

Building a Paintball Sound Suppressor

Tools and Materials

Tool description:

Dremel Multipro:

A Dremel is a small, high speed rotary tool. There are various models available, but I prefer the MultiPro because of its variable speeds. The MultiPro has an adjustable speed of between 5k and 30k RPM and comes with a plethora of attachments. For this project, you'll probably only be using the following attachments:

- 1/8" drill bit
- Various Dremel Accessories

Can be purchased at: Hobby stores, hardware stores, or Sears.



Materials Used:

Table 1: Over-the-Muzzle Silencer Materials

Quantity	Dimensions	Description
1	7"	3/4" PVC pipe
1	4-1/2"	1-1/2" ABS pipe
1	6"X6"	Screen mesh
1	6"X6"	Foam padding
2		1-1/2" ABS end caps
2		1" OD 3/4" ID rubber o-ring

Material Description:

PVC Pipe (white plastic water pipe):

PVC pipe is sold in all shapes and sizes. Most people will recognize it as the white plastic pipe that they used to install their lawn sprinklers. PVC pipe is available in several different "schedules." The schedule refers to the thickness and effective pressure rating of the pipe. The most common schedule is 40. The higher the number, the thinner the pipe will be. PVC pipe can usually be purchased in lengths of between 1 to 20 feet. If you

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are fortunate, your local hardware store will allow you to buy a small one or two foot section of pipe.

Can be purchased at: Most hardware stores.

ABS Pipe (black plastic water pipe):

ABS pipe is not usually sold in diameters smaller than 1 1/2" and is generally found as the schedule 40 cellular core variety. Some of you may recognize it as the black pipe you used to install your household sewer lines. ABS and PVC generally look exactly the same except for their color. The major difference is that ABS is much lighter than PVC (probably due to the cellular core), which is why I use it for the outer casing instead of PVC.

Can be purchased at: Most hardware stores.

Foam Padding:

This is the spongy, sound absorbing material which is sandwiched between the inner core and outer casing of the silencer. There are various varieties of foam available, but it will generally be cream colored. The thickness you select will probably depend on the density of the foam.

Can be purchased at: Fabric stores or hobby shops.

Screen Mesh:

A screen door mesh should be wrapped around the inner core to prevent the packing from bulging through the core ports and interfering with the paintball. The type of mesh isn't really important as long as it allows sufficient air flow and prevents the packing from squeezing through.

Can be purchased at: Most hardware stores.

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Constructing an Over-the Muzzle Suppressor

Inner Core

Description:

The inner core is the most important part of the silencer. It's inside diameter is roughly the size of the outside diameter of the paintgun barrel. Holes are then created in the core to dissipate the gas coming out of the muzzle, thereby reducing muzzle noise. The number, shape, and pattern of the holes are all elements to consider when creating a silencer. Ideally, venting the muzzle gas should not affect the flight of the paintball. Depending on the particular silencer design, you may also have to modify the core to interconnect with the outer casing.

Construction:

Step 1. Select the core

Select a piece of PVC pipe to use as the inner core. For a snug fitting over-the-muzzle silencer, select a pipe with an outside diameter which is at least 1/8" larger than the outside diameter of your barrel. This will ensure that the wall of the core is thick enough at the muzzle-to-silencer junction to prevent accidental breakage.

On a gun such as a PMI-1, the outside diameter of the barrel is 13/16" at the muzzle. I would therefore select a 3/4" schedule 40 PVC pipe (which actually has a 1" outside diameter.) And since the inside diameter of the 3/4" PVC is about 13/16", it's ideal for Sheridan guns.

Step 2. Fit the core to the barrel

Since the inside diameter of the PVC pipe may not match the outside diameter of your barrel, you will have to modify the inside diameter of the PVC pipe so that it will fit snugly over the muzzle of your particular barrel. The best way to do this is usually by sanding the excess plastic away until the first inch of the pipe fits tightly onto the barrel.

If you have a barrel with an outside diameter of 7/8" or 1" you may have to use the Dremel or similar tool to grind away the excess plastic. For slight changes, you can also try heating the PVC to its melting point and stretching it to fit the barrel. This, however, rarely produces good results and often creates a "crooked" silencer.

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It is very important to ensure that the core is straight and follows the line of the barrel. If the alignment is slightly off, the silencer will probably cause inaccuracy and increased ball breakage.

Step 3. Design the core porting

This is the crucial stage of construction where you create the holes in the core which will vent the gas from the barrel. Take some time to consider the size, shape, and layout of the holes; their arrangement may very well alter the course of the paintball. Consider the design of the different barrels and muzzle brakes available. Should you create a spiralling, helical pattern to simulate rifling? Should you stagger the holes to maximize gas dissipation? What shape should you make the vents? These are all questions to be addressed when laying out the core baffles.

I usually run six lines around the circumference of the core and stagger every other row of holes. To put it in other terms, if you were to flatten out the core and create a chess or checker board of six rows across the diameter, you would then drill a hole in each white square, leaving the other squares untouched. The space between holes along the length of the core is fairly arbitrary, but for a 3/8" hole, I usually center the holes 1" apart. (This spacing would give you a chess board with rectangular "squares" instead of square ones. I know it's confusing, but I'm trying my best.)

Step 4. Create the core porting

Once you have laid out the position of the porting, you simply have to create the holes in the core. For a round hole, simply drill a small pilot hole with a small drill bit and then use a hand drill to create the final hole. The pilot hole will help keep the larger drill bit from "wandering" when you're trying to use the hand drill.

You may wish to get fancy and shape the circular holes or create elliptical ports. Select a design which you believe will be most effective. I used the Dremel sanding attachment to create a gradual incline along the path of the paintball, the theory being that the gas would be "scooped" up into the foam.

Step 5. Final touches

You may wish to add special features to the core, depending on the design of the outer casing and it's relation to the core. In the past, I have attempted to add o-ring grooves at the front and rear in an

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attempt to “lock” the outer casing in place with a snug o-ring seal. This is often more complex than necessary, and a snug cap-to-core connection works just as well (if not better.)

A crucial final step in core construction is to sand everything as smooth as possible. Nicks, burrs, and grooves can all cause future problems. Do your best to make the core as smooth and clean as possible.

Outer Casing

Description:

The outer casing is what protects the silencer and keeps the packing in place. This piece is also subject to various modifications. The casing can be something as simple as a piece of ABS pipe with two end caps, to be slipped over the core for a friction fit, or a set of complex o-ring joints and threaded connections.

Since the friction fit construction is the easiest design to implement, I would suggest it to any first time gunsmiths. And since you will probably not want to force the end caps off once they have been forced on, you should go ahead and paint the entire silencer after it has been completely assembled.

Construction:

Step 1. Cutting the ABS to length

Calculate the length of ABS needed to connect the two end caps and cut the pipe to length. You may want to cut the pipe a little longer than necessary because it's always easier to make something a little bit shorter than it is to make it a little longer.

Step 2. Carving the end caps

If you are simply creating friction fit end caps, then create a hole in each cap which is slightly smaller than the outside diameter of the silencer core. Each cap can then be forced on and connected with the length of previously cut ABS.

I have also tried to create more complex casings by altering the cap-to-core contact. By adding an O-ring groove in both the end cap and silencer core, you may be able to create a “locking” connection which can be disassembled for cleaning and maintenance. This type of connection is generally much harder to achieve since it requires more precise machining than a friction fit.

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Another alternative is to use a threaded plug, which can be drilled out much like an end cap and friction fit or permanently attached to the core. This allows the ABS casing to be unscrewed for cleaning and maintenance and provides a secure seal. This seems to be the most effective method if you plan on disassembling the silencer, while still providing adequate structural integrity. It does, however, add a little extra weight to the silencer.

Step 3. Finishing touches

The entire casing should be thoroughly sanded and smoothed (or slightly roughened if paint is to be applied.) If you do not wish to be able to take the silencer apart in the future, you can go ahead and glue the pieces together and paint the entire enclosure.

Assembly

Step 1. Putting it all together

Put all the pieces together and test it out. Will the opponent be able to hear your shots as you're stomping through the underbrush?

Step 2. Finishing touches

You may decide to add a few coats of paint to your creation after you've tested it to ensure that it is working. I'm sure most hardware and paint stores can recommend an appropriate type of paint for the job. Just be sure to get something that will stick to plastic. This may involve applying a few coats of primer before applying the finishing coats.

I would suggest that you do not paint the interior of the core because it is difficult to apply an even coat of paint, and the additional thickness may prevent the silencer from fitting over the barrel.