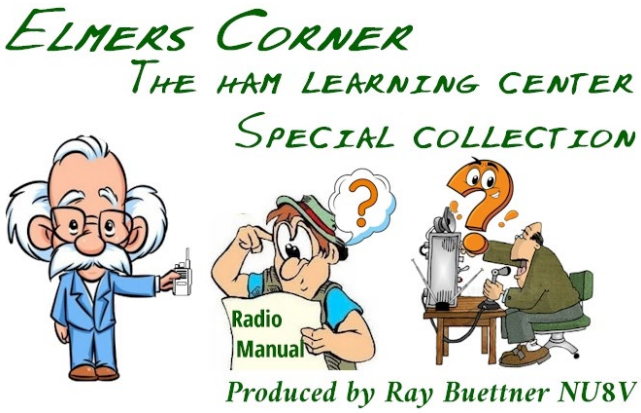


Welcome to another project for the Elmers corner.

Today's topic: QE19 Antenna Launcher Construction

Can We make an Antenna Launcher small enough to ´t into a Rubbermaid Tote?

That way it will be easy to take to the ´eld. Easier than the Archery gear it replaces. This model is so small there is a lot of room left over in the box so it can be used to carry other equipment in addition to the launcher.

Į've actually built four different launcher designs (as of 2/2004) that ´t easily into the Rubbermaid totes (tm). This QE19 (sometimes called the QEV19) is perhaps the easiest to construct, and it is the smallest and lightest of my launchers (Eric's soda bottle chamber launcher is lighter yet but not as small). The nomenclature stands for Quick Exhaust valve launcher 19 inches long.

Note - The newer CSV19 design is a compact design based on a sprinkler valve. It has more performance capability (uses less pressure to gain a particular height, and is capable of going higher) at lower cost than this QE19. It is slightly larger and heavier. There are detailed CSV19 construction instructions here,.

Here is the TBL-QE19 made from a 3/4" Quick Exhaust Valve and a few parts making a quick, effective and easy to build a launcher for heights up to about 150 feet.

Į'm including a photo, a drawing, a description, and a parts list. Įf you want to make one of these hopefully this is enough information to give you an idea of how Į did it. You must take responsibility for your own design. This one is 19" long (hence the 19 in the QE19 designation). The chamber volume in the QE19 is about 75 cubic inches. Įt could be up to about 24" long. Longer than that doesn't buy much, and performance may suffer from friction and inadequate air¸ ow for the barrel volume in the longer barrel. My ´rst version of this launcher was 28 inches long and it de´nitely suffered from too much barrel volume and friction. Performance increased when Į shortened it to 19 inches. Optimal performance is expected to be near 24 inches in overall length. The 3/4" valve just is not big enough for high performance with Tennis Balls. Shorter than 18-19" the performance will also begin to drop off. Consider your transport and storage plans and size accordingly.

The QE19 launcher shown sitting in a Rubbermaid Tote along with a few accessories. There is a lot of room available for other gear in this box.

QE19 Performance

With a 4-ounce tennis ball (a standard 2-ounce ball with about 22 pennies added to the interior), and towing a 30-pound kite line, this launcher has approximately the following performance:

QE19 Performance

Pressure - PSI	Height in Feet
20	25
30	50
40	75
50	100
60	125
70	150

QE19 Description

Starting at the top left is the barrel. 2.5-inch diameter schedule 40 is a tight ′t for tennis balls, but does the job well.

A note here about the barrel. Schedule 40 PVC is fairly available, and Tennis balls ′t quite tightly into schedule 40 barrels. Įt turns out that there is another PVC pipe material with a slightly thinner wall that ′ts Tennis balls almost perfectly. Įt is much easier to push the Tennis balls into SDR21 and the performance of the launcher is improved especially at low pressures. Įt is called SDR21 PVC and the outside diameter is the same, so it ′ts the PVC ′ttings. SDR21 is hard to ′nd in 2.5" size, but Į have located a source and have some of this pipe available.

At the right end of the barrel is a 2.5" coupler, 2.5 to 2" bushing, 2" to 1" bushing, a short length of 1" pipe, a 1" to 3/4" pipe thread right angle adapter, a short 3/4" threaded pipe, and the big aluminum object is the Deltrol 3/4" quick exhaust valve from McMaster-Carr.

Starting at the valve going left is a short-threaded pipe 3/4", a bushing 3/4" threaded to 2", a 2" tee, 2" schedule 40 pipe, and on the left is a slightly special assembly. This is the end of the pressure chamber and there are two choices to go there. The easiest is a regular 2" cap.

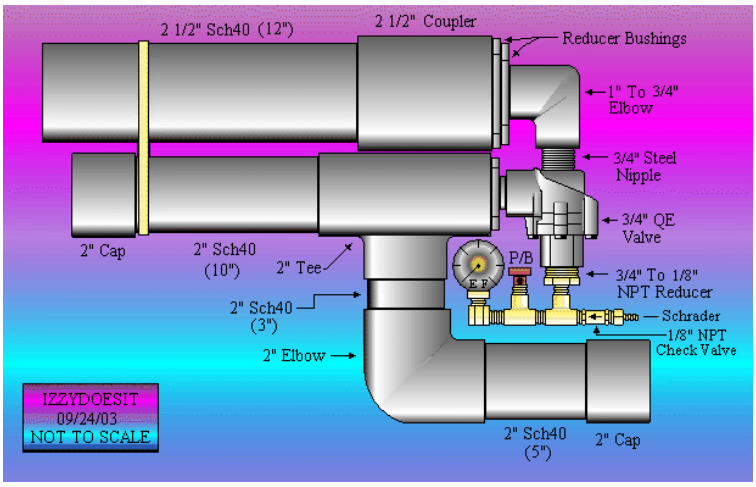
The model in the photo uses a 2" coupler, 2" to 1.5" bushing, 1.5 to 1" bushing and a 1" cap. The 1" cap is glued backwards into the 1.5" bushing on the 'inside' to form a seal, and after drying the extra is cut offi Then this assembly is glued into the 1.5-2" bushing.

The Reel in this system can be either on a 1" pipe section with hose clamps as shown above (requiring the special chamber end), or a simpler solution is to hose clamp the reel to a 2.5" coupler and make the chamber a regular 2" cap.

The bottom portion of the chamber is simple - two pieces of 2" pipe, an elbow and a cap.

The ′ll/trigger system for the launcher, starting from the lower right, is: a schrader to 1/8 NPT valve, a 1-way valve 1/8 NPT female to male allowing, ow toward the male end, a 1/8 NPT tee, two short 1/8 NPT pipes, one going up toward the main valve and one toward the left, 1/8 to 1/2 to 3/4" NPT adapters, another 1/8 NPT tee to the left, a small pushbutton valve, which is the trigger, a 1/8 NPT street 90, and a 1.5" 100 PSĮ pressure gauge.

The overall length is 19", but a few inches longer would improve performance slightly, if you have room in your box.



The barrel and chamber are held together on the left by a small block of wood with double sticky tape on both sides, and a black Velcro cable wrap.

The 1" pipe and coupler below the launcher is a pusher to put the tennis ball into place.

Comments

- Always use PVC cement and primer and follow all instructions.
- Let dry for 24 hours before applying pressure.
- Use Te¸ on tape 2-3 turns on threaded joints.
- Use only pressure rated schedule 40 pipe and ´ttings in good condition.
- Do not subject the completed launcher to extended sunlight.
- Never look down the bore.
- Never point the launcher at anyone.
- Always treat the launcher as if it is charged.
- Always launch in a safe direction.
- Always know your landing zone.
- Do not exceed the pressure rating of any component in testing or use.
- Test carefully before use.
- PVC is not approved by the manufacturer for use with compressed air. Ţt may fragment if broken.
- Do not use when temperature is above 90 or below 50 degrees F.
- Do not launch near power lines.
- Do not use conductive line or launch wire.
- Do not use tennis balls heavier than 8 ounces.
- Do not use the launcher if there is any sign of damage, cracking, yellowing, or other reason to suspect the materials, joints or launcher components.
- BE SAFE!

McMaster-Carr, a supplier of many of the parts can be found at www.mcmaster.com

Drawing

Here's a nice drawing by Ţsrael Sanchez. The measurements are approximate, you can adjust them to ´t your tote and other parts. Build the metal valve system ´rst and work out from there. Note that Ţ used more adapters below the Quick Exhaust valve than Ţzzy shows. This allows adequate room for the gauge to clear. Make sure to allow enough vertical pipe so the lower pipe clears the brass plumbing. Proceed carefully and think ahead..

QE19 Parts Lists

Launcher

- Deltrol Quick Exhaust Valve 3/4" (McMaster 6646K23)
- Schrader Valve, 1/8 NPT short (McMaster 8063K33)
- 1-way valve 1/8 NPT male-female, ¸ ow toward male end (McMaster 7768K21)
- 1/8 NPT Tee, 2 each
- 1/8 NPT short pipe, 2 each
- trigger valve, 1/8 NPT (McMaster 62475K11)
- street 90, 1/8 NPT male-female

- 1.5" 1/8 NPT pressure gauge, 80-125 psi max (McMaster 3847K14)
- 2" schedule 40 pipe, approx. two feet
- 2.5" schedule 40 pipe, about a foot (or better yet, SDR21 PVC pipe)
- 2.5" coupler
- 2.5 to 2" bushing
- 2 to 1" bushing
- 1" schedule 40 pipe, approx. 2 inches
- 3/4" threaded pipe, two short pieces
- 1" slip to 3/4" threaded PVC elbow
- 2" slip to 3/4" threaded bushing
- 2" pipe cap, 2 each
- 2" pvc elbow
- 2" pvc tee
- small block of wood
- two 3/4" square pieces of double sticky tape
- 3/4" by 1.5-foot Velcro cable wrap

Ball Pusher

- 1/2" pvc, about a foot
- 1/2 to 1-1/2" coupler

Reel Mount

- 2.5" coupler
- two hose clamps long enough to go around the 2.5" coupler and the feet of the reel
- 2-3" double sticky tape to go under the foot of the reel

Variations

- Į built and rebuilt this launcher about half a dozen times. Įt started out 28" overall length (based on computer modelling with the manufacturer's Cv rating) with 1.5" pipe and longer barrel, then 2" pipe and double down tubes to get more air, then with 2" single tube and a 28-inch overall length. Į discovered that the Cv rating Į measured in use was about half the published one, and therefore the barrel was too long for the air¸ ow Į was getting. Something like 22-24 inches would be about optimal, but Į decided to go for the Rubbermaid size of 19 inches.
- Recently (1/2004) Į got a metal lathe and began making very compact and lightweight barrel attachments by boring a large hole in a 2.5" endcap and epoxying an elbow directly into the endcap. This allows a longer barrel, saves weight, and provides better air¸ ow. Į made one of these for the QE19, so now perhaps Į should call it the QE19b or x. The picture on the antlaunching page has the new barrel attachment. Įt saved about a half pound of overall weight and allowed a barrel about 1.5 inches longer in the same overall package. Į have not done testing yet but based on all the experience Į have with this launcher Į know it will be slightly better than it was with the regular QE19 barrel on it.
- The new SDR21 barrel material ´ts tennis balls really nicely. They have just a little friction so they won't roll but take almost no force to push in. This really improves the low-pressure performance and does not hurt the higher-pressure performance. SDR21 is hard to ´nd in 2.5 inches. QE19 Cost

Depending on your junk box this launcher usually costs under $100, not including the ´shing reel and line.

Send me an email with your comments.. ohrvcamper@gmail.com or elmerscnews@nu8v.us
All Elmers corner learning newsletters can be viewed at https://nu8v.us
Thank you for reading, Į hope it's helpful to you..
See more coming soon.. ***Ray Buettner - NU8V***