TheBookonGarageFloors.com

Preface

Epoxy will not stick to a smooth surface, it needs something rough to grip onto. Preparing the surface of the concrete by acid washing or grinding it first gives the coating something rough to grip onto. Floor coatings are essentially heavy duty glues with color added to them, and it is important to give them a rough surface to grip onto so that they don't slip and peel away. When you go mountain climbing you need big rocks to grip onto if you don't want to fall. Gripping onto a little piece of sand sticking out of the side of a mountain isn't going to do the trick; first of all, a little piece of sand is too small to grip onto and secondly, even if you were able to get a hold of that little piece of sand it wouldn't hold your weight because the sand isn't being held into place by very much mountain. Therefore it is important that your concrete surface is rough, solid and sound (the opposite of brittle and weak) so that it doesn't brake away from itself with the epoxy still holding onto it.

If you want to build something that you don't want to blow or wash away when the wind and rain of life comes by then you need to first anchor it to a rock. Jesus said the same thing in one of His parables: “A wise builder digs deep until he gets to solid rock before he builds a house on it.” Fortunately for us concrete is made of rocks; that's actually what concrete is, a bunch of rocks glued together.

In order to make concrete you mix rocks, sand and water with an adhesive known as cement. The cement is the binder that keeps the rocks and sand stuck together. The concrete is what you get after you add the rocks, sand and water to the cement. After the wet concrete is placed onto the ground a worker comes behind the installer and uses a steel blade known as a trowel to pack the rocks deep into the surface of the concrete so that the surface is smooth and the rocks are no longer visible. This process is called *hard troweling* the concrete and results in dense concrete that has rocks below the surface.

When we prepare concrete by acid washing or diamond grinding we are making the surface rough and exposing a portion of the solid rock below the surface so that the coating has something more secure to hold onto. The thin layer of concrete above the rocks at the surface is called laitaince and is mostly made of sand that is glued together. Laitance is weak and brittle and should be removed (if possible) in the preparation process. All concrete naturally has some laitaince but if the concrete was over-watered by the installers in order to save money and stretch out the concrete then it will result in a weaker concrete slab that contains an excessive amount of laitance at the surface. Brittle concrete is the reason why many floor coatings fail. This is why it is important to hire a wise and ethical builder to make your homes foundation solid and sound. An unethical or unskilled builder will add too much water to the concrete so that he can make more money and have more working time at the customers expense. Doing this is like adding too much water to your pancake mix, it will stretch out the pancakes so they look bigger but all of the water will evaporate leaving behind large pores and air pockets resulting in a weaker and more brittle concrete foundation. If a coating peels and there is concrete stuck to the back of the coating then the failure was not due to a lack of adhesion on the coatings part, but rather the concrete foundation failed and broke away from itself. These types of failures indicate that the coating did its job, it stuck to what it was supposed to. Therefore deficient concrete can be a reason for floor coating failures. This is why we always inspect garage floors and test their density before installing a

floor. If the floor is extremely brittle we will not be able to offer you a floor coating.

Although brittle concrete is a common cause of coating failures, there is a more common cause. According to Sherwin Williams: “As high as 80% of all coating failures can be directly attributed to inadequate surface preparation that affects coating adhesion.” 80%.... that's a staggering number. That means that 8 out of 10 garage floor failures are because someone didn't prepare the surface adequately. Floor coatings which include epoxy, urethane, or acrylics will not stick to a smooth object, they need something rough to grip onto. The rougher the surface the better the potential for adhesion. But you don't want to prepare the concrete to a rougher degree than you can afford, because if you make the surface of the concrete too rough it will cost you more money in coating than you can afford to level the surface back out because when you make the floor rougher you have to use more coating. That's why there are different concrete preparation techniques. It is not a one size fits all. If you are going to apply a thin coating you only need to lightly profile the concrete with acid and then power wash it. If you are going to install a medium thickness coating you need something more aggressive than acid washing to hold that coating into place, so you will most likely want to diamond blade grind the surface for a medium concrete surface profile. If you want to install a very thick coating you will need to shot blast the surface for a heavy (very rough) concrete surface profile. The roughness of the floor needs to be proportionate to the thickness of the coating being applied.

In 2003...

When I started installing garage floors in the summer of 2003 I used The Home Depot Rustoleum Brand “Epoxy Shield” garage floor box kit because it was the only place I knew where to get epoxy. The kit came with just about everything I needed; about a gallon of epoxy, 1 pound of decorative chips, and a little bit of acid powder that was supposed to be mixed with water to etch the concrete surface before power washing. The kit did not come with roller covers, roller frames, a pole to attach the roller frame to, paint brushes, buckets to mix the coating with or a power washer to profile the concrete with after acid washing. Profiling the concrete is the term for ruffing up (preparing) concrete before you coat it. Typically speaking if you don't acid wash but just use a power washer on concrete it doesn't make the surface ruff enough for a floor coating to stick to. It might work if you had really soft concrete but most garage floors aren't soft enough to ruff up with a power washer alone. That's what the acid is for. If you pour acid mixed with water over the surface of concrete the acid will chemically react with the alkali based concrete and cause it to shatter and loosen the sandy top layer (laitance) of concrete so that you can more easily knock off the loosened concrete with a pressure washer afterwards and expose a lightly ruff concrete surface profile. But you MUST pressure wash the concrete after acid washing otherwise you are going to apply coating over a bunch of sand that you just loosened. Acid washing without power washing afterwards is counterproductive, it actually causes more harm than good. It is like spraying Dawn Dishwashing Soap on your Pots and Pans without washing off the grease afterwards.

After I acid washed and power washed my garage floors I was left with a light concrete surface profile. And that was well and good with the one gallon of epoxy that came with the Home Depot Box Kit, but that's not actually a lot of product. On the contrary, it is the bare minimum necessary to stretch across a 2 car garage, and I mean stretch, because you have to put real effort into stretching a gallon of watered down epoxy across the surface of a 2 car garage floor because if you're not really trying then you won't make it across the whole floor without running out of epoxy. I remember the first time I tried to install

a gallon of epoxy across a garage floor, I didn't even get half way before I ran out, it was embarrassing.

So after I learned how to manage the amount of coating Rustoleum was putting into their garage flooring kits my customers were ending up with a really thin floor. Considering the epoxy was only about 50% solids (50% epoxy) that meant the other half was water which evaporates so my customers were only getting about 2 thousandths of an inch (2 mils) of floor coating after it dried. They were getting 4 mils when the floor was wet but only 2 mils after it dried. This is the difference between wet mils and dry mils. 2 dry mils of epoxy is about the same as a really thin coat of wall paint, so you can only imagine that vehicle and foot traffic is going to wear thru that in no time at all. I was looking at an average service life of 1 year. I know this because I started installing garage floors for friends and neighbors whom I could visit later to see how the floor was holding up. Of course my friends weren't upset with me for the floors that wore thru to the concrete after 1 year, they knew they were buying Home Depot epoxy. Actually, they were the ones who bought the epoxy kit, brushes, rollers and buckets I just showed up to do the labor. This was the safest way for me to learn how to do the floors without risk. Of course, I didn't make much money but I figured it was sort of like going to school or an internship. I was interested in doing this professionally, something about coating floors turned me on. So after I learned that the Epoxy kits from the Home Depot were only lasting about a year before failing I figured there had to be a better way. So I eventually started putting 50% more epoxy on. I would buy two kits and use half of the second kit so that I didn't have to stretch the floor so thin. But it doesn't take a rocket scientist to figure out that if 2 mils of coating lasted 1 year then 3 mils would only last 1.5 years which wasn't great. After I started to put the coating on thicker I started to get some phone calls about peeling. Not a lot, but just enough to let me know that as I was increasing the thickness of the coating to 3 mils I was going to also need to get more aggressive with my preparation. Essentially too much floor coating was on top of the concrete and not enough was inside the profile of the concrete, sort of like a tree with shallow roots that tips over too easily. So I started to buy muriatic acid for swimming pools and I used it to acid wash the floors instead of using the little bag of acid that came with the box kit. It made a huge difference. Power washing after acid washing with real acid removed much more sand from the surface of the concrete and gave me a much rougher profile than what I was previously getting. But the rougher the floor got the more coating I needed from the Home Depot. The 1.5 kits from Home Depot was not stretching across the floor anymore, so I had to use 2 kits of epoxy for a garage floor. At this point I was using twice as much epoxy as the kit called for and I was ending up with 4 dry mils of coating which only lasted 2 years on average.

Eventually The Home Depot started to sell containers of decorative chips by themselves next to the Box Kits which meant that my customers could buy more chips to put into the floors, and this was a hit because it was difficult trying to get the little 1 pound baggy of chips that came with the kit to stretch across the floor in an even manner without running out of chips. I can remember a few times running out of chips before I got to one side of the garage or accidentally throwing a handful too heavy so that the floor looked blotchy and clumpy, there was no recourse for this so having more chips available really made a difference and helped make the floor look fuller and more even so that I could fix my mistakes with more chips by just making the rest of the floor heavier with chips if I needed to. I had dreamed of buying enough chips to saturate the floor completely with but I didn't know where to get that many chips (The Home Depot only sold the spare chips in 16 oz bags.) This was back in 2004, most people didn't know what epoxy was and there were only 2 companies on the internet in the Houston area that installed garage floors.

With more chips came the necessity for clear coat. The box kits didn't come with clear coat. Rustoleum didn't even sell one at the time. Behr (a different company) sold a wet-look acrylic water based concrete sealer at the Home Depot next to the epoxy. Sometimes people would buy it and have me

install it the next day over the epoxy and chips for added protection and shine. It was really watery so it wasn't a thick product, it was more of a sealer, but it did provide a thin film with a nice sheen. I actually started to highly recommend the clear coat because I noticed that if you didn't get it then the chips would stain very easily especially where the tires from the vehicles drove onto the floor. This was when I learned that the chips are not actually a typical plastic, they are a porous vinyl which stains very easily. I didn't know that at first because Home Depot was selling the Rustoleum epoxy garage floor kits without the clear coat so I assumed that Rustoleum knew what they were doing and the chips were ok without a clear coat, but they aren't. The chips are like almost like a heavy duty confetti and will disintegrate like paper if they get wet with water. The chips only toughen up when they are saturated and their pours are filled with a clear coat, that's when they become super tuff. After learning that the chips were staining when not sealed I STRONGLY recommended the clear coat because, I had too many people upset with me for not stressing the need for it after the floors stained. This was a big fork in the road for me because even after I had started to tell everyone that if they wanted any chips in the floor then they need to spend the extra money on the clear coat people repeatedly came back from The Home Depot without the clear coat because they wanted to save money. Then their floors would stain and then they would get upset with me for not somehow forcing them to buy the clear coat. I realized that I had to make a choice, was I going to provide a low quality product by installing chip floors with no clear coat and make more sales volume (money) or was I going to provide a higher quality product and separate myself from the competition knowing that it would reduce my sales volume (money) by requiring clear coat to be purchased at the risk of losing customers? Most people told me to offer both, but as I learned with the unreasonable people, they negatively effected my reputation even though I had warned them of the side effects of not getting clear coat even though they had agreed to buy it from the store. You see, the extra cost of the clear coat was killing the deal for lots of people and affecting my business. The question I had to ask myself was: Is it viable to risk my reputation in the long run in order to make more money now? I decided that it wasn't worth the long run risk because I wanted to do this for life and I wanted to be the best, so in order to prevent customers from not getting what was necessary I started to buy all of the materials myself and sell it as a package deal. One of the guys who worked for me thought that I was stupid because I was losing money from people who wanted a chip floor without the clear coat. He said, “You warned them to get the clear coat. It's their fault.” And then he would laugh out loud like an old country farmer. He was technically right, but why would I want to give a customer enough rope to hang themselves with? That doesn't help anyone in the long run, unless you just worship money and are selling the rope. He quit working for me. He sells epoxy floors and gives you the option to install clear coat because he knows he can sell more floors without it. Its a great strategy if you don't mind helping people waste their own money at your benefit. I couldn't do that and I still can't. Anytime someone offers to sell you a chip epoxy floor without any clear coating you should think twice about the motives of that person. If they are willing to do this, then what else are they willing to do?

After I moved to 2 kits of epoxy per garage floor and muriatic acid for preparation I started to notice two major problems with the acid washing. The first one was that the acid water running down and out of the garage floor would leave slight discoloration (burn marks) on the driveway as it ran down the driveway and into the street. Since it requires so much water to acid wash and since garage floors are naturally made at a slope it is physically impossible to acid wash a garage floor without getting acid on the driveway thanks to gravity. You can soak the driveway with clean water first to mitigate the burn and even add baking soda to the driveway to help neutralize the acid when it hits the driveway but it doesn't stop it. I wasn't previously having this problem with the Rustoleum acid bag that came with the kit because the acid they provided was so weak which was good for the driveway but not sufficient to make a profile in the garage. So I knew that I had to find another way of preparing concrete. Besides, I wasn't happy with 2 year garage floors anyways, I wanted a more permanent solution (a thicker floor)

which naturally required more of a profile. The second major problem I was having with acid washing was water retention. You can not apply epoxy (even if it is water based epoxy) over damp concrete. That means that I had to acid and power wash on day one, apply fans, then come back on day two to apply the coating. But sometimes the floor would still be slightly damp when I returned the next day even with fans on it overnight, so I would sometimes have to come back a third day to install the epoxy which people didn't like since they had all of their stuff from the garage sitting outside or on the front porch. Plus epoxy takes 24 hours before you can walk on it and 72 hours (the 4th day) before you can drive on it or put heavy stuff back on it, so people had their refrigerators and tool boxes and all their tools outside for a week. Besides that, why would I want to add water to the concrete slab that could potentially migrate upwards later in the form of moisture vapor anyways?

So in order not to damage people driveways I switched to diamond grinding and when I did that the surface got so rough that the 4 dry mils of coating was not enough to level it back out. I had to come back the next day and put down another kit or kit and a half (2 or 3 dry mils) on top of it in order to make the floor level. 6-7 dry mils total is about the very bare minimum of what you can use to cover a floor that has been diamond ground. But that's still only a 3 to 3.5 year floor on average based on 2 mils per year.

At this point I was doing garage floors so regularly and using so much epoxy that I was constantly buying out all of the Rustoleum box kits from the nearest 5 home depots to my house. It was becoming a problem so I looked up local epoxy manufacturers and actually found one within 20 minutes of my home in Tomball Texas. The name of the place was called American Coatings and I started to use their industrial grade oil based epoxy and I just used the chip bags sold from The Home Depot. The epoxy from American Coatings was much cheaper because I wasn't paying retail and it was a much better product with more shine that could also be put down thicker which was nice because I needed the depth since I was diamond grinding now. The water based low solids content Rustoleum epoxy was already being put down thicker than it should be at 4 dry mils thick which was slowing down the dry time and actually causing some shattering where it puddled in low spots in the garage floors. Typically speaking over the counter epoxy like the Rustoleum Box kits at The Home Depot only have about 50% solids which means they are about 50% water and should therefore only be applied at about 4-6 wet mils which dries to 2-3 (dry mils) thick per each coat otherwise the water could get trapped inside while it dries on the outside and it will dry slower than typical and shatter when the water forces itself out of the coating a few hours or days later. If you want to apply a single layer of coating thicker, then you would need a High Solids coating which has a solids content of about 60-89% and therefore less oil based thinner or water that could potentially get trapped inside while drying. The solids part of the material is what stays on the floor after it dries and the solvent is the water or oil based thinner that loosens the product so that its viscocity is lower so that the material from the container flows into the surface of the floor in an easier manner and so that it spreads out nice smooth without roller marks and keeps the material from drying too fast. The more solvent in the product the more time you have to work with the product because all of the solvent (oil based or water) needs to evaporate before the solids part can dry. Home Depot is selling their epoxy to slow home owners who have no experience installing floors therefore they sell a low solids product at the cost of sacrificing thickness. Just so you understand if you put down 10 wet mils of coating and 75% of it is solids then that means that 25% is the oil based thinner or water (aka the solvent) which means the floor will dry to 7.5 mils thick. A lot of people think that water is not a solvent but that is not technically correct. Anything that loosens or dissolves a solution is a solvent. When you are using water to dilute a water based product your water is actually the solvent in that case. There is a secondary meaning for solvent which means oil based thinners but that is simply a secondary definition. The Rustoleum epoxy from the Home Depot was water based and only about 50% solids. This meant that if I put down the coating at 4 wet mils then it would dry to 2

dry mils thick. The stuff I was buying at American Coatings was oil based and High Solids (about 66% solids), I put it down at about 7 wet mils thick and it dried to about 4 dry mils. I still needed two coats for my diamond ground floors but I was having less of the negative side effects when the coating puddled in low spots. If you want to put down a coating thicker than 7 or 8 wet mils thick at once then you need a 100% solids product which are typically designed to be put down at 8-30 mils thick, but I wasn't ready for that yet. At the time I was content using High Solids for two reasons. The first being that American Coatings didn't sell 100% Solids epoxy. The second being that I didn't mind doing the floor in layers which actually works just as good for partial chip floors if you don't mind coming back an additional day for each layer.

So I used American coatings for about a year until one Saturday morning on my way to pickup epoxy I saw that American Coatings was no longer there, it had burned down the night before. All that was left was a pile of smoking and charred metal that use to be a building.

So I went back to The Home Depot that Saturday to get Rustoleum epoxy again because I had no other option and on Monday morning I called the nearest Sherwin Williams and asked them if they sold industrial grade epoxy. I knew they sold the kits on the shelf just like The Home Depot did but I didn't want to go back to low solids material. They told me that if I wanted to buy industrial grade epoxy I would have to do buy it from the commercial store on Hempstead Highway and Longpoint Rd, in NW Houston because they were the only Sherwin Williams store in Houston that sold it at the time. So I drove there and asked the manager for pricing on epoxy. He told me that he couldn't sell it to me without going thru a corporate rep first. It turns out that commercial coatings are packaged differently (they don't have labels with instructions) and they are raw materials so they are more hazardous, especially if you don't know what you are doing. Plus weather conditions and temperatures force you to make wild adjustment on how you store, mix and apply industrial coatings since they don't have all that water in them to control the drying, and learning all of the adjustments can only be acquired by trial and error. So I had to get interviewed by a corporate rep before I could buy the good stuff. I passed the interview for the High Solids materials and I bought my first kit of Tile Clad High Solids Epoxy by Sherwin Williams. I loved it! It was even better than American Coatings and dried faster too. I could actually do two or three coats in one day which really cut down on my installation times since I was doing two coats and a clear coat for all of my floors at that point anyways. Even if you use 100% solids materials you can't just put down one thick coat because it would bubble on you, the first coat over concrete can only be applied at 4-8 mils max otherwise the gas (warm air) from the holes and pours in the concrete will not be able to break thru the coating and will create bubbles like the bubbles you get in pancakes while they are on the grill. This doesn't happen too much if you put down the coating late in the evening because the earth isn't emitting heat at night because the sun isn't hitting it. This also doesn't happen if you don't do much preparation like when I was using the Home Depot acid bags because you don't expose many holes and cavities in the concrete surface if you don't prepare the floor aggressively, therefore there isn't as much space to create air bubble from. Every floor coating installer knows about out-gassing (the bubbles you get on a primer that is put down too thick) and knows that you put the first coat on thin enough to allow the gas to pass thru in order to prevent the bubbles and then after the primer dries and seals the pours shut your second coat can be put down thick. The exception to this is if you are fully saturating the floor with chips. If you are doing this then you can put the first coat down slight;y thicker than 8 mils because when you throw chips into the surface they will pop the bubbles naturally just like your finger can pop the bubbles in your pancakes. As long as the bubbles are popped when the floor is still wet they wont dry like a crater or bubble.

I used Tile Clad high solids epoxy from Sherwin Williams for a few years all the while learning about the different products that Sherwin Williams had to offer, they eventually started ordering decorative

chips for me in large 25 pound boxes which saved me lots of money. I was buying more Tile Clad epoxy than any company in Houston which included machine shops, oil refineries, and pipe painting companies as Tile Clad is suitable for steel, pipes and concrete. My rep took me out to lunch often and let me try different High Solids products that Sherwin Williams sold. I tried epoxies, acrylics and urethanes of all types. Every time I tried one product I asked him to order me a different one because I wanted to know if there was something else better that I was missing out on. I hated the idea that there might be something else better out there that I wasn't aware of. Sherwin Williams has dozens and dozens of different types of industrial floor coatings and I wanted to know what was unique about each one of them. So I tried them all. Each one had a special characteristic about it. Some were low viscocity for deeper penetration into brittle concrete, some were moisture bypassing pre-primers, some were oil by-passing epoxies, some were acrylics on steriods, some were breathable urethanes, and other were shiny epoxies. I wanted to know how each of them worked just like a mechanic wants to understand how each tool works so that if I ever needed to use one then I would know exactly what I was getting myself into. I wanted to be a pro at all floor coatings so that I had different options to choose from when I came across floors with special issues or needs. At the same time, I was looking for the best all around product for garage floors but I wasn't getting satisfaction in what I was trying. The products were not thick enough. One day while installing a garage floor a neighbor of my customer came over and struck up a conversation with me, he asked me if I did heavy chip floors and I told him that I had actually dreamed about it but that I had never actually seen one. He told me he had one. So we walked across the street to his garage and I saw an amazing looking floor, it was like a sheet of marble or granite, it was an epoxy floor totally saturated with chips so that the epoxy was not visible and it had a clear coat thicker than anything that I had previously seen. I had actually dreamed of seeing a floor like this and I will never forget the first time I saw one. It changed my life. I asked who did the installation and he told me that a company from out of state did it because no one in Texas offered it. (That's how long ago I started doing this.)

I asked my Sherwin Williams floor rep about the full chip floor that I had seen. He told me that I wouldn't be able to install a full chip floor with the High Solids materials that I had been using because it wasn't thick enough to hold that many chips. I had previously only been doing partial chip floors which meant you could still see the epoxy in the background because the chips were only sprinkled sparingly in the floor. He told me that I would need to buy a material called 100% solids products in order to get to a depth of about 10 dry mils in order to hold a full saturation of chips. I had previously heard about 100% solids materials and He said that he had been reluctant to sell or mention them to me because it required experience to install. It's not something you can do right the first time on your own. He was right. The low and high solids epoxy that I was accustomed to installing was different and was applied like paint was applied. I would take a 9” roller frame on a pole (a broom stick with threads on it that I would screw a roller frame onto it) and I would dip the roller into the bucket of epoxy and roll it onto the floor while I walked my self backwards from the back of the garage to the front. There was no real rush to install the high or low solids epoxy because it stayed wet in the bucket for about an hour. High Solids products typically have a longer pot life because the solvents can no start dissipating and drying until it is rolled out thin. When you have a compressed mass of solvent in a bucket it evaporates at a much slower rate than if it were spread out thin. You can take a cup of water, paint thinner or acetone and put it into a cup and it will stay in that cup for a long time because the weight of itself on top of itself keeps it held together, but as soon as you pour it out on the floor it has no pressure on top of itself so that it can dissipate quickly. You can try this experiment if you want to see it demonstrated: take a tablespoon of water and pour it on a solid surface outside like a glass table or your driveway then take a tablespoon of water and leave it in the tablespoon and put it right next to the water that is spread out on the glass table or the driveway. The water outside the tablespoon container will evaporate much faster. 100% solids epoxy dries much faster while in a bucket because it has no solvent to slow it down.

When you mix 100% solids epoxy you must pour it out onto the floor immediately after mixing it otherwise it will combust if left in the bucket too long (rapidly harden, get extremely hot, melt the bucket, start smoking and possibly catch on fire). So in order to get prepared to install this type of material I had to buy special spike shoes to walk on the epoxy after it had been all poured out onto the floor because I was no longer going to be able to dip and roll it while walking myself backwards out of the garage.

So after convincing my floor coating rep that I understood the process of installing 100% solids epoxy, I bought a kit and took it to a customers garage. I was super excited! So I mixed up the part A and Part B in a bucket before I realized that I had forgotten to buy the spike shoes that were necessary to walk on the floor coating without leaving foot prints. I didn't think it all the way thru so I was sort of stuck since I had already mixed up the 100% solids epoxy. I couldn't just leave it in the bucket to "possibly catch on fire" like my rep said, and I couldn't pour it out because I didn't have the spike shoes I needed, so I quickly decided that I would have to try and dip and roll the floor from the bucket like I usually did except I would do it super fast. So I started dipping and rolling as fast as I could and a few rows into it (after covering about 10% of the floor) I noticed that the epoxy was getting thick like cold pancake syrup, so I kept rolling as fast as I could but the bucket started to smoke a little bit, so I kept dipping and rolling, but the epoxy was getting thicker and thicker after each dip because it was rapidly hardening in the bucket and it was smoking even more now. The smoke in the garage was getting so dense that I was concerned that smoke might be visible from the neighbors house and they might think there were a fire, but I didn't have time to stop and worry about that because I needed to get this floor covered asap. I had only covered about 25% of the floor when I stuck my roller back into the bucket one last time and the epoxy grabbed my stick. I couldn't pull the stick back out of the bucket because the epoxy had hardened around it. Plus the epoxy had my only roller frame and I wanted to get it back, so I started to tug on the stick in the bucket. It was a tuff fight, there I was playing tug-a-war with my stick against a smoking hot bucket in some guys garage when I looked inside my customers window and into the kitchen to see the customer with his wife and two teenage daughters eating cereal and watching me! LOL! It was embarrassing! After the customer put the spoon back into his mouth one last time he came outside and asked "Is there a fire?" We both started laughing!

I said, "No." and that "I had probably gotten a bad batch of epoxy." I tried to act cool like I had it under control, and he thankfully went along with it so as not to embarrass me any further. He didn't ask any more questions after that. I came back the next day and fixed the floor.

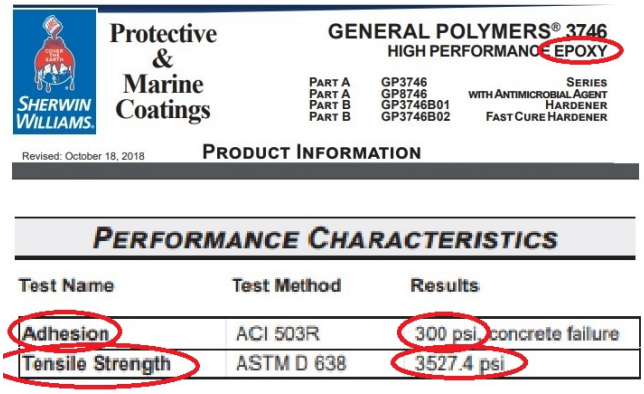
After I started using 100% solids epoxy floor I felt better about my floors because I was able to saturate them completely with chips for a marble/granite appearance, but I wasn't satisfied with the clear coat. I was still using a high solids urethane called Armorseal Rexthane which could only be applied at 3 mils thick (most urethanes can't be applied as thick as epoxy without shattering) and the chips pretty much soaked up all of the 3 mils of clear coat which meant the heavy chip floors were still pretty rough. People often complained that they couldn't walk on the heavy chip floors with their sox on because the chips sticking out of the floor would snag the sox and rip them apart. So I started to offer two coats of Armorseal Rexthane but this was expensive because I had to come back another day and I was still only getting 6 mils of clear coat which didn't completely resolve the sox snagging problem. I did a floor with 3 coats once which was about 9 mils thick and I was really happy with the results, it didn't snag my customers sox but it took 4 days to install so I talked to my rep about an alternative urethane that could be installed at 10 dry mils thick in one layer. First he recommended 100% epoxy in clear because it was easy to install but the draw back is that epoxies have very little stain resistance, they scuff easily and turn yellow. Some epoxies claim to yellow less than other epoxies but that's a losing argument because they all yellow. (You never want to use epoxy as a clear to coat, it does not stay clear, it has a

milky dull look and catches stains all over it.) I didn't want to have clear coats that easily scratched, scuffed, stained or turned yellow. So he told me about a material called polyaspartic which was a fast drying 100% solids urethane that could be installed at 10-30 mils thick, but he was cautious about selling it to me and warned me that it was very difficult to master because it required two people working quickly and in unison because it dried super fast. I had told him about my fight with the smoking bucket in the garage so he joked that the 100% solids urethane was a tougher fighter and would probably beat me up too. So after a lot of coaching he sold me a kit of polyaspartic 100% solids urethane and we did a great job installing it. It was just a matter of knowing the process and following it. The floor was beautiful. It gave me that thick clear coat appearance that I had seen in that first heavy chip floor a few years prior.

Just so you know, after you pour out 100% solids epoxy onto the ground it takes all night to dry (since there is no weight on top of itself causing combustion and a fast dry) which is nice because you can take your time rolling it and throwing chips into the surface of the epoxy. As long as you mix it right and have your spike shoes and pour out the epoxy immediately 100% solids epoxy is actually very easy to install, once it is poured out there is no rush which means one person can mix it, roll it out and take their sweet time throwing chips because it won't start getting for a while. 100% solids urethane is the opposite. It is not as reactive while under compression therefore 100% solids urethane has a slightly longer pot life (it can stay in a bucket about 15-20 minutes after being mixed) but it dries super fast after being poured onto the floor. 100% solids urethane polyaspartic dries so fast when poured out that you need one person rolling it while another person throws chips behind them. If one person pours and roles out polyaspartic by themselves the back of the floor will already be dry by the time he gets to the front of garage so that it will be too late to throw chips into the back of the floor. One person could pour, roll, and throw chips in rows as he goes but it is an extreme amount of fast paced work for one person to do alone. You really need 2 skilled people to install polyaspartic on a garage floor. Anything good requires skill to use. Polyaspartic will be dry enough to walk on in only 2 hours and could have actually driven on the floor in 12 hours had it not been for the epoxy underneath the urethane that I had installed the day before which required 72 hours before it could be driven on.

Up until that point I had always been told that urethane was better than epoxy in everything except for adhesion which was why epoxy had to be put down first and urethane on top. And this was true until they finally made a urethane that stuck better than epoxy. One day I was reading the data sheets on the new and improved 100% solids polyaspartic urethane that Sherwin Williams started selling me when I noticed that the adhesion strength to concrete was greater than that of epoxy. I was shocked! Typically speaking urethane data sheets don't show an adhesion strength listed because they aren't good at adhesion. Manufacturers have free reign to list the performance characteristics of their products as they see fit, so they naturally only show what their product is good at. so when I saw that the adhesion strength of the new polyaspartic urethane was actually being listed PLUS it was greater than that of epoxy I was thrilled! Not only was finding the strongest overall garage floor coating my goal but finding one with the characteristics of urethane (flexibility) was the other. You see, epoxy isn't flexible at all, it is rigid and brittle which means when you put it over cracks in concrete then the epoxy will crack, buckle and peel because it can't stretch. When I was using epoxy as the first layer about 95% of the phone calls that I had gotten about floor coating failures had been in locations directly on top of cracks in the garage floor. That is because all concrete cracks move, they have to. If you have a crack down the center of your garage floor then you have two different concrete slabs, when it gets cold at night time each slab shrinks making that crack between them larger. When it gets hot during the day the two slabs get larger and that crack shrinks. Most of my epoxy failures over cracks on epoxy floors were during the heat of summer or the cold of winter because that's when there is the most stress on the coating that is bridging over the cracks, and I was regularly getting these types of failures due to the

nature of epoxy. But if you were to replace that brittle epoxy with a flexible product like urethane you would eliminate these types of failures which are very common for epoxy. But I hadn't been able to replace my epoxy primer up until that point because urethane wasn't typically recommended directly to concrete because it had previously never been manufactured in a way to yield a high adhesion strength.



Protective & Marine Coatings

GENERAL POLYMERS® 3746
HIGH PERFORMANCE EPOXY

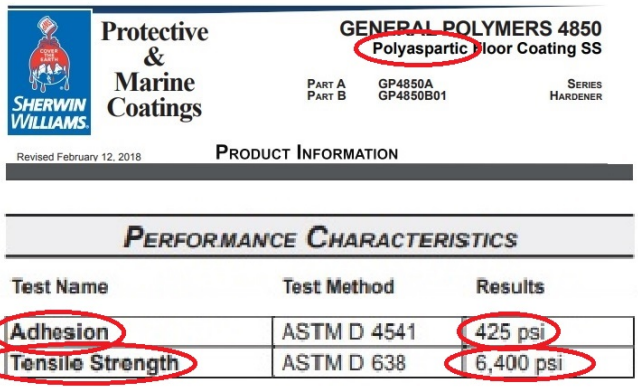
PART A GP3746
PART A GP8746
PART B GP3746B01
PART B GP3746B02
SERIES WITH ANTIMICROBIAL AGENT HARDENER
FAST CURE HARDENER

Revised: October 18, 2018

PRODUCT INFORMATION

PERFORMANCE CHARACTERISTICS

Test Name	Test Method	Results
Adhesion	ACI 503R	300 psi, concrete failure
Tensile Strength	ASTM D 638	3527.4 psi



Protective & Marine Coatings

GENERAL POLYMERS 4850
Polyaspartic Floor Coating SS

PART A GP4850A
PART B GP4850B01
SERIES HARDENER

Revised February 12, 2018

PRODUCT INFORMATION

PERFORMANCE CHARACTERISTICS

Test Name	Test Method	Results
Adhesion	ASTM D 4541	425 psi
Tensile Strength	ASTM D 638	6,400 psi

After I replaced my primer with urethane the number of phone calls that I received about peels over cracks decreased ten fold and my customers were pretty impressed with the 1 day installation. A lot of people tell me they could not get this done if required more than one day because they are not able to leave their valuables outside for more than 1 day. We are now able to grind the floor in the morning. Patch the concrete cracks and install the urethane and chips onto the floor in the early afternoon then come back an hour later to scrape the chips and clear coat the floor. Our customers can walk on the floor the same evening that we start the project (2 hours after installing the clear coat) and 12 hours later they can park their car on it because it is ready for FULL use in ONLY 12 Hours! We have been using polyaspartic successfully for 8 years now. This is where we are now. Technology now allows us to install a garage floor that is not designed to fail, and it allows us to do it in one day. Now you understand the nature of concrete, the nature of cracks, the nature of epoxy, the nature of 100% solids products and the superior nature of Polyaspartic Urethane.

Donald Eugene Sanderson Jr

HoustonGarageFloors.com