THE SMOKE GRENADE AND PAINTBALL GRENADE RECIPE GUIDE

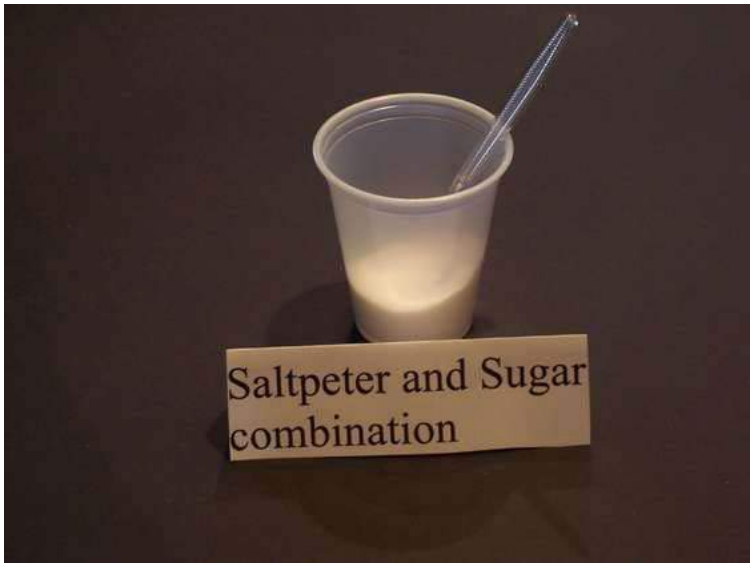
Making Smoke Bombs/Grenades

Smoke Bomb Materials

- sugar (sucrose or table sugar)
- potassium nitrate, KNO_3, also known as saltpeter (you can find this at some garden supply stores in the fertilizer section, some pharmacies carry it too)
- baking soda
- organic powder dye if making colored smoke bomb
- skillet or pan
- aluminum foil

How to Make a Smoke Bomb

1. Measure out 30 grams of Saltpeter and 20 grams sugar. You can make larger amount but just keep the 3:2 ratio. Measurements don't need to be exact, but you want more KNO_3 than sugar. For example, you can use 1-1/2 cups KNO_3 and 1 cup sugar. If you use equal amounts of KNO_3 and sugar, your smoke bomb will be harder to light and will burn more slowly. As you approach the 5:3 KNO_3:sugar ratio, you get a smoke bomb that burns more quickly.



2. Now a pan is need to be made. First take a piece of aluminum foil and fold it in half, then in half again, and once more. Refer to the pictures for more help. Note* the "Pan" is not the only way to cook the mixture, you can also use a glass bowl or cylinder to cook in, but the glass will be rendered unusable after. Apply low heat to the pan. Now this is the only hard part. You have to cook the mixture without burning it. Now if you leave it on for to long it will burn catch fire and smoke will be everywhere, so I recommend doing this outside. Stir the mixture with a spoon using long strokes. If you see the grains of sugar starting to melt along the edges where you are stirring, remove the pan from the heat and reduce the temperature before continuing.

3. Now the trick is to put it on a stove and stir it until it becomes an orangeish color. Then take it off and continue stirring for it will still be cooking. Basically you are caramelizing sugar. The mixture will melt and become a caramel or chocolate color. Continue heating/stirring until the ingredients are liquefied. Add a table spoon of baking soda, and colored dye if you want a colored smoke bomb, otherwise it will be white smoke. Remove from heat.




4. And Vola you have a smoke bomb sheet. You can set the whole thing on fire and smoke a whole yard, or you can break off little pieces and burn for smaller amounts. Allow the smoke bomb to cool, and then you can peel it off the foil. Or if making a grenade pour into a mold while still warm, the videos below also show how this is done. You can pour the smoke bomb into any shape, onto an object, or into a mold. The shape and size will affect the burning pattern. If you are making a smoke grenade, pour the mixture into a cardboard, plastic, or metal tube (small pop can with top removed works good). Push a pen into the middle of the mixture to make a hole for the fuse, and let set for an hour then remove pen. Insert a fuse into the hole and pack a piece of cotton swab into hole to make it fit tightly. Wrap tube with duct tape and the grenade is ready to go. If you aren't going to clean your skillet immediately, pour hot water into the pan to dissolve the sugar (or else it will be harder to clean). Clean up any residue you may have spilled out of the pan, unless you want mini-smoke bombs on your stovetop.

Pull Ring Smoke Grenade

Materials

- Make smoke grenade as describe before
- Box of matches
- 1 Straw
- Electrical or duct tape
- 1 Paperclip
- 1 Elastic

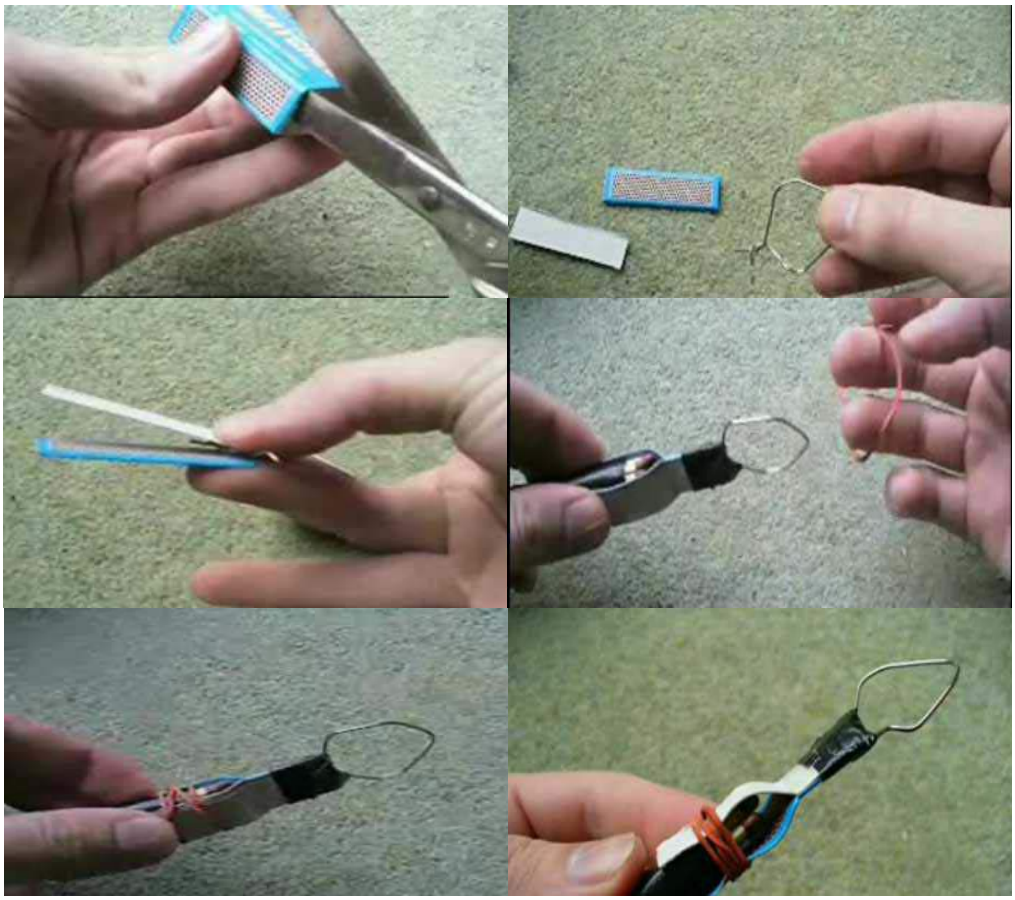
How to Make a Pull Ring Fuse

To make a smoke grenade with a pull ring fuse, follow the same instructions but instead of inserting a burning fuse follow these instructions:

1. Fill a drinking straw with match heads and seal the end with paper tissue.

2. Wrap straw with matches and secure them with electrical or duct tape.

3. Cut match strikers off match box, and make a ring out of a paper clip. Tape the ring in between the match box strikers, insert the straw wrapped with matches in between the strikers and wrap an elastic around it.



4. The Fuse is now complete, now insert it into the fuse hole in the smoke grenade. Place another cardboard tube around the smoke grenade and pack with tissue, this will protect your hands from being burned. Now wrap the whole grenade tube with duct tape to seal it off, make sure to leave enough room at the fuse hole to pull the ring out.

Chemicals Used to Add Color Flames To Your Smoke Bombs

You can add these chemicals to your smoke bomb to create colored flames:

1. Red - strontium salts, most easily found in road flares
2. Orange - calcium chloride (laundry bleaching agent)
3. Yellow - sodium nitrate (common in chemistry lab)
4. Green - barium salts, such as barium nitrate (common in chemistry lab)
5. Greenish-Blue - copper sulfate (common in a chemistry lab, also found in many algaecides for pool treatment) Blue - copper chloride (common in chemistry lab)
6. Purple - potassium permanganate (common in a chemistry lab, also used in sewage or water treatment)
7. White - magnesium sulfate (epsom salts, found on laundry aisle or in a pharmacy)

Colored Smoke Bombs

The recipes for some colored smoke bombs require chemicals that may not be readily available unless you have access to a chemistry lab, but it's worth knowing how it's done. You can also just add color dye to the smoke bomb

mixture which also works well. The parts or percents below are by weight. The ingredients are sifted together and ignited to produce the smoke.

White Smoke Recipe

- Potassium nitrate - 4 parts
- Charcoal - 5 parts
- Sulfur - 10 parts
- Wood dust - 3 parts

Red Smoke Recipe

- Potassium chlorate - 15%
- para-nitroaniline red - 65%
- Lactose - 20%

Green Smoke Recipe

- Synthetic indigo - 26%
- Auramine (yellow) - 15%
- Potassium chlorate - 35%
- Lactose - 26%

If you can order chemicals, here are some of the dyes used to produce more colors:

Red

- Disperse Red 9 (older formulation)
- Solvent Red 1 with Disperse Red 11
- Solvent Red 27 (C.I. 26125)

Orange

- Solvent Yellow 14 (C.I. 12055)

Yellow

- Vat Yellow 4 with benzanthrone (older formulation)
- Solvent Yellow 33
- Solvent Yellow 16 (C.I. 12700)
- Solvent Yellow 56
- Oil Yellow R

Green

- Vat Yellow 4 with benzanthrone and Solvent Green 3 (older formulation)
- Solvent Yellow 33 and Solvent Green 3
- Solvent Green 3
- Oil Green BG

Blue

- Solvent Blue 35 (C.I. 26125)
- Solvent Blue 36
- Solvent Blue 5

Violet

- Disperse Red 9 with 1,4-diamino-2,3-dihydroanthraquinone
- Solvent Violet 13

Smoke Bomb Recipe #2

Here is an alternate method to make a white smoke bomb, I find that the first one works better but here is another anyway. A white smoke bomb can be made from sulfur, potassium nitrate, black powder, aluminum powder, iron oxide and carbon tetrachloride. It can be used either for signaling or screening.

Materials Required

- Sulfur
- Potassium
- Nitrate
- Black Powder
- Aluminum Powder
- Black Iron Oxide
- Carbon Tetrachloride
- Improvised White Flare Mix
- Tablespoon
- Wooden Stick
- Newspaper
- Quart Jar with Lid
- Window screen
- 10inch Fuse

- 2 and half inch by 5 inch tin can and a lighter.

Procedure

1. Measure 3 level tablespoons of dried sulfur into the quart jar.
2. Add 4 level tablespoons of dried potassium nitrate to the sulfur.
3. Add two heaping tablespoons black iron oxide.
4. Place all ingredients on the window screen.
5. Mix ingredients thoroughly by sieving them onto the newspaper, repeat this 3 times.
6. Pour the ingredients back into the jar. Screw the lid on the jar tightly and mix the ingredients vigorously until even.
7. Remove the lid and add 10 heaped tablespoons of aluminum powder then mix thoroughly with the wooden stick.
8. Store in the jar with tightened lid until use.

Usage

Wet the ingredients in the jar to a paste consistency with Carbon Tetrachloride, do this in a well ventilated area as the Carbon Tetrachloride will give off toxic gases. Add a half cup of black powder to the paste and mix carefully with wooden stick.

Measure one heaped tablespoon of white flare mix onto a four inch square aluminum foil. Knot one end of the fuse and place in the middle of the white flare mix. Fold the corners of the foil tightly around the fuse.

Place the white smoke bomb mix into the can. Place the fused white flare device into the can just below the surface of the smoke bomb paste and ignite the flare to deploy the smoke bomb

Making Paintball Grenades

We tested them with water and found them to be drop safe with the pin in. With the pin removed and the washer placed correctly, the grenade is sensitive enough to go off from an arms-height drop.

Materials available between most hardware stores and online

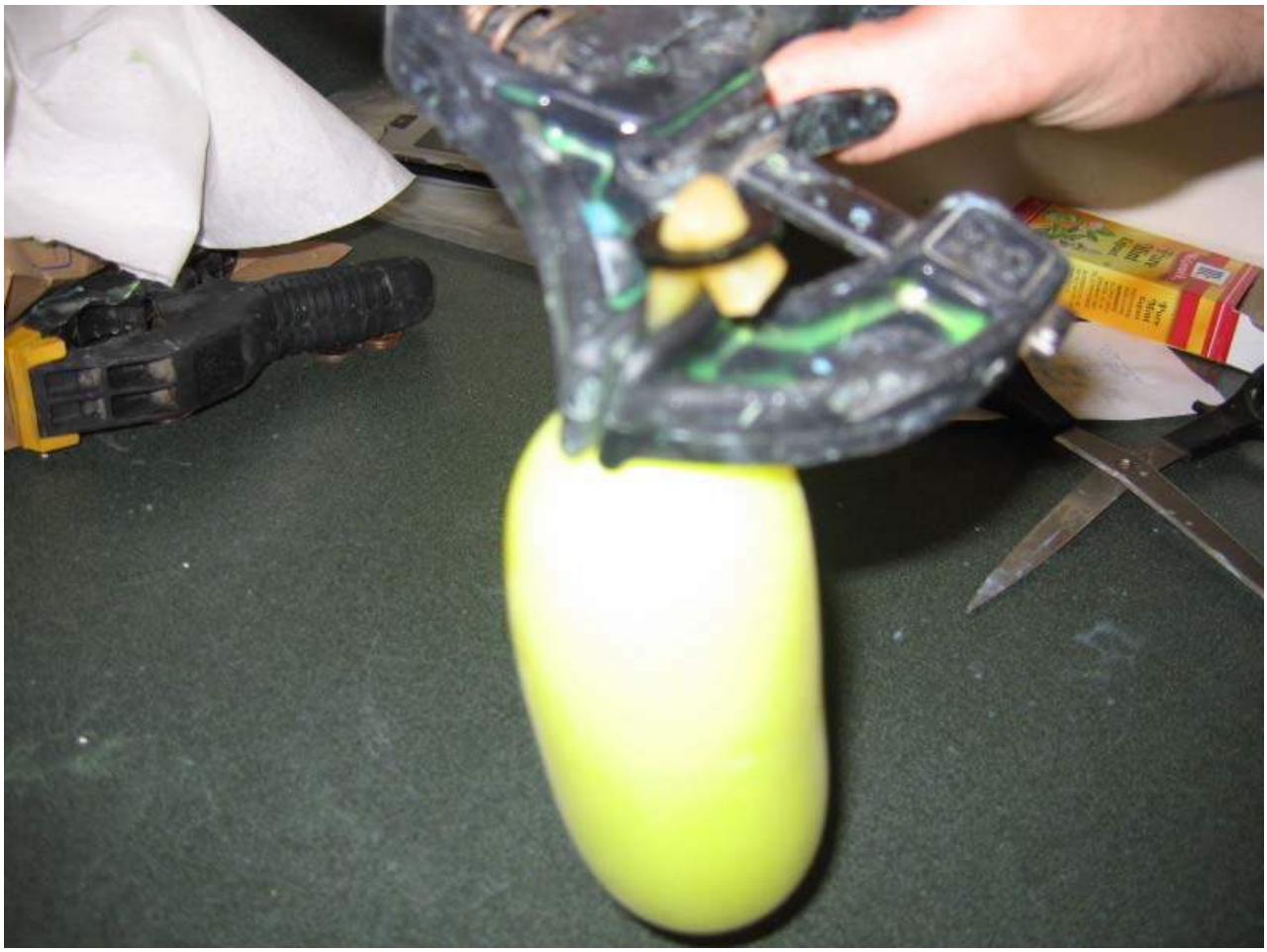
- 1/4" inside diameter, 3/8" outside diameter latex tubing
- 7/16" plastic washers (metal washers will also work). You can also use 1/2". 7/16" is pretty tight, while 1/2" is more sensitive and likely to go off. 7/16" is preferred.
- Cotter pins...these only need to be a little longer than the diameter of the washer
- Zip ties...used to seal the bottom of the grenade and to make a "ring" for the pull pin
- 60cc 1/4" tip irrigation syringe...for filling the grenades. You may need to get this from a healthcare website. Wal-Mart also sells a device similar to these syringes. It's called the "MIXMIZER" and it's used for mixing oil with gasoline so I guess you'd either look for it in Lawn care or Automotive.
- Small wood clamps...I recommend the kind that you squeeze with one hand and clamps into place as shown in the following pics.
- Children's washable paint, diluted to desired thickness. If you can, get washable tempera paint from a craft store. The best "fill" I have come up with is one part washable tempera paint diluted with one-half to one part tap water. It's very thick.
- OPTIONAL: food flavorings/extracts...Added to mark the enemy with a specific scent. We used mint so the enemy will smell fresh if hit. Orange works great and smells good too. Vanilla is too weak to cover the smell of the paint. I've yet to experiment with others...

Directions:

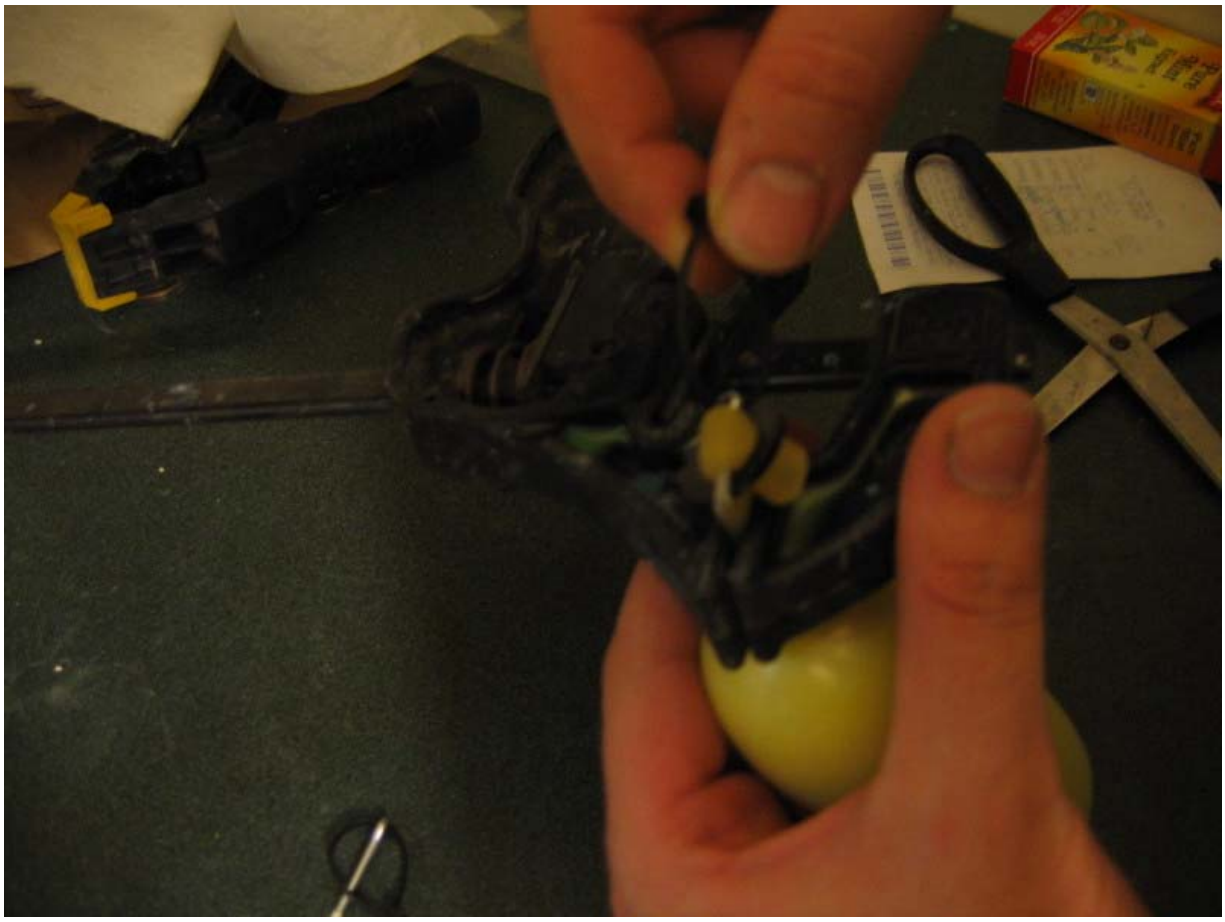
1. The first step is to cut a length of tubing. You can use any length you want, we liked a total length of about 4-5 inches best for shape. After your tube is cut, fold the last 1/2" over itself and zip tie it together as hard as you can, or tie one end of the tubing.

2. Next ready a syringe by drawing about 2 oz. of paint up. Secure the tube as far up the nozzle as it will go. Make sure you are pinching the hose around the nozzle so it won't leak. Make sure the push part of the syringe is braced against your chest or stomach, because once paint is in the latex tube, it will be pressurized and want to shoot the plunger right out of the syringe. Push the paint into the grenade tube and hold it with your off hand, making sure to keep pressure on the plunger and keep pinching the end of the tube against the nozzle so nothing leaks. With your other hand, clamp the grenade tube at the syringe nozzle. An alternate method of filling grenades is using a spray nozzle off of a spray bottle as shown below.

3. Ready another syringe of paint and plug it snug into the tube. MAKE SURE AT THIS POINT YOU BRACE THE PLUNGER AGAINST SOMETHING SOLID. You wouldn't want pink, minty paint all over yourself, now would you? Release the clamp and push the extra paint into the grenade. Repeat the clamping procedure and fill the grenade to the desired size (we did 6 ouncers). Once you get the grenade to the right size, clamp it one last time and grab a washer. Fold the end of the grenade over itself the same way as if you were going to zip tie it. Wedge the washer over the folded end of the tube.



4. Push a cotter pin through the fold of the tube (do not actually puncture it) and over the washer. Make sure the tube is stretched over the cotter pin, which should be pushing against the washer. Now you can release the clamp and the grenade should not leak or go off. Pull the tube through the washer and pin like a belt buckle to tighten it up and get a little extra tube past the pin so it doesn't slide out.



5. You now have a paint grenade! You will need to play with how tight you make the washer to get it to your liking in terms of how much force is needed to set it off. With 7/16" washers, I pretty much pull them right up to the pin. This makes the grenade rather sensitive, so much that you must be somewhat gentle when removing the pin. When they hit something, the washer is blown off and the grenade starts a-spinnin'! We tested ours (with water) from halfway up the stairs, chucking them into the bathroom. Every surface was hit with the grenade, even the ceiling. They spin pretty violently, so watch out! Here's the box we cranked out in one night

There is also another way of capping the business end of the grenade off, you can fold over the tubing as usual and instead of using a washer you can use a ½" coupling.

Making a Two chambered Grenade

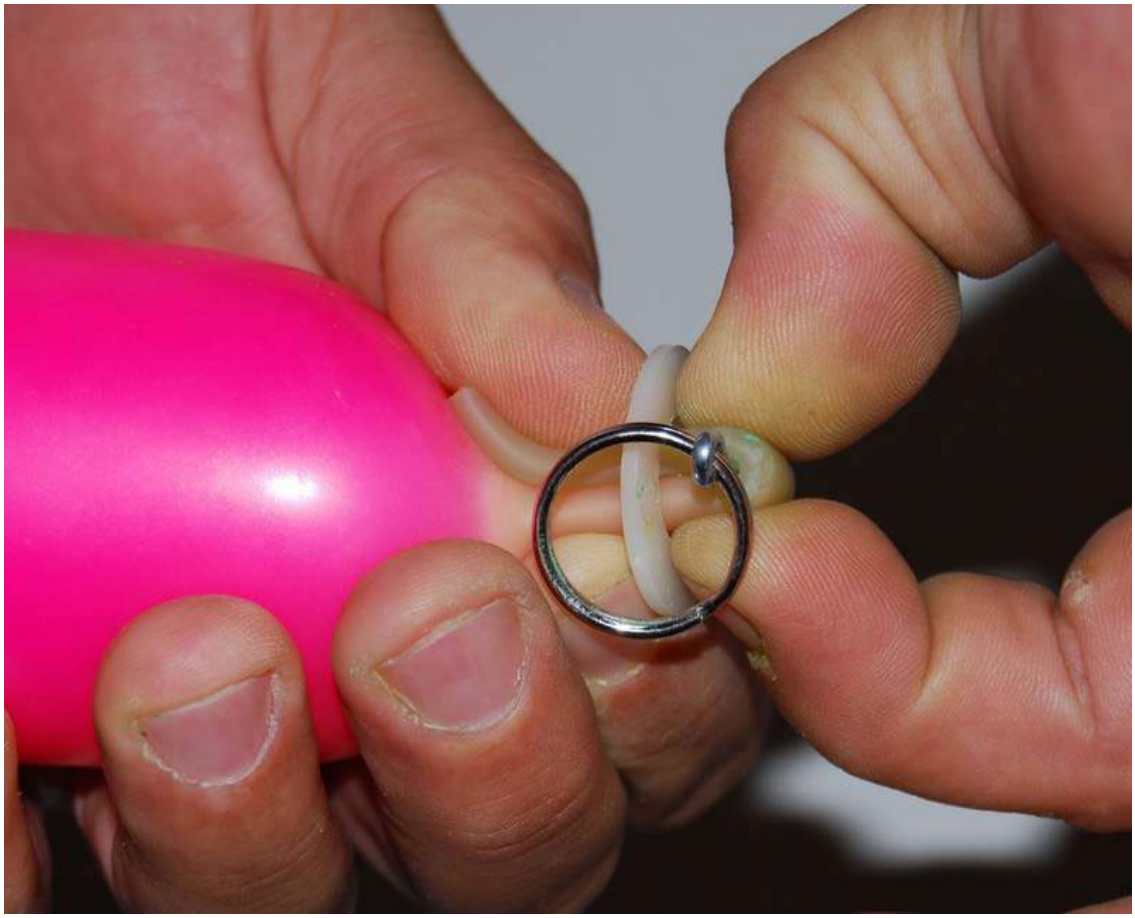
To make a two chambered grenade you must use about double the length of latex tubing as usual. You will begin making a grenade as usual except you fill the latex tubing slightly less than half way, then twist the tubing a few times and continue filling. Once the rest of the tubing is filled to about two inches from the top, position the two chambers parallel to each other and cap them off by inserting both ends into the washer or PVC coupling.

A few people have asked how to set the trigger on my grenades. So here are the instructions for all to see and use. Always wear goggles when you use any paintball product.

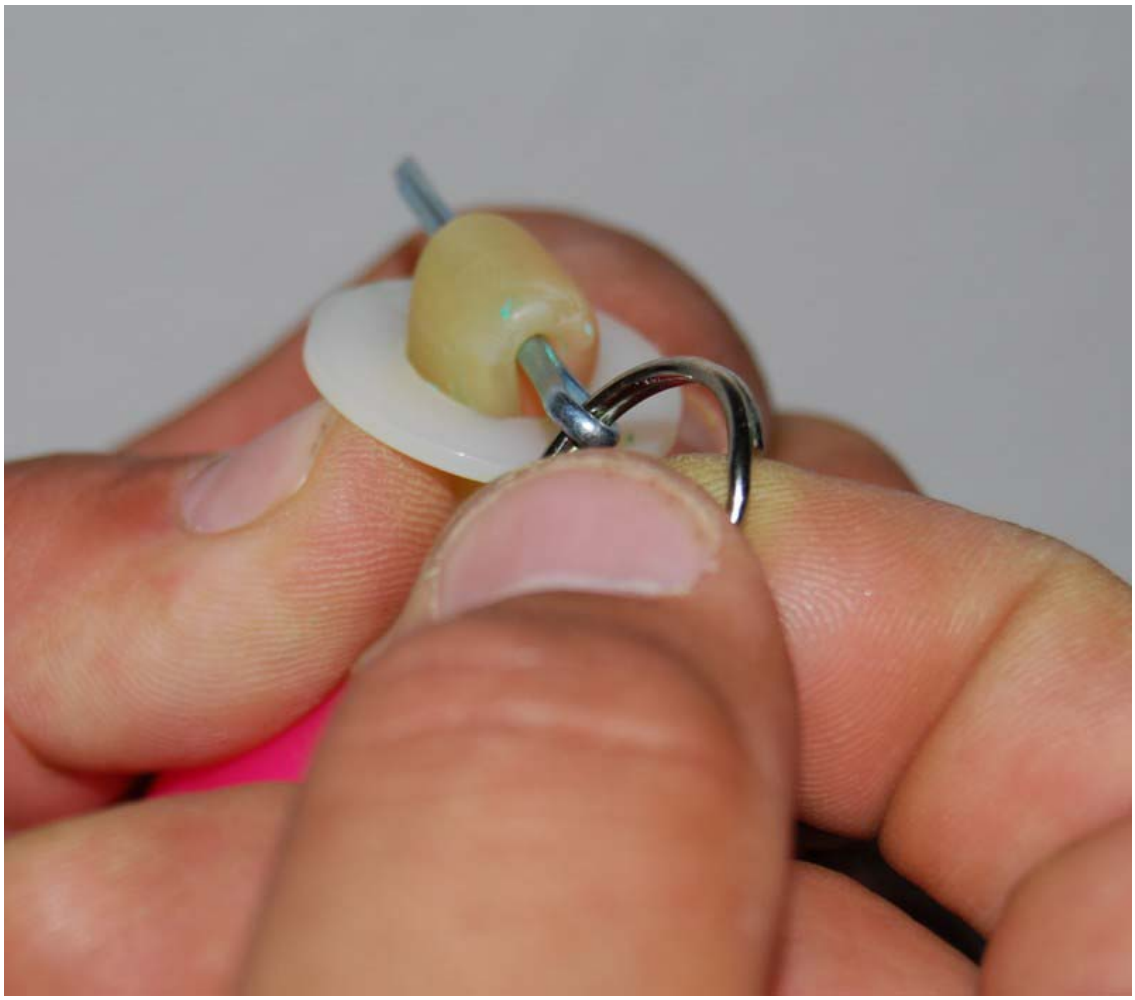
First shake up the grenade prior to play, this will mix up your paint prior to playing. The running around you do during the game will keep the mix constant.

Prepare to pull pin:
Squeeze around the neck as shown. This is only a guide. Personal style comes into play when you feel comfortable using these.

Set Trigger:
Lightly Squeeze around cotter pin as shown. This will bring the wash down to a set point. Remember you are not pulling the washer down, but rather pushing it with your finger tips



Pull Pin:
While still pinching Goose neck, pull pin.



Trigger is set:
This is how it should look. Not to far down or to high up. To high up, and it will set off when thrown. To low and you will lock the washer in place. This is why I chose the washer size I did, to obtain 100% detonation.

Ready to throw:
You can throw this over hand, lob or just drop from a high point. The picture is just a reference for the player.

here is my recipe for my paint mix:

1 cup "clean color" neon paint(I prefer Neon Yellow or Neon Pink)
4 cups of warm water
1/2 cup of "THICK IT" liquid thickener It can be bought at almost any drug store. More then likely it's behind the counter.
Then Blend it for about 30 secs.

NOTE: Blender and warm water is a big part in the mixture, if not you will get lumps. Put thickener in last and then blend.

This will give you about 40 oz of a very thick fill. You can cut it to your liking or make it thicker. I have found that these two colors and paint work the best.

How to make your own paint grenades Method #2

I made this for those of you that want your monies worth. This is an old Idea with a modern day twist. KVA were the creators of the refillable paint grenade. Only they used a red cap and a plug at the end that sent a spray of paint. They also used some thread protector around the body so if the grenade took off it could be recovered. Please do not ask for my supplier of check valves and syringes. He asked for me to keep it private. Enjoy.

Supplies needed:
Gorilla glue
IV one way check valve
5in 3/8OD x 1/4ID x 1/16 wall-Latex Tubing
Cotter pin with ring
Modified 3/8 washer drilled to 31/64
Syringe for filling

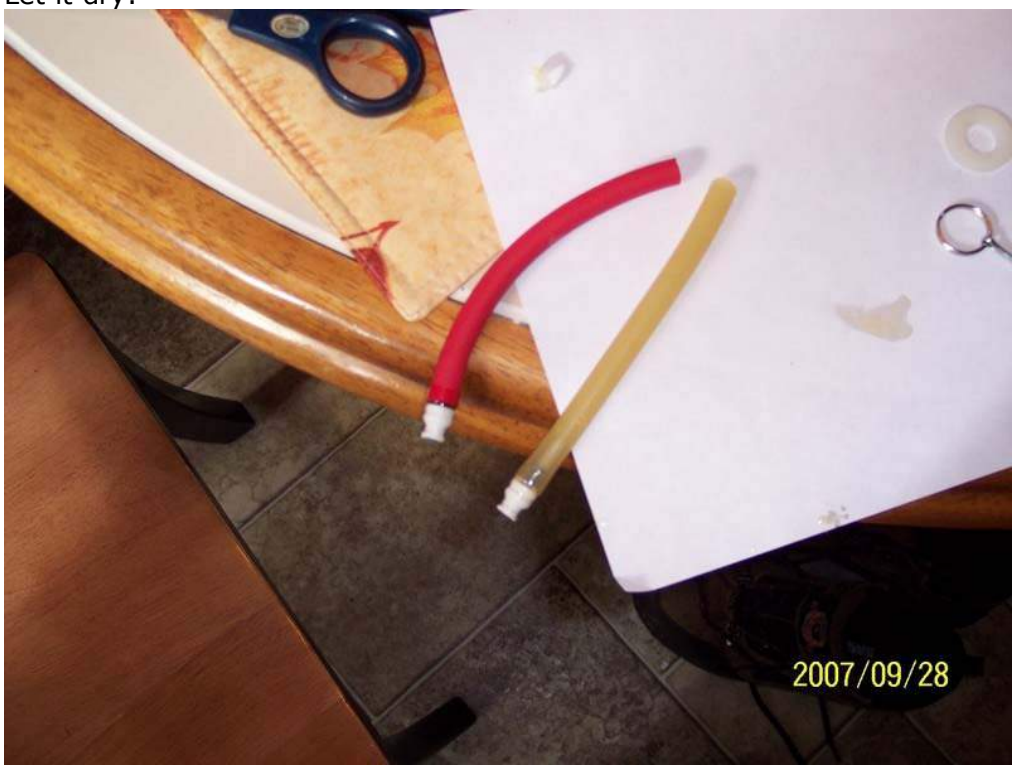
IV one way check valve:

I dipped mine in water first. This will make the glue swell when it starts to bond. Smear it on the check valve. Do not get any in the hole.

Slide it in the Tubing:

First I wet the tubing at the end with a little drop of water. Then I slid in the check valve to the end of the shank edge. Then with the excess that came out of the tubing end, I smeared it along the bottom of tubing.

Let it dry:



Gorilla glue will swell and cause a foaming action, this is ok. It means that it is bonding. This is great glue, its water proof as well.

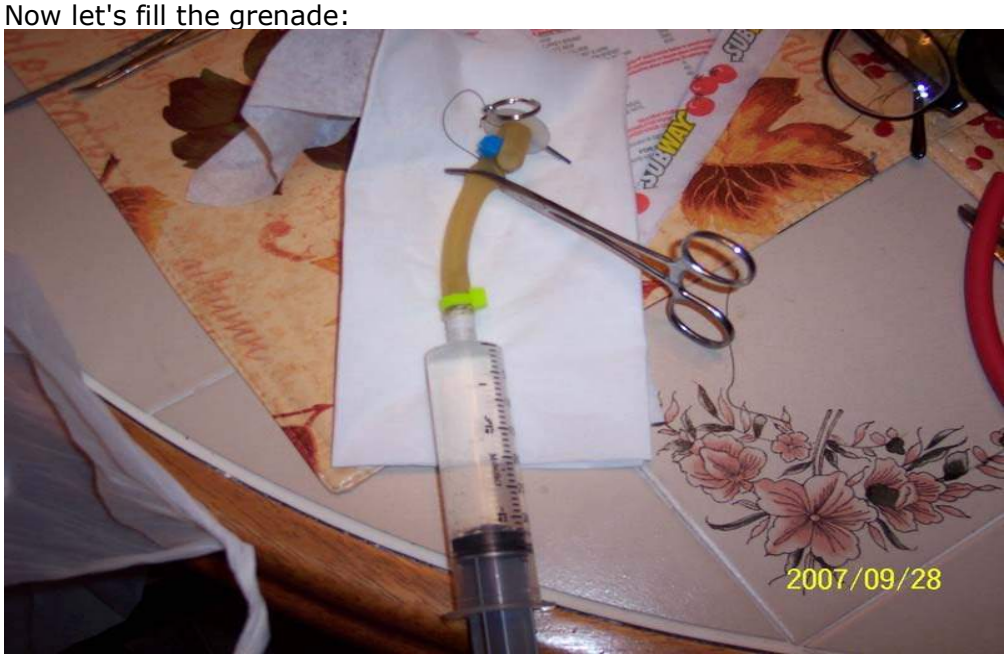
Now that it's dry:

I put a zip tie on the end. Why I don't know, maybe just over cautious. That's just me. If it bonds correctly you don't have to worry. Then I put a zip tie around the tube itself. Not to tight, just enough for it to have a little friction.

Tie on the washer:

This is what the zip tie around the tube is for. I just hold onto the cotter pin when throwing the grenade, so no worry about tying it off. Tie some nice strong string around the zip tie and washer so they can be recovered and reused. I would recommend drilling a whole thru the washer. In this case I didn't have to. I used some very heavy duty thread that is used in sewing military gear.

Now let's fill the grenade:

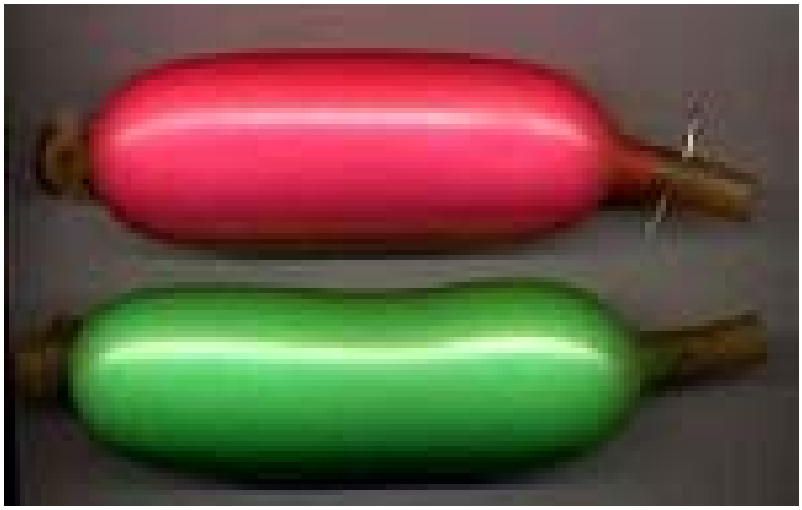


Clamp off with hemostats. Screw the syringe on to the check valve and start filling. I used about 6 syringe fills. Big note on filling. After the fill is in, don't let go of the syringe plunger right away. The check valve is still open and will force the water back into syringe. This is fine with just water, but not with paint.

All filled up and ready to throw:

Recommendation for fill. For 8oz of water, I would use about 10 paint balls mixed in. It's really up to you. Have fun with these. You can use tags and tie them on so you know they are yours. The string holds the washer, so it can be reused. Hold onto your cotter pin. How many times these can be filled, I'm not sure. Last time I used one, I got 50 fills. I plan on introducing these at a local field. I'll probably sell them at $5 and the 25-50 a refill. It keeps the kids happy. Enjoy and improve.

How to make your own paint grenades Method #3



Materials

Materials needed: A section of 1/8" rubber tubing about a foot long. (Available at hose supply stores, medical supply stores, or chemistry supply stores.)

- A plastic clip tie

- A large syringe (if you don't have medical friends, you can find syringe like "emergency pumps for basketballs" in your local sporting goods store)
- Some paint (either boiled down paintballs or children's washable non-toxic paint
- A pair of hemostats (clamp)
- Some ball bearings of slightly larger diameter than the tubing (you can find these in your hardware store)
- Cotter pins
- Alcohol
- A rubber band (optional)
- A target

Directions

1. Take the tubing, and cinch it down tight in the middle. If you want to make smaller; Little Betty type grenades, use only a six inch length and tie off one end of the tubing.
2. Fill the syringe with the paint mixture and inject it into one side of the tubing. Leave about 2 to 2.5 inches at the top empty.
3. Before you remove the syringe, crimp off the tubing below it with the hemostats. The filled section of tubing should look like a hotdog.
4. Lubricate one of the ball bearings with the alcohol and insert it into the tubing above the hemostats. If you still have the cap from the SquadBuster, just fold the tubing tip over and place the cap on.
5. Insert one of the cotter pins above the ball bearing, through the tubing. Leave the hemostat on until the alcohol dries. If you are making a Little Betty type grenade, you are now done.
6. Take the other empty side and repeat the process, except use the same cotter pin to hold both bearings in.
7. If you want the grenade to have maximum area coverage with a smaller paint coverage, simply leave as is. However, if you want maximum paint coverage put a weak rubber band around the grenade. The theory being this: When you pull the cotter pin out and throw the grenade, the non-banded kind will fall apart, pointing in two different directions. The banded kind will however, spray a greater amount of paint at a specific area. However, both types will spray in a radius because the release of pressure will make the hose tip wag around.

I have tested one of these, they do work, and expect about a 5 to 6 foot spray radius. Remember VERY IMPORTANT: get a good arc on these or try to throw it at something hard (like a bunker right behind your target) because you need to get enough pressure when it hits to push out the bearing (or knock off the cap). Conversely, after you have pulled the pin, DON'T squeeze the grenade or you will get very, very messy! Also, after you pull the pin, if you notice a small amount of leaking paint, throw it quickly or it will blow soon! And this should be the final result.

Home Made Paint Grenade Filler

Parts list:

1. 1/4” ID Nylon Tubing, 3” to 4” pieces (Available at most hardware stores)
2. 1ft long by 4” OD SCH40 ***PRESSURE RATED*** PVC tubing. DO NOT use anything other than pressure rated!
3. One 4” to 2” PVC coupler.
4. 3” piece of 2” OD PVC tubing ***PRESSURE RATED***
5. One 4” PVC end cap
6. PVC Purple primer or similar and PVC cement
7. Random pieces of wood or some other material to act as a stand.
8. Standard 100 to 150psi air compressor with regulator.
9. Standard male air compressor coupling
10. Air valve (optional)
11. Manual twist test plug for 2” pvc tubing
12. 90 degree elbow female to male ¼” threads
13. 3” long steel or brass nipple ¼” threads
14. Ball valve ¼” threads male to male
15. Zip ties, Any size should do
16. More than 1ft of ½” PVC tubing
17. Drill and a 3/32” drill bit
18. 16awg nails or similar pins

SAFETY ALERT

!!! READ BEFORE CONTINUING !!!

Before continuing, consider that if fooled around with, or misused this can possibly injure yourself, others, and property. Take all caution and do not exceed any ratings listed in this tutorial. Excessive pressure can be hazardous or even fatal.

Be smart, Be safe……..

Procedure:

1. Assembling the pressure chamber.

A. Take the 2'' OD 3'' long PVC pipe and at one end coat the outside about ¾'' up with purple PVC Primer.

B. Coat the inside of the 2'' hole on the 2'' to 4'' coupler with primer as well. Let it dry for about 15 or so seconds each.

C. Apply a thin layer of PVC cement over the primed area on both the pipe and the coupler. Quickly and firmly press the pipe into the coupler and hold it in for about 10 seconds. Keep applying firm pressure so that the pipe is seated all the way at the bottom.

D. Coat the end of the 4'' PVC pipe and the inside of the 4'' diameter hole on the other side of the coupler with primer.

E. Apply a thin layer of PVC cement to the pipe and the coupler and again press them firmly together, keeping the pressure for about 10-15 seconds.

F. Repeat steps D & E for the 4'' end cap.

G. This is what you should have in the end

H. Now we will assemble the fill mechanism. There are two options available for doing this. The way I did it, I had a main shutoff valve, some brass pipes, and a pressure gauge (NOTE: THIS IS ALL FOR LOOKS). The really serve no purpose because to turn the air off and drain the tank before taking the cap off, I have to unhook the air compressor hose from the system anyway. THE EASY WAY will be explained in the next step. This is basically what the fill setup looks like when I completed it. Note every threaded connection I made during this build was Teflon taped to prevent leaks.

I. This is the easiest way of making the fill setup. It is not necessary to have a

pressure gauge on the system because most air compressors have a built in regulator and gauge. Basically instead of making an intricate fill setup, you can just take the male air compressor coupling and screw it directly into the side of the PVC pressure chamber as shown below.

J. Now we will construct the paint fill valve and tubing. This consists of basically a 3" galvanized or brass pipe threaded at both ends with ¼" threads. Thread one end into the 90 degree elbow using Teflon tape to seal. Thread the other end into one side of the ball valve. The other side of the ball valve, screw in the ¼" pipe barb. This is what it should look like in the end:

K. Going back to the pressure chamber, we will now drill the air intake and paint fill

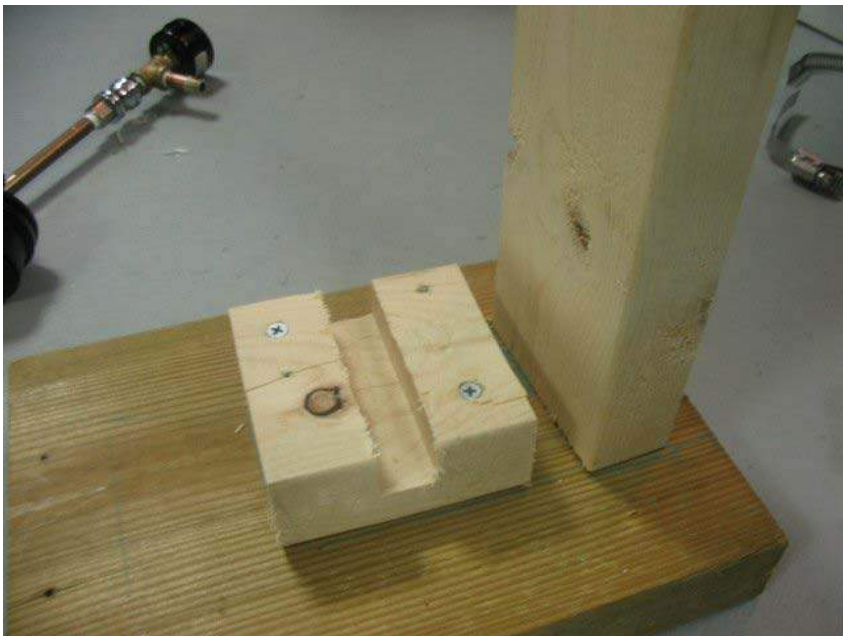
tube holes. The hole for the air intake will go about 1’’ down from the lip of the coupler and the paint fill hole will go at the bottom of the end cap. The threads on the 90 degree elbow shown in the picture above are 1/4" NPT. I drilled a hole a bit smaller than and just self threaded it into the PVC. For the air intake, there could be a number of different thread size options based on what you did, so here is about what I think the drill sizes are.
1/8’’ NPT = .375’’ or 3/8’’ hole
1/4’’ NPT = .5’’ or 1/2’’ hole
1/2’’ NPT = .625 or 5/8’’ hole
Using these as a guide, (Double check, don’t take my word for it cause it could be different, this is what I remember off the top of my head) the threads should make a real snug fit if you self thread them into the hole. *I like to screw it in once to make the threads, then take it out and cover it with Teflon tape and screw it back in. So far this has not leaked for me yet.

Base with paint fill tube and valve screwed in:

Side with air fill threaded in:

L. Now I can not tell you what kind of stand to make or what not, due to the fact that

based on this some will come up will different methods or designs based on what I've started. This is a basic picture of what I made, it's just a bunch of scrap wood lying in the garage with a slot routered into the one 2x4 for the elbow and pipe to sit in:



M. Now we will prepare the actual tubes. It's basically the easiest part of the whole build. Take one of the 3" to 4" sections of latex tubing you cut and fold one end over itself about ½". Keeping it folded, wrap a zip tie around the fold and zip it as tight as possible, keeping the fold tightly together.

How to fill a grenade:

A. Cut .75'' sections of the ½'' PVC and drill a hole between 1/4 and 3/8 of the way up through the tube using the 3/32'' drill bit.

B. Fill the pressure chamber with your paint material. I use venom paint mix available at www.rap4.com

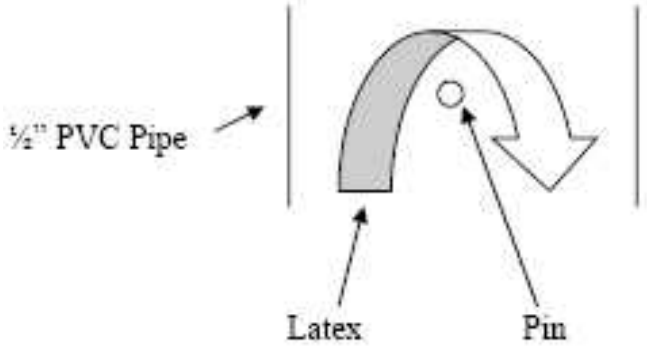
C. Put in the test plug and make sure it is screwed down as tight as possible. Failure to do so will cause the cap to violently burst off.

D. Pressurize the chamber to around 35 to 40 psi.*don't be an idiot and go higher than 40psi.*

E. Place one of the tubes on the end of the barbed nozzle and turn the ball valve slowly till the tube starts to inflate and fill with the paint. Fill the grenade leaving about 1'' of deflated tube remaining at the business end.

F. Fold the tube over and place this inside the section of PVC you cut earlier with the hole lined up so the pin can go between the two halves of the fold. The tubes should be a snug fit over the fold.

G. Place a pin in one hole and work it through the fold as shown in the vague sketch below:



The grenade is ready for play, pull the pin and give her a toss!