

# TRIPOLI GERLACH

## Research Rocketry



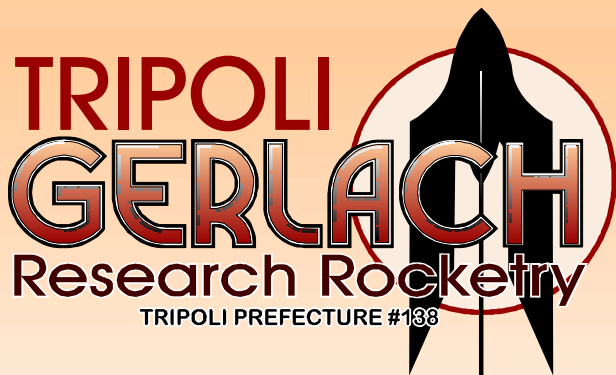
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**PUBLISHED EXCLUSIVELY FOR  
THE MEMBERS OF TRIPOLI GERLACH  
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Tripoli Gerlach was founded as a National Prefecture under the Tripoli Rocketry Association, Inc. Devoted to Research Rocketry and the Black Rock Desert area of Nevada, we welcome all National Tripoli Members, no matter their location or Certification Level.

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**[WWW.TRIPOLIGERLACH.ORG](http://WWW.TRIPOLIGERLACH.ORG)**

**ON THE COVER** Tripoli Gerlach member Guillermo Descalzo came all the way from Argentina to capture his Level 1 & 2 at Black Rock. He formed Argentina's Rocketry organization ACEMA and has written a book on Rocketry in Spanish.

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## THE EDITOR

Our membership is intact for 2014. Nearly all members renewed with us only losing 3 people.

This issue is devoted to rocket finishing and painting. Well not the actual finishing and painting but things you may find of interest in you rocket finishing activities.

We are also featuring our newest "foreign" member, Guillermo Descalzo, a very accomplished rocketeer in his homeland of Argentina. Guillermo is on our cover this month and has written a small editorial. You can visit his shop on page 19 of this issue.

The HAMSTER DANCE WebSite is up and running with some new information regarding our Waiver and some new rules to make the event more challenging..

Last for those of you who wonder what some of us do when we come out early for the BALLS launch, there is a new website several of our members support. Check it out at:

**[www.brxs.org](http://www.brxs.org)**

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# EDITORIAL

## GUILLERMO DESCALZO

In September 2013 I first went to Black Rock Desert to attend BALLS 22. I learned of the existence of BALLS via the internet, about fifteen years ago when I started looking for information to get back to rocketry, my childhood hobby. About the same time I learned about the existence of the Tripoli Rocketry Association.

In 2003, along with other rocketeers of Argentina, we had the idea of forming a local society of rocketry, which today is our ACEMA (Argentina Experimental and Model Rocketry Association), and in 2004 we started our local CanSat Program.

For those things about life in general, and of our country in particular, things like money, different circumstances, my job, etc., I planned a trip to the USA in 2010. At that time I began to evaluate the idea of participating in a rocketry meeting in the U.S. And finally I was able to go to Black Rock, the legendary desert of northern Nevada, in September 2013. In retrospect, I can say it took me a few years to schedule this trip, but again I said "IT IS POSSIBLE", and, as I always say to my children: if effort is made, working and studying, hopefully things finally come. In the meantime we passed through hard vicissitudes, some health problems, complex family situations, economic losses, etc., but we must move on.

From the point of view of any Argentine rocketeer, Black Rock is seen as "The Mecca" of Rocketry, the mythical place where the most interesting things happen. But from a distance, it is quite complicated to arrange a trip there, for several reasons: first, from Argentina you can think that Black Rock is in the middle of nowhere: no airports, there is almost NOTHING near there.

Anyway, to start organizing the trip, I had the possibility to obtain fairly cheap one-way tickets to San Francisco and back from Las Vegas. The rest would be by car. But once the travel problem was solved, the new problem was staying there, in the desert ... It seems rather complicated for me.

Through several E-Mail consults, suddenly emerged several "helping hands". Aid came from Mark Clark and Robin Meredith, of AHPRA. They put me in contact with Tom Blazanin, and he was able to obtain a

room for me at Bruno's, the only place in Black Rock. Finally, a nice room was registered in behalf of "Guillermo and Agustin Descalzo" (I brought with my son along).



In my country there are not any rocket meets the size and scale of BALLS; in fact, rocketry is a very small activity here in Argentina; in a country of 40 million inhabitants, it can be said that less than a hundred people practice rocketry in any form. Additionally, the rules used in Argentina, although they are strongly based on the rules of TRA, are not as strict in the use of materials such as steel in the manufacture of casings and nozzles in experimental rocket motors. It is highly probable that this could be re-evaluated in the near future directly affected by the things learned in this first visit to Black Rock.

In Black Rock, I got to meet exciting people. People who are "living legends" of our activity for many Argentine rocketeers. Without special emphasis on anybody I know I now have many new friends in the U.S. I was able to accompanied these "living legends" to Hamster Dance III and through the three unforgettable days of BALLS 22.

Among the good things that happened to me there I want to mention that I joined The Tripoli Rocketry Association, got my certifications L1 and L2 and I formally joined Tripoli Gerlach Research Rocketry Prefecture. I also participated in their annual Friday meeting (the famous "spaghetti and meatballs" dinner!), and I participated in the election in which Gary Rosenfield emerged as current Prefect of Tripoli Gerlach, with Tom in the office of Secretary and Dave Rose as the best Treasurer ion the Far West.

If all goes well, I'll be back at Black Rock in 2014, but this time I'm bringing some Argentine rocketeers with me.

I look forward to meeting again with all of you there!

# BLACK ROCK ADVENTURES

*Another high adventure in Trekking Black Rock when you show up a week before a major rocket launch. We've had interesting response for more articles like these so here we go again. Hope you enjoy this one. It would be more enjoyable if you joined us early and have the fun with us.*

Well the day got off to a flying start and never stopped! Joe met a Burning Man floozy at breakfast and run off with her. He now has a tattoo and two body piercings. At High Rock Canyon Jason fell and broke his left leg, two ribs and cut his nose. Dave rolled his Blazer racing a train - and Tom is in jail.

Sounds like a bunch of tale tales but the truth is even greater! And we have photos!!

We left Bruno's after breakfast with the intention of visiting XPRS EX day. But on the way to the lake decided we really didn't want to see what we see all the time and headed out to the petrified wood area for some collecting. As usual the cattle were everywhere. They don't know the difference between grass and asphalt. (Dave wants to know if a head to head confrontation with a bull is still called playing chicken or playing cow?)

We reached the petrified wood area and with tools in hand began our hike. We found a good number of specimens, especially the white kind with nice opaline finishes and beautiful linework. Dave found the best specimen with almost the whole sample made of clear quartz. We also found a trunk made almost completely of multicolored agate. (Note: Next year bring jack hammer and explosives). This was a good workout for our further hikes to come.

Our next destination was a trapper's cabin at the north end of High Rock Canyon on the Emigrant Trail. Problem was getting there. The road through High Rock Canyon is good then bad then good then bad. Getting to the cabin would involve traveling over 90 miles out of our way and on gravel and dirt roads, mostly dirt - or we should say rock! We would discover a place called Vya



and a ton of the most interesting sites on the trek to Steven's Camp. (Note: Next year bring BIG off road vehicle)

On the way to Steven's camp we found Painted Point, a huge mountain of natural colors that you would have to see to believe. The brilliant orange band near the top was indescribable. It would be worth a trek closer for possible rock collecting as it has the most outstanding colors nature could provide. It is something like 6,000





MSL and I doubt any of us could really make the trip to the top (maybe Joe without the cigar). The back side is a long slope upward, possible to walk, a long walk! Then once at the top would we be able to access the face of the cliff where all the colors are. Sure would be nice find out what makes the brilliant orange band at the top.

Next we found a Land Shark. Like Snoopy Rock on 447 on the way to Gerlach, the Land Shark is a rock formation that

someone painted a mouth and eyes on. It raises out of the ground head first with its tail a hundred yards behind going into the ground. Joe got too close and it grabbed him in its mouth but we were able to save him before it dove back under!



We passed Massacre Lake, a large RED dry lake. Probably got its name from the blood red color - different! Another possible destination for another adventure.

Still heading for Steven's Camp we spotted what we thought was large boulders of Obsidian. Smaller samples are all over the place and we assumed this was like a mother lode. It turned out to be very loose matter made up of small Obsidian "crystal" like pieces loosely bonded together with smaller bits of rock and junk. As if it was never hot enough to form Obsidian yet hot enough to flow and collect junk.



Just before the North Gate of High Rock Canyon we reach Steven's Camp. Back in the 30's a guy named Steven built a concrete block cabin on BLM land without the Feds knowing about it. He stocked it with food and water and furniture and its purpose was to provide shelter and safety to trappers and hunters during bad winter months. The door was left open to anyone who came upon it. The BLM eventually found out about it and it is now a Federal building still there under its original intention. We met an assist group based there for the day to meet cyclist biking through High Rock Canyon. We also explored the amenities of the cabin and must admit, while rough it is really set up nice as a safe haven.

On the road again to, of all places, OREGON! As usual the road was a wonder of visual sites. We even found a Jaba the Hut rock. No paint needed as it was great just the way it is. More cows, more sites. We passed through Cedarville California and up over the mountains heading inland. Before we reached Oregon we came across a gigantic lake (wet) called Goose Lake. Really really big and an impressive sight from a road cut high above it. Great panorama pictures!





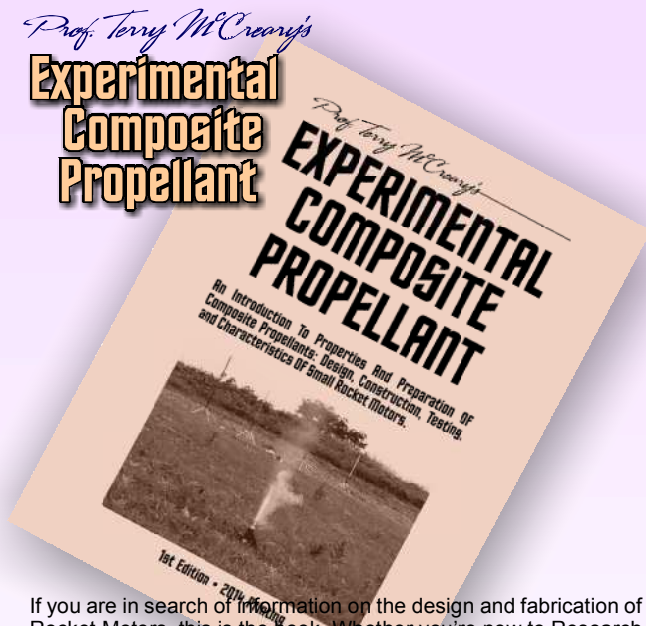
We eventually reach the border and stopped for a photo op. We notice a piece of Obsidian we had placed on the running board of the car back near the Obsidian rocks. It was still on the running board! - So we left it there, drove further into Oregon to make it legit and then turned around for dinner at the Black Bear Restaurant in Susanville, California - a hundred and twenty miles South!

Black Bear Restaurant is a place we had eaten before and had always wanted to return. The food is good, the portions are big and the price is right. They now have one in Fernley. The four of us ordered and the waitress had to come back and inform us everything we ordered was OUT! So a second choice was made and it still lived up to our expectations.

It was dark now, around 9pm and we headed back to Gerlach through Smoke Creek. The road, called Gerlach Road, was the worst ever with over 50 miles of



continuous washboard from Susanville to Smoke Creek Road. We didn't kill as many jackrabbits as last trip but we tried! Or I should say they tried! We reached Gerlach about 11pm. The town was closed except for Bruno counting his dollars in his lonely lit office. We put on just shy of 500 miles (100 on paved road!)



If you are in search of information on the design and fabrication of Rocket Motors, this is the book. Whether you're new to Research Rocketry or Experienced this book is a must in your library. Order direct from the Professor.

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# ROCKET FINISHING MATERIAL

*This article covers surface finishing materials of applicable use on bare metal, fiberglass and carbon fiber up to the final color paint application. It does not cover polyester & epoxy resins. While many people do things differently these materials presented are basic and time proven. Surface paint will be covered in a separate and unrelated article.*

When building rockets one puts a lot of work into learning all about how they operate and how they go together. But there is more than just that. Finishing High Power Rockets is as different in building compared to ordinary Model Rocket. Model Rockets using basic white glues and light weight putties and primers to obtain their smooth look. Weight is a major factor so you really have to build light.

High Power rockets require more structural integrity and weight in some cases can be an asset. Epoxies are the adhesive of choice. There are several good ADHESIVES and EPOXIES you should become familiar with covered in other documents. But in addition to these there are other building materials you should also become familiar with. High power rockets are subject to massive stresses and need materials that can stand up to them. Keep in mind you are also no longer working with cardboard.

Many people approach their high power building using materials of choice. Many times these are items not readily available to the average High Power builder. We'll try to keep our selection to stuff readily available without special ordering. All of these things are available in most any auto parts store or bodyshop store, which are plentiful and located in nearly any town of size. Despite their title a Body Shop Supply Store is open to anyone walking in off the street. Prices are the same for anyone but unlike a Body Shop you'll have to pay tax.

## FILLERS

The first item we'll present is DURAGLASS. This is a product of USC. It is an Epoxy filler; a thick green colored substance that has unbelievable bonding character and strength. It bonds great to metal, fiberglass, carbon fiber, phenolic and wood. It comes with a small tube of hardener for curing and if not over used the little tube of hardener will last the whole can of product.

The hardener usually is blue for DURAGLASS however any color, red or white, will work the same as



they're all the same. The color is there to aid in the mixing process.

There is a similar product called TIGER HAIR which is DURAGLASS, or equivalent epoxy filler, containing fiberglass fiber strands. While this is good in the automotive industry, for building rockets its aggravation factor outweighs its usefulness - don't use it.

When DURAGLASS hardens it is HARD. It is best to shape sand it with 30 or 40 grit dry sandpaper just after it begins to set. Work to a finer paper, 80 or 120, as the final shape nears.

Keep in mind this is not a finish product so your desired shape need not be perfect, but good enough that a final top coat of filler will be needed. The DURAGLASS is best used, once a fin is secured with epoxy, as a fillet on

a motor tube or a small fillet on a fin to airframe application. Remember most to sand it while it is still somewhat "soft". Once it hardens, it can still be sanded but it takes more work.

DURAGLASS can be purchased in a smaller can for convenience. Since you do not use a lot of this, when building a rocket, there is no need to buy a whole gallon when a quart will last quite awhile.

Once you have a solid DURAGLASS fillet shaped you can move to another filler from the automotive industry. The good old stand-by BOND0. This is a grey colored polyester filler used for finish shaping. It also comes with a small tube of hardener and even though its polyester the hardener is the same used with DURAGLASS. Usually it is red but again the blue or white works the same and helps aid in mixing.



There are several version and brands that all work well. BOND0 was one of the first and its name became a generic term for polyester filler. Top it off it is probably the cheapest and yet far from the worst. There are versions given the title LITE or GOLD or FINE. These are pumped with air to actually make them light weight and also easier to sand. Problem is they cost more and you actually get less.

Unlike Epoxy fillers, Polyester fillers can be shaped just after kicking off with a rough sandpaper however if let

to sit overnight you will find BOND0 sands best when actually HARD. This also works well when re-skimming to fill low spots. The new soft BOND0 will sand easy while the hardened stuff maintains shape and you can even things out quite nicely. If sanding continues you will work the older stuff as well so pay attention and sand with fine paper.

There is a second Polyester filler you might be interested in. Made by USC it comes in a large tube and is called ICING. It too uses the same hardener as DURAGLASS and BOND0. It is a very smooth fine textured "bondo" material used best for final skimming. Called a finish putty; it is no more than a Lite version of BOND0 taken to the extreme. It is very smooth to work with and ideal for filling sand scratches and "pin" holes in the work you've already smoothed.



The three items thus far mentioned all have one thing in common and most important to their proper use. Never apply any of them over primer or paint. They work best, getting a good etch bond, when applied directly to a raw well sanded surface. Again, the surface can be fiberglass, wood, metal and even cardboard.

These fillers are mixed and spread using plastic squeegees. Rubber squeegees and even pieces of old leather belt will also work. You want to use something that will conform and shape the filler to the desired surface required, for us usually a fillet. Repairs on nose cones and airframes are also subject to curves and a good flexible squeegee is necessary.

Also with these fillers watch your sanding. Without experience you can very easily over sand and end up constantly reapplying filler to bring up to shape. When you're finished surface does require a re-coat of filler identify the exact area and circle it with a pencil. This will make it easier to find with a squeegee full of filler in hand.

Another trick for finding imperfections, with filler or final finish glaze, is running your fingers over the surface - with your eyes closed. Looking at the surface



while feeling it doesn't work as your eyes tell your fingers everything "looks" good. With eyes closed your fingers are more sensitive and it is amazing how much you will find.

Last note for fillers is that their finish need not be final. Strive to get it really good but keep in mind fillers are not the final surface.

## PRIMERS

We cover Primer Paints next as they are actually the next step. We will only cover primers here as finish paints are an article to themselves. As stated never put fillers over primer or paint. The next most important thing about primers and paints, both, is never use RUSTOLEUM!

RUSTOLEUM is a product developed by Norwegian Whalers to protect their ships from rust and sea corrosion. It is fish OIL based, which means while it's great for rust protection and re-coating with other RUSTOLEUM products, makes your lawn furniture and railings look good for a long time, they will not be compatible with GOOD and expensive "real" paint. In most instances your use of RUSTOLEUM primer will cover your project perfectly and you will be thrilled - until you apply your good paint final coat and all hell will break out with what is called, in the paint business, fisheyes. RUSTOLEUM paint also has a very long soft life. This is due to the oil contained. Handling newly sprayed RUSTOLEUM creates havoc to your finish. While it may seem dry and you can handle it you will find even slight pressure will leave permanent finger prints - even days after spraying. It seems RUSTOLEUM never really dries! Best advice, if you take advice, is never use RUSTOLEUM on rockets.

The best primer is regular automotive primer used in commercial body shops. It comes in various colors, gray, red, green, yellow, etc. While ideal and very usable their cost is up there. Besides the primer you'll need thinner and a spray gun and a compressor, all of which the average rocket builder does not have.

Spray cans are the answer. They're relatively inexpensive and readily available. They also come in various colors: Gray, Red and Black. There are also two types of primers: Sanding Primer and Filler Primer.

KRYLON Primer will work but their coverage and build is limited. DUPLI-COLOR is available in AutoZones, Advanced Auto, PepBoys and most auto parts stores across the country. DULPI-COLOR makes both Sanding Primer and Filler Primer along with compatible color top coat paint for the automotive industry. This is your best bet. Be sure to read the words on the can. One emphasizes the fact to look for the words Filler Primer and Sanding Primer.



Sanding Primers forms a hard surface finish, very thin and with almost a highlight shine. This primer is best used as the surface coat before the first color coat of paint. It is sandable but they never tell you to sand it with steel wool or an extremely fine dry paper just to break the surface so the color paint can bite in and bond. Anything more and your nice smooth surface will have more scratches and need recoated. Sanding primer can be wet sanded to a nice smooth finish, but again using extremely fine wet paper only.

Filler primer is what works best when working for a smooth uniform finish. It has a high build up of product when sprayed that fills scratches and pin holes leaving a soft looking mat finish. You can put on several wet coats and it will build up thickness. Sandable Primer does not build up thickness it actually goes on much like paint in thin layers. Filler Primer builds up material and is easily sanded using wet or dry sandpaper from about 320grit to 600grit. It dries, the same as Sandable Primer, very quickly.

When sanding a light pressure works best. It not only lets the sandpaper clear itself it also helps leveling high and low spots.

When buying spray paint look to see if it has a fan nozzle. This creates a vertical fan pattern when spraying. It can be turned horizontal if needed. Unlike "normal" spray can buttons that send the paint to the surface in a round pattern, susceptible to runs and banding of color, the fan button imitates a regular spray gun pattern for a more uniform covering.

The photo on the next page shows a Can Gun mounted on a spray can. This is a handle tool available in almost any hardware store, Auto Parts store, Wal-Mart's,

Harbor Freight or Home Depot. It lessens finger fatigue when pressing the spray button and actually allows for better control of your spray pattern.

## GLAZING PUTTY

GLAZING, sometimes called Stain, is usually a nitrocellulose product. That is it is very very thick Primer. It is made by 3M under the DYNATRON name and sold as a BONDRO brand product. It is available in Auto Parts stores anywhere you can buy BONDRO products.



hole filling less than 1/16" deep, way less. Again, do not try to use it as filler. When applying Glaze use a rubber squeegee and drag the product toward you. The second squeegee of Glaze should be drug onto the first application. Do not start on the first and drag away. You'll crumble the glaze and rip open what you've already got smooth. See the diagram at the bottom of the page.



A similar product called NITROSTAN is an equivalent, although they do the same thing somewhat differently. NITROSTAN is considered "old school" by the automotive industry today, even though it is a superior product. You will find the Bondo Brand Glaze more readily available and cheaper.

Never apply this to bare surface. Body Filler is considered a bare surface. Glaze requires primer to be applied first for a compatible bonding surface. It does not work at all with RUSTOLEUM. It also, unlike fillers, requires thin layer application. Putting it on thick will require very long drying time, if it ever does, and when sanding it will crumble and rip open.

Glazing Putty will sand really easy if little pressure is applied. It is ideal for sand scratches, imperfections and pin

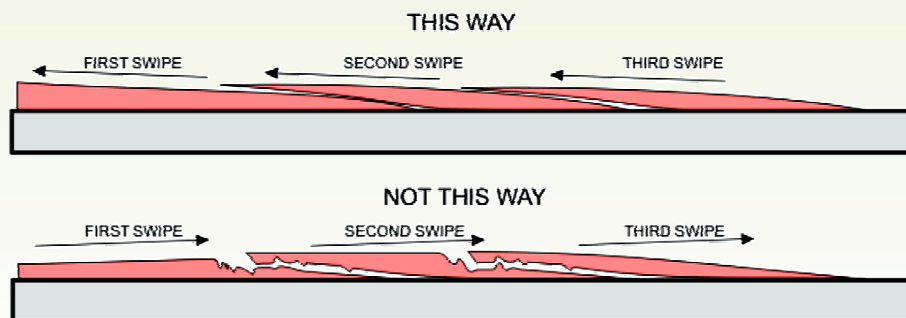
The BONDRO brand GLAZE dries with a soft look. It is best dry sanded using 320grit sandpaper or finer. It can be wet sanded however, if it is too thick or gets too wet, when it dries it will actually crack and you'll go crazy trying to re-glaze it. Sometimes the "dry cracking" will not show up until after you begin applying your finish color paint.

NITROSTAN, on the other hand, dries with a smooth hard shell look. It is best wet sanded. It can be dry sanded but only with experience. After wet sanding it does not crack upon drying unless you've applied it too thick. With both products a little bit should be all that is required. Remember these are finishing glazes. What you see is what you're gonna end up with.



Once the glazing operation is done apply one or two coats of Sanding Primer. When this is dry you can wet sand with 400 grit paper or dry scuff with steel wool to break open the surface for paint bonding of your color coat. Many people have their own ways of doing things and favor various products available. The products mentioned and shown here are basics and should perform well and meet anyone's expectations.

**The diagram below shows the proper way to apply both BONDRO and NITROSTAN Glazing Putty.**







*This is just an overview of paints readily available for application painting a rocket. It is not meant to be all encompassing yet may present some information little known to most readers.*

Painting rockets brings out the pride in all of us. We want our creations to look good making the viewer spend more time examining all of the work we put in to it. Of course some of us are just show offs at heart but no matter how you approach it, like in a Car Show, the finished paint makes or breaks the appearance of your hard work.

The most ideal paint for a rocket, for that matter any sort of vehicle, is Industrial or Automotive Paint. These provide without question the most number of colors AND, again without question, the best finish and shine. The problem with automotive paint is it requires equipment and facility not many of us have, nor can afford.

Spray guns, compressor, a substantial paint area and material adds up rather fast just to paint a rocket. So unless you already have a body shop, or a good friend who has one, Automotive paint is not economical. This leaves us with one solution – Spray Cans.

### **RUSTOLEUM**

There are many brands on the market, each offering various solutions to paint needs. One assumes at the top is RUSTOLEUM, and it probably is BUT not for our use. Rustoleum paint was developed by Norwegian fisherman who needed a good paint to protect their



fishing boats from the harsh sea weather and environment. They put fish oil into their paint. This did a great job keeping their ships from rusting and from old rust spreading. It is nearly incompatible with any other paint and it NEVER really dries.

Auto body painters will tell you one of the worst problems in metal finishing is oil stains from hands and rags. When applying fresh paint it forms circular rings and blemishes in the paint called “fisheyes”. Automotive paint will not set over this form of contamination.

On a rocket you have no rust, nor a need to protect from it. You do not want a good protective finish to turn bad due to incompatibility with under coats. And in particular it would be nice if the finish formed a good hard surface. Rustoleum never will. It may feel dry but in reality the oil contained in it never evaporates and even after quite awhile it is possible to embed fingerprints into the paint. Don't ever use Rustoleum.

### **KRYLON**

So we ask what paints are readily available in spray cans? Just about any hardware store or home improvement store has several selections available. The one most common is KRYLON. This is a general purpose paint great for just about any home use you have. And it works well on rockets.



There are several variations of Krylon for different applications and finishes. The straight Gloss is what you want to look for. They also have Satin and Mat. Their Metallics, while very acceptable, do leave something to desire. Their Clear coat is waste of a dollar. And forget their primers.

Krylon paint is inexpensive (around \$2.95 a can average) and that should tell you something. It is not meant for industrial applications. It will scratch and fade with time. Their best product, Gloss, does finish out with a really nice gloss but only if sprayed under ideal conditions as described on the can. With ideal conditions and application on small rockets Krylon Paint can dry to a really impressive gloss finish using only the color paint and no clear top coat.

Larger rockets tend to have a problem. Your paint surface on a large rocket is so big that the applied paint dries before you can return on your spray pattern. This actually leaves the finish “dull”. No amount of recoating will gloss it up. Attempting to apply a Krylon Gloss Clear will really achieve nothing. Again this is on large rockets.

## DUPLI-COLOR

A company called DUPLI-COLOR makes spray can paints to match factory automotive colors. It's used for small touch up jobs on cars and trucks. It can be found in most any auto parts store such as AutoZone, Advanced Auto, PepBoys and others. They make Spray Can primers in several colors and in primer, both Filler and Sandable versions.



Dupli-Color is more expensive than Krylon (about \$5.95 a can), but then it is a better paint. While it cost more it is still very affordable. When sprayed on large rockets it creates a smooth nice finish. Not quite gloss yet not as dull or flat like Krylon. The metallic colors cover well. Overall Dupli-Color finishes are more impressive than the average Krylon finish. The metallics are uniform with less streaking.

Several Candy colors are available as well as high metallic bases. Some very interesting finishes can be created with

these. Dupli-Color also seems to blend better than Krylon when you are trying to fade one color into another.

When Dupli-Color Clear Coat is applied life jumps out on any color, solid or metallic. Dupli-Color Clear provides the best in wet coat covering and under ideal conditions can provide a very shiny, but not glossy, finish – if that can be understood. Best thing about Dupli-Color Clear is it can be used over Krylon with very similar results.

If you do not have access to serious Automotive paint material and facility both Krylon and Dupli-Color are your reliable solutions. In both cases it is important to look at the spray nozzle. Spray cans today can have a high tech nozzle which sprays the paint in a Fan Shaped pattern. This mimics a regular spray gun and eliminates the standard round ball pattern of regular spray cans. Any brand you buy make sure you get the Fan Pattern Nozzle. It will tell you on the label.

## THE SECRET

With all that said so far there is a way to achieve an Automotive Gloss Finish with Spray Cans. And yes it is relatively EXPENSIVE (\$39.99 per can). This system provides Automotive Urethane Paint in a single can containing both the paint and the catalyst. Most Spray Cans have a nozzle at the top to dispense the paint. These “secret” cans have the top nozzle and at the bottom of the can they have a puncture button that when pushed releases the catalyst into the contained urethane providing true automotive paint in a Spray Can.

## ALSA

A paint company out of California makes these KILLER CANS in a fantastic selection of colors, clears and even special effects.

Primarily used by custom car & bike painters these spray cans deliver what all the others can not. A good hard glossy catalyst paint.

ALSA has perfected the catalyst paint in a can that offers true Automotive Urethane Paint that is easy to apply. The secret is now out.





KILLER CANS have a wide variety of custom base coats, candy colors, pearls & Murano, special effects and even “real” looking chrome that deliver the most realistic look turning a simple fiberglass rocket into one that absolutely looks like metal.

Best part they even spray over Krylon and Dupli-Color provided they are completely dried.

ALSA's secret is in the can itself. On top of the can is the normal spray head designed for a fan pattern and smooth atomizing. Remove the red button from the lid and insert it into the underside of the can. Push it in and the exact amount of catalyst is released into the contained paint.

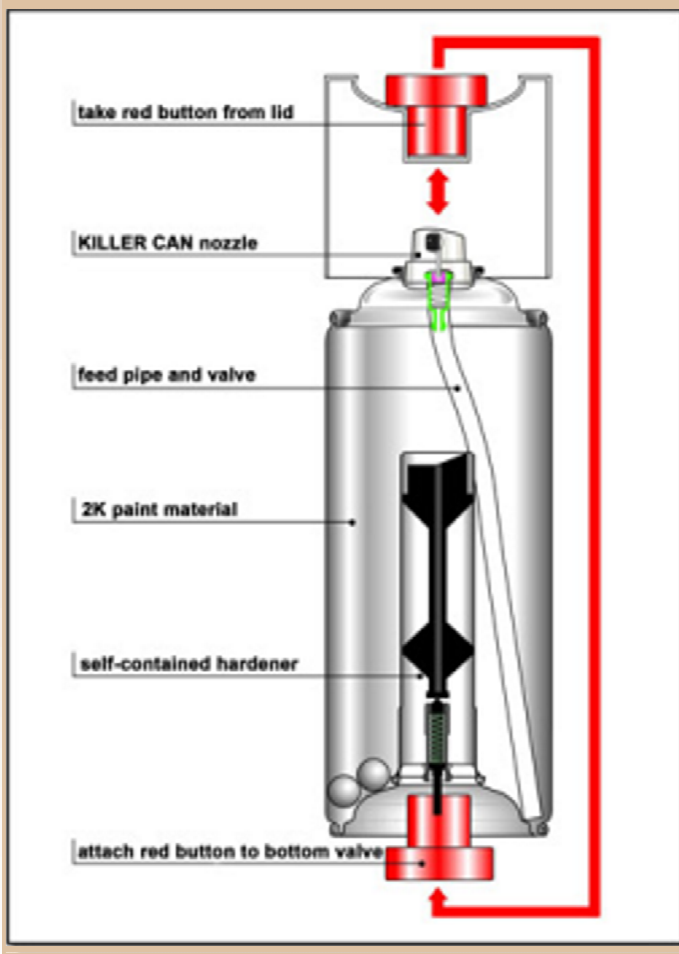
The paint is sprayed like a normal spray can. There is no need to rush as the paint will dry like regular Urethane. Masking is possible in a relatively short time when adding designs or effects.

All of the ALSA products work well together to create outstanding finished. The Chrome paint is their pride but checking out their on-line catalog reveals they can be proud of everything they sell.

So whether your looking for a standout custom paint job on a rocket or just an unbelievable glossy finish, spending the extra dollars is well worth it when using ALSA.

Visit their WebSite and check out all of their custom finish products. The colors and effects are mind boggling.

A special note: about once a year all products go on sale half price. But you may not want to wait!



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# SPRAY GUNS

MOST PEOPLE PAINT THEIR ROCKETS WITH SPRAY CANS. BUT, IF YOU REALLY WANT A GREAT FINISH YOU NEED BETTER EQUIPMENT. THIS MEANS GETTING A SPRAY GUN. THIS ARTICLE COVERS BASIC KNOWLEDGE OF THE VARIOUS TYPES OUT ON THE MARKET AND OTHER REQUIREMENTS. IT MAY NOT BE FOR EVERYONE BUT DOES CONTAIN A WEALTH OF INFORMATION.

The spray gun is designed to aerosolize or atomize the paint by breaking it up into very small particles and then mixing it with the outgoing air.

Spray guns fall into two categories, although each category has several variations or system designs.

The Conventional Spray Gun is called a Suction, or Syphon Feed. This has the paint container attached under the gun section itself. The flow of air through the gun section pressurizes the container forcing the paint up a tube from the bottom of the can and into the gun assembly. (This is not actually a suction effect) The paint is shot under pressure out the center hole of the gun nozzle. Two air holes located on each side of the nozzle blows air, also under pressure, into the stream of paint causing it to atomize the fluid into minute particles to travel to the surface to be coated.

The optimal mixture for paint to air is usually about 2 to 1. The purpose of the gun is to achieve a fine spray of paint/air, resulting in an even application on the intended surface.

Most people assume the air and paint is mixed internally but this is not the case.

Since forever this type of spray gun has been the industry standard, they worked well and with some materials would require a somewhat higher air pressure to operate.

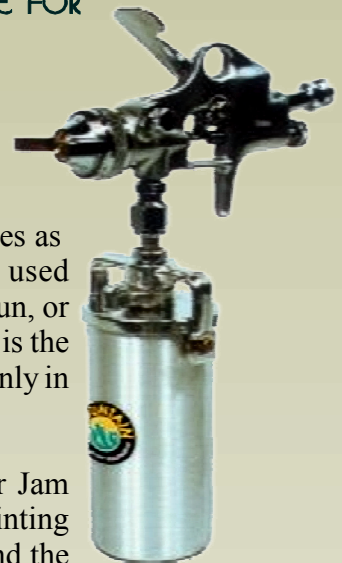
Today they are almost all relinquished to primer paint duty. They can handle the thicker primers and fillers and with their metal containers prove easy to "store" paint, like primers, for a longer period of time. They're durable



and clean relatively easy, even after long storage times.

Syphon guns come in all sizes as well. The second most used syphon gun is called a jam gun, or sometimes a detail gun. This is the same principle of operation only in a smaller hand size version.

In a lot of cases the smaller Jam Gun works ideally for painting smaller rockets. Keep in mind the paint container is small and if the rocket is large you'll constantly be refilling it. It would be best used for secondary color applications or design work.



For proper spraying the mixture of air and fluid must be proper or you will end up with streaks, splotches and runs. Adjusting this is the same for just about all externally mixed spray guns. Cut back all air and fluid. Advance fluid until you have a good stream, then adjust the air to create a thin uniform oval as shown above.

## SPRAY PATTERNS



Not Enough Air

Proper Air

Too Much Air

Not enough air will form a circle. Too much air will form a figure 8 pattern. This is almost about as much instruction on spray gun operation you need other than actual paint types (Enamel, Laquer, Acrylic, Urathane etc) which may be covered in a future article.,

It is also advisable to place an air gauge on the spray gun. This way you can adjust the actual amount of air



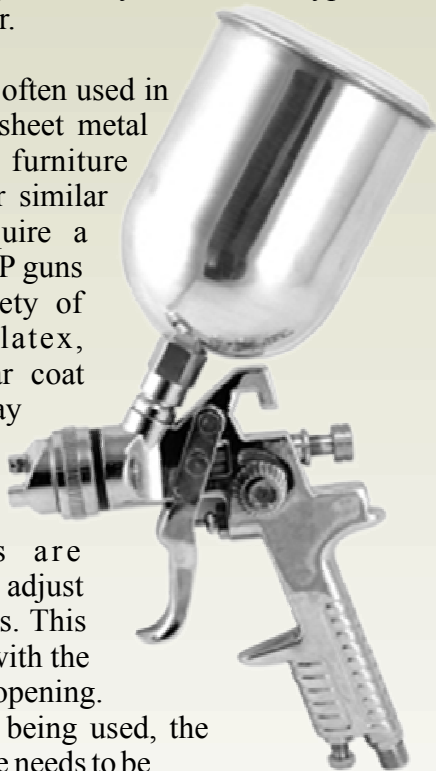
the gun is fed right at the gun. This and the gun adjustments will give you the exact combination for really nice paint work.



Several years ago the painting market had a great change in the type of paints produced, mainly to meet EPA requirements. These new paints could be used in standard syphon feed guns but a “new” gun proved better. Actually it really wasn’t new the High Volume Low Pressure and (HVLP) had been around for quite awhile.

There are two distinct types of HVLP paint sprayers, turbine HVLP spray guns and air compressor driven HVLP guns. Turbine HVLP guns, as the name suggests use a turbine motor to move fins that produce large volumes of air and move it at low pressure through the gun. These are expensive pieces of equipment and their use is confined mostly to professionals. Air compressor driven HVLP guns are far more common and are the type most people recognize today. This is the type of spray gun we will cover.

HVLP spray guns are often used in automotive painting, sheet metal painting, cabinetry, furniture making and repair, or similar applications that require a fine finish. Most HVLP guns can use a wide variety of paints including latex, enamel, lacquer, clear coat and primer. Some spray guns are made for only one specific type of paint and some spray guns are designed to be able to adjust to different paint types. This adjustment has to do with the width of the nozzle opening. The thicker the paint being used, the larger the nozzle orifice needs to be.



The whole point behind using a low pressure approach to applying the paint is to reduce the amount of paint being used to only what is needed to cover the surface being painted. When too much paint is used, the result is called “overspray”. Because HVLP spray guns are able

to reduce this overspray, they are said to have a high “transfer efficiency”. In other words, the gun transfers just enough paint to the surface to be effective, but not too much to produce a splatter and waste. The result is a smooth and even coat of paint.

## PAINT SPRAY GUN SELECTION AND OPERATION

### • What kind of air compressor is required?

You will need a compressor powerful enough to drive your gun. Most air compressors designed for air tools should be able to drive your HVLP spray gun. The important thing to remember is that the air requirements listed on the gun are what the gun needs delivered to it, not what the compressor is required to put out. The best way to make sure what is present at the gun's intake, is to use a spray gun with a built in gauge.

### • How long of a hose will I need?

Hose length depends on how far you want to work for the compressor. Just remember, the longer the hose, the higher the compressor output will need to be to compensate for the added air volume in the system

### • How do I set up the gun?

Turn the compressor on and open the outgoing valve part way until you have some pressure in the system. Pull the trigger on the gun to see what the pressure at the gun is. Then adjust the valve at the bottom of the gun until you have the gun pressure you need. Then you will need to adjust the flow level to achieve the mixture that you need. The adjustment knob for this is at the front of the gun where the paint comes out. Test the pattern the gun is making by doing a few test sweeps on scrap paper.

### • How do I apply the paint?

Sweep the gun back and forth in smooth strokes. You should have smooth even coverage with no running paint. If your paint is clumping up or running, adjust the mix at the front of the gun.

### • Safety.

Remember to always use respirator when using your HVLP spray gun. Make sure the cartridge you are using is designed for paint fumes and particles. Use goggles or other suitable eye protection.

## COMMON TERMS AND ABBREVIATIONS ASSOCIATED WITH HVLP SPRAY GUNS

• **HVLP:** This stands for High Volume Low Pressure. It refers to the fact that the gun uses a high volume of air (HV), and delivers it at low pressure

• **PSI:** This stands for Pounds Per Square Inch. This is the pressure at which the air is moving. Remember that the PSI can, and probably will be different at different points in the cycle. The psi measurement coming out of the compressor will likely NOT be the psi at the gun.

• **CFM:** Cubic Feet per Minute. The rate at which air is being moved.

• **Overspray:** When too much paint is atomized and blown toward the target surface

• **Transfer Efficiency:** Limiting the amount of paint leaving the gun so only the amount needed hits the painting surface.

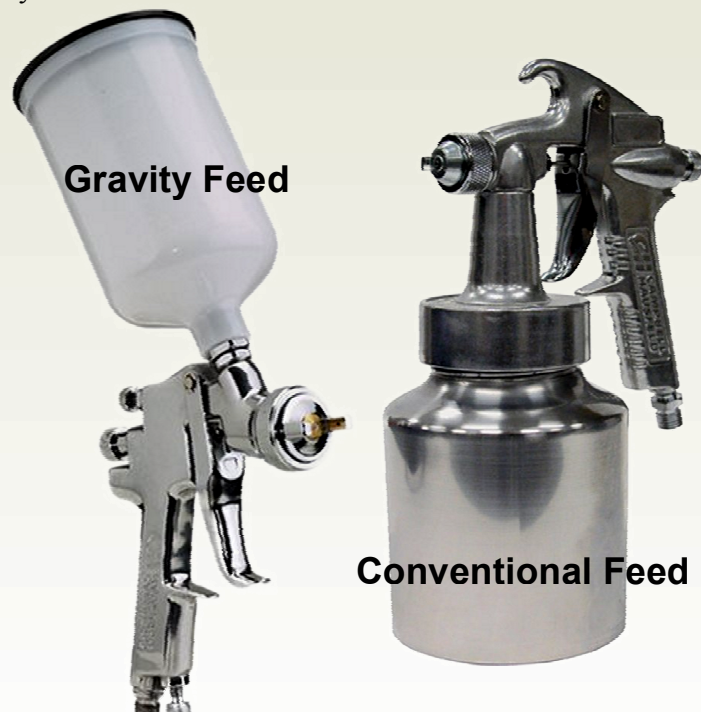
• **ID:** Internal diameter. The width of the inside of the air hose.

• **OD:** Outside diameter. The width of the outside of the air hose.

• **NPT:** National Pipe Thread. The style of the threaded connection of the ends of the air hose and on the inlet of the spray gun.

### GRAVITY FEED GUNS vs CONVENTIONAL FEED SPRAY GUNS

When selecting a spray gun you have a choice between gravity feed (cup on the top) and conventional feed (cup on the bottom). It is really a misnomer to call a conventional feed spray gun “siphon feed” because “siphon feed” has a specific meaning. However, using the term “siphon feed” often communicates “cup on the bottom” to many people. This section discusses the differences between the two systems.



On the left below we have a Gravity Feed Gun and a Conventional Feed Gun on the right.

Conventional feed guns were the first to be widely used in autobody repair. Until the advent of HVLP (high volume low pressure), all conventional feed spray guns were siphon feed.

In the 1980's gravity feed spray guns came into wide use and their popularity has overtaken the use of conventional feed. Painter's have begun to favor them over conventional feed guns and the introduction of HVLP as a requirement by environmental laws made gravity feed the natural choice.

Spray guns all have one thing in common - the atomization of fluid at the tip where the paint leaves the fluid nozzle. There are two passageways in a spray gun - one for air and one for fluid. Atomization is achieved by a vacuum formed by the air rushing past the fluid passage while drawing the fluid into the air stream. At this point, air is mixed with fluid and a spray mist ejects from the nozzle.

In order to achieve sufficient atomization, paint has to be either drawn up from below the gun (conventional feed) or fed from the top down into the nozzle (gravity feed).

In order to achieve sufficient atomization with siphon feed, greater air pressure must be used in order to attain a strong enough vacuum to pull the fluid up the feeding tube from below. The requirement for greater air pressure in siphon feed guns is the main limitation for their use in HVLP systems. It is much more difficult to keep low air pressure and achieve adequate vacuum.

It is obvious that gravity feed overcomes this limitation and less air pressure is required to atomize the paint.

Spraying with less air pressure has the advantages of less overspray, less waste and greater control for the painter. These are the reasons why painters have been switching from conventional feed to gravity feed guns.

Although HVLP is a requirement in most areas, whether or not you use an HVLP gun, gravity feed offers the advantage over conventional feed because of the lower air pressure requirement.

For those users who prefer conventional feed, it is possible to achieve atomization at lower air pressures by pressurizing the cup. This assists the siphon process



by forcing the fluid up the feed tube. You can identify a pressurized cup by the presence of an air tube that extends from the air supply to the cup.

## THE COMPRESSOR

When spray painting it is obvious you need a compressor for the air supply. Paint guns move a lot of product and need a lot of air to do so. A small “pancake” compressor as that used for a nailing gun or to fill tires is NOT WHAT YOU WANT. It may provide the right air pressure BUT for only a few second - even with an air tank built on. You need a compressor capable of producing and holding more than 90psi for a period of time.

Above all do not buy a vibrator compressor. As stated these are fine for nail guns and air brushes but to feed a spray gun, even an HVLP, it ain’t gonna work.

To the right is an example of what is needed, Above the air storage tank you will see an electric motor AND a cast iron two cylinder pump. A single cylinder pump will work just make sure your volume is sufficient. If these are not present you have a vibrating compressor. Don’t let anyone tell you it will work for spraying paint.

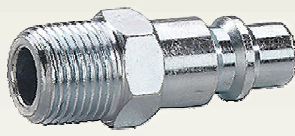
Compressors compress air and so doing force much water out of the air. This finds its way to the gun and can create problems with the paint finish. A water extractor is require. This is place right at the point the air leaves the compressor and enters the air line. This traps any water in the system and keeps it from passing any further provided you drain it regularly.



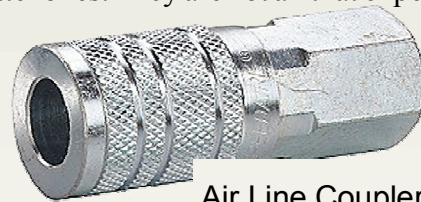
The last thing to consider is Air Fittings. There are several brands and styles on the market. All of them are good as long as they can be quickly connected and released. The cheaper they are the more chance you’ll have they will stick or jam. Pay the extra bucks and get the better ones. They are not all that expensive!



Female Fitting



Male Fitting



Air Line Coupler

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# ALL ABOUT PEM NUTS

In rocketry there are many situations that require attachments to metal, fiberglass and even cardboard that you will find yourself removing time after time. Especially where an Av Bay attaches to an upper, or lower, airframe such as a recovery section.

This is best accomplished using screws and permanently attached nuts. The easiest way to do this is with a special nut known as a Pem Nut.

Also known as Insert Nuts or Captive Nuts, these fasteners are well-suited for use in lightweight materials. To install, simply press the knurled end into a hole using an arbor press or similar pressure tool. They can also be drawn tight using a screw and washer. The knurls cut into the panel to hold the nut in place. Inch sizes have a Class 2B thread. Nuts are not rated for hardness.



There are two types of Pem Nuts: Chinch and Broach. Forget about the Chinch type. Use broach style nuts in soft aluminum, polycarbonates, fiberglass, epoxy, and resin laminates. Actually work well in cardboard and phenolic when a dab of epoxy is used.

At the bottom of the page is a chart for ordering from McMaster Carr. It gives the size of the screw required as well and the material and the McMaster Carr part number.

You can use Button Head Screws or, if your material is thick enough, a Tapered Recessed Screw for a nice flat finish..

The hole drilled for the screw must be precise.

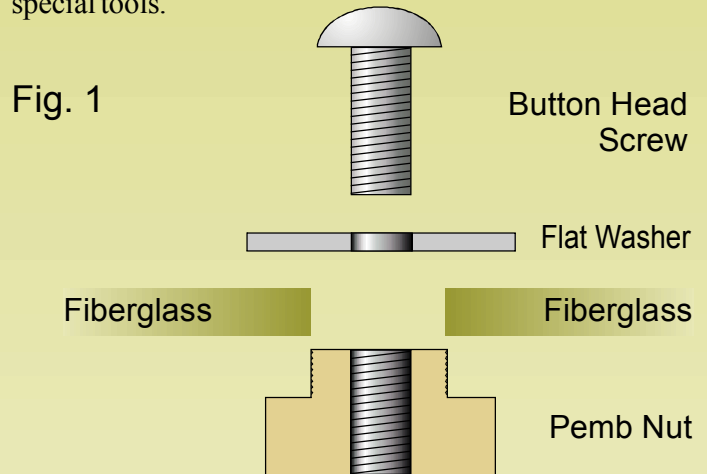
For a 1/4 - 20 screw make a .328" mounting hole.

For an 8-32 drill a .25" mounting hole

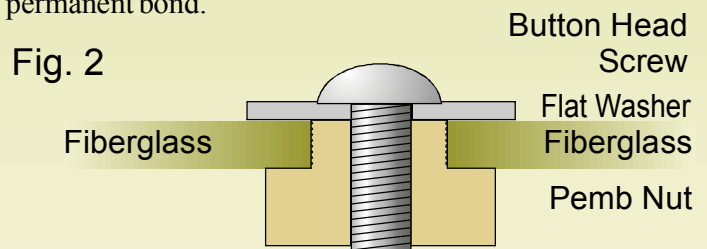
And for a 6-32" screw make a .213" mounting hole

Making the hole too big will not let the Pem Nut anchor into the material being used.

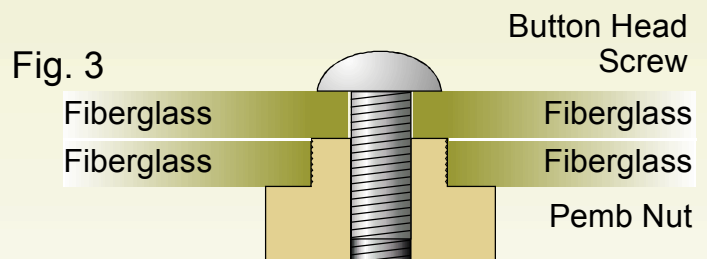
Fig 1 shows the items needed to anchor a Pem Nut without special tools.



Run the screw through a flat washer and into the Pem Nut on the other side of the material and tighten as shown in Figure 2.. This will draw the Pem Nut into the material. The knurled portion will grip into the material for a permanent bond.



Remove the screw and washer. You can then attach a second material having a hole large enough for the screw being used. Insert the screw and tighten as shown in Fig 3.



The same applies for application in cardboard or phenolic, except you must place some Cyanoacrylate adhesives or epoxy on the Pem Nut before tightening down.

## McMASTER CARR

DESCRIPTION	SIZE	TYPE	MC#
Broach Style Captive Nut (PEM)	1/4 - 20	18-8 SS	94648A370
Broach Style Captive Nut (PEM)	8-32	Tin Plate Steel	95117A444
Broach Style Captive Nut (PEM)	6-32	Tin Plate Steel	95117A433



# LET'S VISIT GUILLERMO DESCALZO

Tripoli Gerlach member Guillermo Descalzo resides in Buenos Aires, Argentina. While rocketry there is somewhat different than in the U.S. The theme is all the same. And all people into rocketry have their shops.

Starting out with tools from his Father and Grandfather

Guillermo has turned an out building into a place for pursuing all of his interests. From custom building his own bass guitar (he plays in a band on weekends), to a near perfect 1940's Jeep (something you hardly ever see in the

U.S. anymore) to all of his rocket activities from building rockets to making research candy motors.

Guillermo also designs and builds his own rocket electronics (altimeters and onboard computers). There is a special area set aside just for that. - Wood working, electronics, fabrication, motor making; anything needed can be done here.

Much like things State Side a hardcore rocketeer in Argentina must rely on himself for just about everything



Fabrication of parts and propellant making is done in an open area while final rocket prep is done at a workbench.



Motor making and final fabrication is also done at a workbench where hand tools are readily available,



Electronics fabrication & assembly takes place at its own work area of the shop.



# THINGS TO MAKE YOU SAY HMMM!?



## GOVERNMENTAL SHORT MEASURE

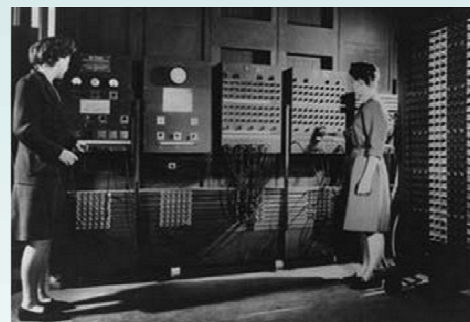
A few years back the Department of Environmental Protection of the Commonwealth of Pennsylvania distributed free pocket rulers to advertise their services to the taxpayers and promote their website. However, on close examination, the ruler is seen to have a defect. The blunder stands out like a sore thumb. They've shorted us one centimeter! Centimeter 14 is missing.



Perhaps this is the new "Metric Lite". One should praise the DEP for an effort to promote metrication in the USA, but their art design and/or printing service sabotaged the idea. That's what you get then you contract things out to the lowest bidder. Oh, well, we can always use this ruler in physics classes to demonstrate determinate error.

To add insult to injury, a fella from Berlin, Germany was the first to notice another problem with this ruler. It seems to be consistently based on the assumption of 1 inch = 2.5 centimeter. One inch should be 2.54 cm. It's a small difference, but it adds up. The ruler has the 2 inch mark lined up with 5 cm, 4 inch with 10 cm, and 6 inch with what should have been 15 cm if the 14th centimeter hadn't gone missing.

On a correct ruler 6" should read 15.24cm!



## ENIAC vs iPad

It would take ENIAC almost two years to preform the number of operations the iPad does in one second.

ENIAC: 385 Operation/Sec  
iPad: 21.6 Billion Operations/Sec



The Wright Brothers took their first flight in 1903.  
The B-52 bomber was first produced in 1952 and is still in service.  
Time between the first recorded flight and the B-52: 49 years.  
Total number of years we've had the B-52: 61  
The B-52 has been flying for more than half the total time humans have.