nine months. Those two markets are:

- **Auto Parts Stores**

Currently, there is an unfortunate wave sweeping America. With the high price of gasoline, holes are being drilled in gas tanks to drain the gas. What is most frustrating to victims is not the loss of the gasoline, it is the costs incurred to get the vehicle back on the road.

If you google repairing a gas tank, a number of products, mostly epoxies, will appear that will allegedly repair the damaged tank. Most of these products will fail. Some will fail almost immediately and, sooner or later, almost all of these products will fail. Knowledgeable mechanics will not use any of these products to try and fix any gas tank.

So victims must buy a new gas tank, which for some vehicles is over \$ 1,000. Add to this \$1K, the labor to replace the tank, which will be an additional hundreds of dollars. Most people look for a cheaper, but reliable way to fix these gas tanks. Some of them have found the PTFE Tech-Patch and consider the price paid to be "cheap".

- **Dental Labs**

In the dental industry, there is a transition taking place. With the goal to eventually 3D print dentures and plates, the industry is switching from resin plastics to make devices for the mouth to thermoplastics. Thermoplastics are easier to 3B print than resin plastics.

Immediate challenge and how to solve that challenges.

To be placed on retail shelves, products must have a three-year shelf life, so our immediate challenge is to package each of the products in our Poly Kits to achieve that minimum requirement. There are three products in our Poly Kits, as follows:

- Surface Insensitive (SI) Cyanoacrylate
Our SI adhesives are premium cyanoacrylates (superglues).
- Activator/Accelerator (AA)
The AA is our "secret sauce" because it produces a chemical reaction. The potency of that reaction is unmatched by any accelerator on the market.
- Poly Prep (PP)
As a surface prep, the Poly Prep etches the poly surface.

How we will meet the shelf life requirement for each of our products is given below.

- The SI adhesive
Cyanoacrylate adhesives stored in tubes are considered to have the required three-year shelf life in order to get shelf placement in retail outlets. It is important to note

that we will maintain that shelf life by refrigerating the tubes in a refrigeration unit until they are packaged.

- **Activator/Accelerator (AA)**

Because our AA is acetone based and acetone eats through the seals used in plastic pump sprayers, our secret sauce presents a packaging challenge. There are two solutions that we will use, as follows:

- **Foil wrap packaging.**

This packaging is most used for the finger wipes provided by restaurants or the alcohol swabs common in doctor's offices.

Kits with foil wrap packaging for the AA and Poly Prep will be single use kit. These kits will be called "Micro Kits". There have been companies that have approached us who want to include a Poly Kit with their product. These companies will use micro kits.

Packets holding the AA and Poly Prep are called sachets. Sachets for each of the chemicals will be color-coded.

- **Micro aerosols and aerosols**

Bottles holding 20 ml of liquid or less are micro aerosols. Micro aerosols are multiuse but with their limited capacity can be reasonably priced for the retail market. Color coding will be the same as the sachets.

We will also have aerosol containers for customers needing higher volumes

- **Poly Prep (PP)**

The same packaging principles apply to both AA and PP.

Immediate Testing Needed

A summary of the tests that need to be conducted is provided below. Companies need the certified results of these tests in order to support the decisions companies make on using Tech-Bond.

It is important to note that, since polymers could not be bonded till now, no standardized tests exist. We are working with our engineering firm, Intertek, to develop new stress testing methodologies.

Tensile Stress Test

A tensile stress test tests the amount of tension that a bonded piece can endure until separation occurs.

Tensile strength measures tension when the two pieces are pulling straight apart without twisting or applying stress from the side.

Shear Stress Test

A shear stress test measure the strength of a bond when the pressure comes from the side.

Burst Pressure Test

A burst pressure test measures how much pressure a Tech-Patch can withstand when sealing a pipe, tank or bladder.

Historically, burst tests have been done with steel pipes. Ratings for our Tech-Patches have come from the patches on steel pipes. However, Because of the Process, we have to develop procedures for testing polymer bonds, which we are doing.

Biocompatibility testing

Any component or chemical used in a medical device must be biocompatible meaning the component or chemical must not harm living tissue. Numerous cyanoacrylates have been tested as being biocompatible. It will not be a problem to get the biocompatible designation for our SI adhesives.

We have been contacted by John Hopkins Medical Center as well as other organizations on whether Tech-Bond is biocompatible. Dental labs will also want to know if our adhesives are biocompatible. In 2017, a Doctor from Mt. Sinai, Brooklyn, used Tech-Bond to build and test a prototype medical device. Tech-Bond worked as promised.

Many organizations have contacted Tech-Bond regarding biocompatibility. Since most medical devices are made from polymers, specifically nylon, and the Process works extremely well with nylon, getting the biocompatible certification will translate to significant business for Tech-Bond.

Buying Decision Hierarchy

With myriad markets, both known and those not yet identified, having a plan to follow is mandatory. Separate plans will be needed for each industry. Critical to having a plan for each market is having a format for developing those plans. For Tech-Bond that format is the Buying Decision Hierarchy (BDH).

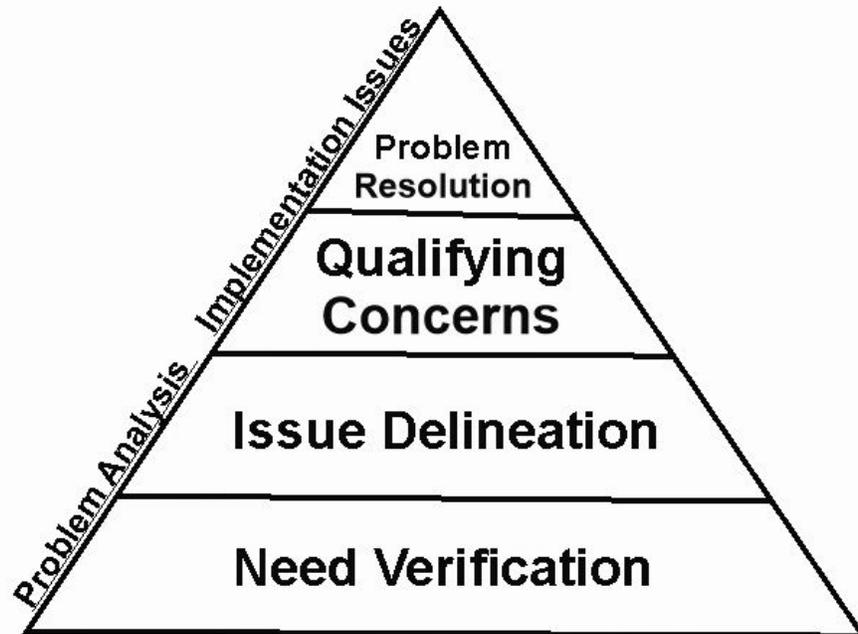
The BDH provides a framework for gaining agreement in any sales interaction. When marketing, the goal of the interaction is to gain agreement to consider a solution or product. In a sales interaction, the goal is to generate a sale.

A sales interaction is the process by which a prospect becomes a client. Every sales professional has mastered a methodology for “closing” a sale. We find, however, that these formulas for success often rely on forcing a decision and not enough on reaching agreement.

We have also found that most sales training programs have focused too much on the “close” as the key to making a sale. Why? Two reasons.

1. Because the steps of the interaction have not been defined.
2. That not enough time has been spent to learn about the how’s and why’s of the needs and wants of the prospect

Buying Decision Hierarchy



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With a completed Hierarchy, Tech-Bond's sales reps will have an understanding on what:

- Will generate interest in looking at how the product or service might better meet the needs of the prospect.
- or
- What factors will influence the buying decision.

Every Hierarchy is divided into two major sections -, Problem Analysis and Implementation Issues. These issues identify the two stages of a sales interaction, making the sale and executing the close.

The graphic below illustrates that the steps of Problem Analysis are Need Verification and Issue Delineation & Resolution. It is almost always beneficial to remind a prospect(s) that he/she/they have a problem. Once the need is verified, all relevant issues are delineated and there is an understanding on how the problem can be solved, the basis for an agreement, i.e., the buying decision, has been established.

That agreement supports joint navigating through the Implementation Issues, Qualifying Concerns and Client Needs. Sales professionals must understand that progressing through the levels of the Hierarchy takes time. A sales rep needs to give the consumer time to reach the decision to spend money.

Problem Analysis

After the opening handshake, a sales rep's first priority is to establish the foundation for all discussions to follow. verifying the needs/wants and critical in building a mutually beneficial foundation. When the seller and buyer begin from the same point, arriving at the same destination becomes much easier.

Implementation Concerns

After each issue covered during the discussion of a prospect's Implementation Concerns, an agreement must be acknowledged. During the marketing phase, those acknowledgements, i.e., the agreements, must be assumed. In the sales phase, each agreement must be verbalized. A buying decision is just the culmination of the Buying Decision Hierarchy.

We are developing BDH brochures to use on every target industry and market. Our brochures will minimize the time necessary for Tech-Bond's worldwide success.

Immediate priorities

Every new major undertaking always has a huge problem, lack of management depth. We will have that problem. There are a number of people familiar with Tech-Bond who can play a major role in Tech-Bond's success. My job is twofold:

1. Putting the right person in the right place.
2. Withing the company, creating an atmosphere of cooperation with a little bit of competition.

That leaves the longstanding problem, an adequate amount of funds to do what needs to be done. With this document, we explain the need and where the funds will go. A detailed financial plan is forthcoming.

Additionally, a sales and marketing plan will be developed for the auto parts market, the dental lab industry and the RV market.

All critiques will be appreciated.