

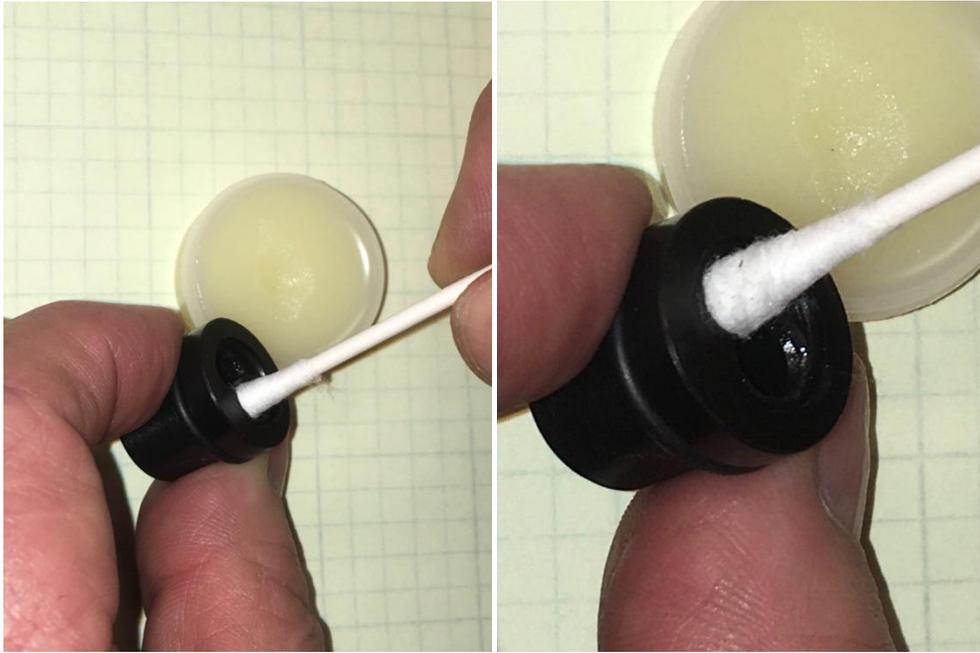


## 8-12-22 Updated User Instructions

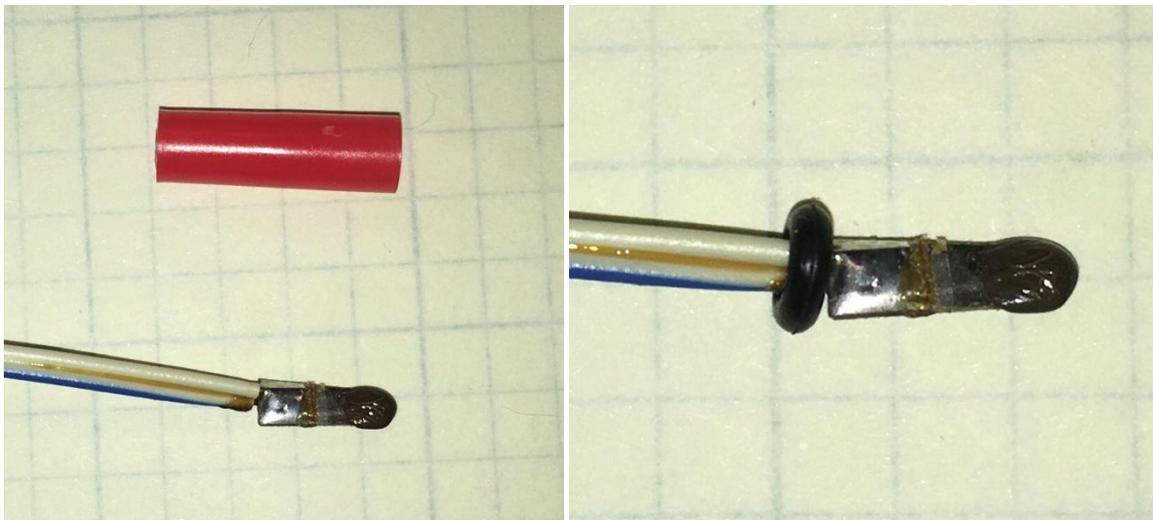
**Note:** These instructions are written for "rocketry folks" and it is assumed that all directions will be closely followed. If you are not a "rocket" guy or gal or you do not feel that you can follow these directions exactly, **please do not use this device!**

### **Step 1 - Prepare the E-match & Charge Cup**

Using the supplied lube, thoroughly lube the Charge Cup  
(The Dual Charge Cup is ALWAYS recommended for flight)  
**(Hint:** Don't be stingy with the lube and do not substitute other lubes!)



Remove the protective plastic cover from the e-match  
Slide one of the small black o-rings over the wire and up to the e-match head



## Step 2 - Sealing the E-Match in the Charge Cup

**Sealing the gasses** in every Tinder Rocketry device is **very important**. Traditionally e-matches have been "potted" or sealed in charge cups using epoxy. More recently, two new and significantly better methods have been developed.

*All three sealing methods are outlined below and you are strongly encouraged to read through ALL of the sealing methods AND cleaning instructions before choosing a sealing method!*

### Traditional Epoxy Sealing Method

The traditional method for sealing e-matches into their housing has been epoxy. While sealing with epoxy does work, it takes time to cure, and can be a challenge to disassemble and clean. In addition, if the goal is to seal 100% of the pyro gasses 100% of the time, the epoxy sealing method is NOT the preferred method. In fact, with the introduction of the other two e-match sealing methods,

**I no longer recommend using epoxy to seal e-matches at all! (Read on and you'll see why)**

Even still, I have outlined below how to seal e-matches with epoxy.

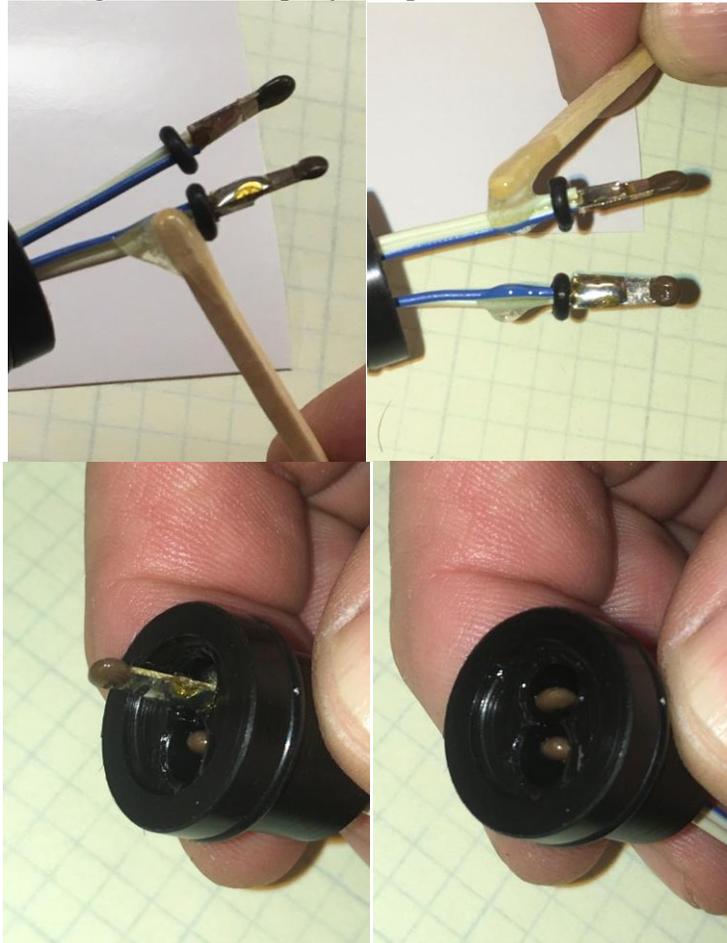
Prepare the e-matches with o-rings and lube the Charge Cup as outlined in **Step 1 on page two**.

Add a dab of quick set epoxy to the wire on **both sides** of the o-ring

Pull the e-match wire so that the e-match is entirely inside the Charge Cup.

(Note: If you cannot do this you probably have epoxy residue left inside the Charge Cup from previous use. Remove the e-match and see below under cleaning as to how to remove this epoxy residue)

Note: Don't be shy about using a fair bit of epoxy and put it on BOTH sides of the o-ring. (Not shown)



Use Q-tip to wipe any excess epoxy and set aside, **hanging from the wire**, to cure overnight.  
**IMPORTANT: Make certain that you use enough epoxy so that it oozes out the wire hole when the wire is pulled!**



**Important: make certain that you allow even this quick set epoxy to fully cure overnight! Failure to allow full cure of the epoxy or failure to use epoxy at all, will result in this device spitting hot burning particles of pyrogen out the back and will reduce the pushing power of the pyrogen, possibly reducing the force to the point of the device failing to achieve the needed Puncture Piston velocity to effectively puncture the CO2 cartridge for proper gas release.**

**Note:** The holes in the Charge Cups are intentionally drilled a little tight to aid in sealing, especially for the epoxy sealing method. It has been noted that there is a slight variation of the thickness of the insulation on some e-matches that can make it more difficult to get these e-match wires started. In some cases, the stripped wire needs to be started by being pulled by **pliers**. Once started they are easily pulled into the Charge Cup.

**Be assured that I am working on another Charge Cup variation for all Tinder Rocketry devices that will make starting e-match wires and cleanup a bit easier, but for now, we have pliers...**

While sealing e-matches with epoxy is simple and effective, the down side is that the epoxy must fully cure before use, making the device a once per day proposition...which brings us to a second method of sealing the device...

## Hot Glue Sealing Method

Prepare the e-matches with o-rings and lube the Charge Cup as outlined in **Step 1 on page two**.

Add a dab of hot glue to the wire on **both sides** of the o-rings.

Pull the e-match wires so that the e-matches are entirely inside the Charge Cup.

**Note:** The glue gun must be completely up to full temp before use. The hot glue must be applied and the e-matches seated in the Charge Cup fairly quickly, as the hot glue will want to cool and set, making pulling the e-matches entirely into the Charge Cup difficult. That said, this method is both simple, quick and does seal very well.



*Sealing the e-match in the Charge Cup using hot glue is fast, easy and seals very well. The only known down side is that at a launch, it is often not so simple to find the 120 VAC that most glue guns like to run on. Which leads us to yet another method of sealing the e-match inside the Charge Cup...*

## Poster Putty/Mounting Putty AKA: Putty Sealing Method

Prepare the e-matches with o-rings and lube the Charge Cup as outlined in **Step 1 on page two**.

With a hobby knife cut one of the putty "squares" into quarter sections

Remove one of those quarter sections and roll it in your fingers

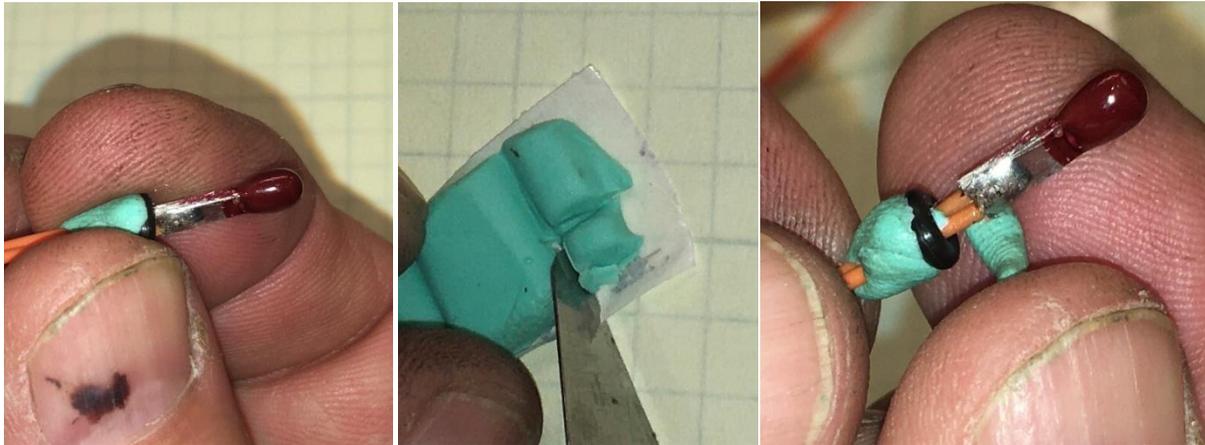
Fold the putty around the wire below the o-ring



"Roll" the putty covered wire/o-ring in your fingers

Cut one of those quarter sections in half, roll in your fingers and apply it to the top side of the o-ring

**Note:** To achieve the best seal, first slide the o-ring "down" about 1/8" or so before adding the putty to the "top" side.

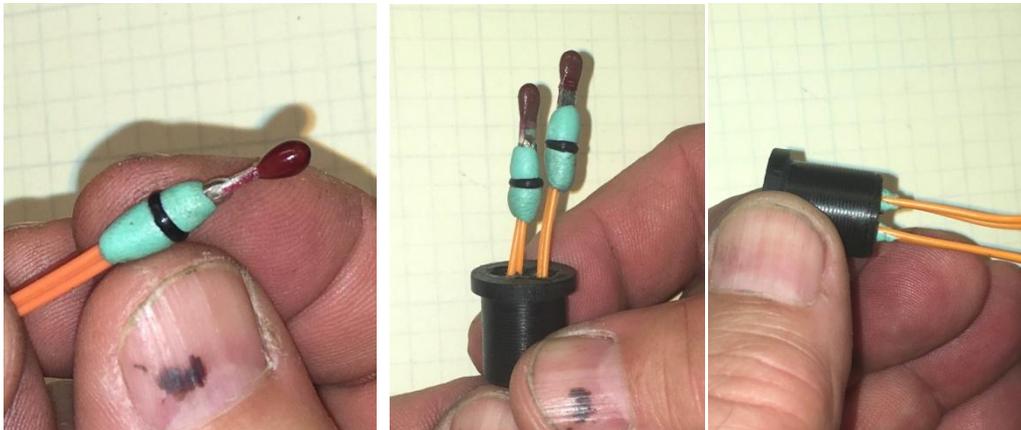


Roll the whole thing in your fingers so that you have putty completely encircling the wire on both sides of the o-ring.

Insert the putty prepared e-matches into the **lubed** Charge Cup

Gently pull the e-match wire until the e-match head is just below flush with the mouth of the cap

**Note:** You may have to tug on and wiggle the wire while tugging to get it seated properly, this is ok. You may also very likely see the putty ooze through the wire hole along with the wire, this too is ok.



The Putty Method of sealing the e-match has been tested at room temp, at about 0 F and over 140 F and it has been found to seal very well every time in this device!

**Because of the excellent sealing, easy setup, fast disassembly and cleaning, this is my preferred method of sealing e-matches in ALL Tinder Rocketry devices!**

**This poster/mounting putty can be found on Amazon or at your local hardware store.**

(A small amount is now included in all Tinder Rocketry kits!)

### Step 3 - Adding Pyro Powder to the Charge Cup

Fill one of the supplied Powder Measure Vials "to the line" with 3F or 4F black powder or BP substitute in the 3F or pistol granulation (Such as **Triple Seven or Pyrodex P**). It is ok to "tap" the powder down a bit to settle the powder to get a good measure. Do not add extra powder. You may find it convenient to fill the vials ahead of time and close the lid for later use.

Carefully add the pyro powder to the prepped charge cup, tap to settle powder if needed.

Use one of the supplied "Red Dots" to seal the pyro powder in the Charge Cup  
Press firmly to make sure the red dot sticks properly.



### VERY IMPORTANT Note:

**Do not ever use smokeless powder in this device!** (Or any Tinder Rocketry device for that matter)

**Use black powder or black powder substitutes such as Triple Seven or Pyrodex P ONLY!**

**The powder from a "disassembled bullet" is NOT black powder!**

**The powder from a "disassembled fire cracker" is NOT black powder!**

(I tell you this because I have had a few customers that have used these powders with bad results!)

## Step 2 - Prepare the Housing and Lube parts

Wipe a generous amount of the supplied lube into the small end of the Housing.

Reach in with a lubed Q-tip and swab the Housing to a depth of at least 1 inch.

**Make sure that there is a thin o-ring on the Charge Cup** and with a Q-tip (Or your finger) lube it.

Lube the Push Piston o-ring



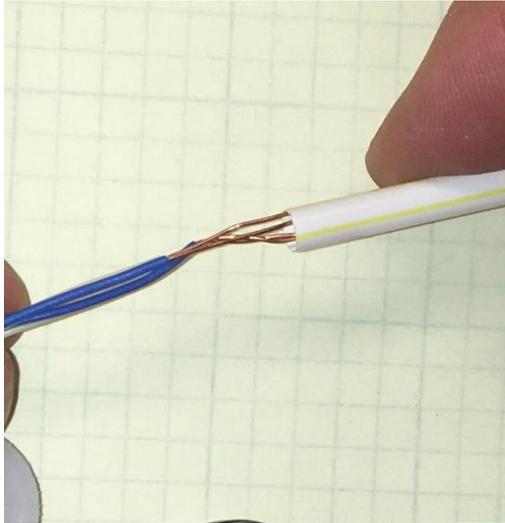
### Step 3 - Assemble the device

**Insert the completely assembled Charge cup into the lubed Housing.**

**Hint:** Save yourself some frustration by using the supplied plastic straw to aid in controlling the e-match wires while inserting the Charge Cup into the Housing!

Gently pull the Charge Cup by the wires until you feel resistance then STOP!

**Do not fully seat the Charge Cup!**



### **Insert and seat the Push Piston**

Use a 12gm CO2 ctg to aid in seating the lubed Push Piston

Use your finger to push on the CO2 ctg while gently pulling the e-match wires.

**The Push Piston should push on and be touching the Charge Cup when pushed into place.**

The Charge cup and Push Piston are properly seated when just over 3/8" of the Charge cup is protruding out of the Housing.

**Important:** The reason the Push Piston needs to be touching the Charge Cup is to make certain that there is no space between the two. If there is a space between the two, the push piston may not achieve the needed velocity to properly pierce the CO2 ctg when the device is activated.



### Finish the Assembling the device

Place the alignment collar into the Housing and over the CO2 ctg as pictured

Install the Return Spring

Attach the assembled Housing to the Mounting Cap. Screw the cap on just a little more than snug.

Note: There is no need to over tighten as it will not work loose during flight!



**Your **Peregrine** CO2 Ejection Device is ready to attach to your rocket!**

(That is, if the Mounting Cap is not previously mounted to a bulkhead!)

## After use Disassembly & Cleaning

### Step 1 Disassemble the device

Remove the Housing from the Mounting Cap  
Remove the spring, the Alignment Collar and remove and discard the spent CO2 ctg



Clip the e-match wire to about 1" from the Charge Cup  
With your finger, push out the Charge Cup and the Push Piston.  
You may have to use some sort of dull object to aid in Pushing the Charge cup until it is free.



**Check to see if the sealing o-ring is still on the Charge Cup, as it is most often still inside the Housing!**

(There are replacement o-rings in case you lose one, they never wear out!)



## After use Disassembly & Cleaning of the Charge Cup

The method you used for sealing the e-match in the Charge Cup will determine the method and difficulty of removing the spent e-match. Choose from the list below and skip to that section:

**Step 1-E** if you sealed the Charge Cup in the traditional manner, with **Epoxy**

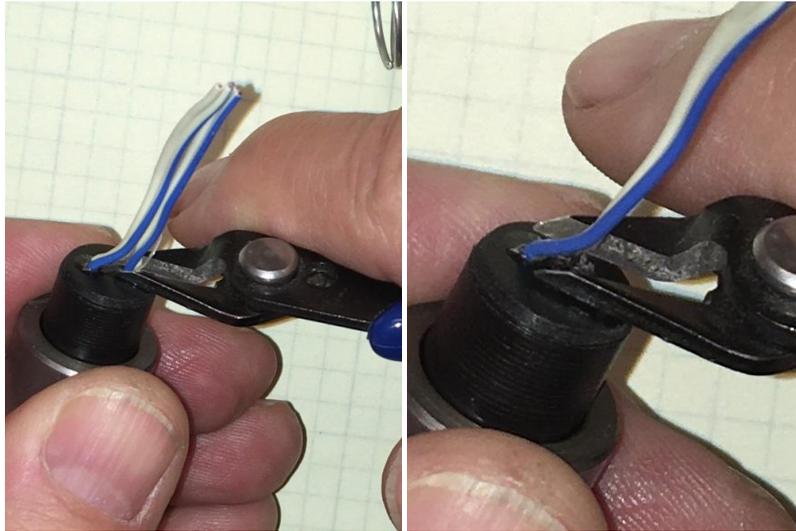
**Step 1-HG** if you sealed the Charge Cup with **Hot Glue**

**Step 1-P** if you sealed the Charge Cup with **Putty**

### **Step 1-E & HG Disassemble/Remove Spent E-match**

**(Use these instructions if you if you sealed the Charge Cup with Epoxy or with Hot Glue.)**

Clip the e-match wire as close to the surface of the cap as possible, Using a sharp side cutter (Such as the Xuron 2175 Maxi-Shear Flush Cutter on Amazon) is advised.



**Use the supplied punch to free the spent e-match, o-ring and seal**

**If you sealed the Charge Cup with Hot Glue**, simply hold the Charge cup in one hand and the supplied punch in the other.

Center the punch on the clipped wires and push the wires as far as they will go.



If you sealed the Charge cup with epoxy, you will likely need to first place the Charge Cup on a flat surface, then Center the punch on the clipped wires



Now **Tap gently** with small lightweight hammer to gain movement of the spent e-match.

Once you gain movement of the spent e-match, **STOP POUNDING!**

(Otherwise you will damage the Charge Cup)

The design of the punch will only allow some movement of the spent e-match and is not intended to completely push the o-ring out.

Use the punch to push until you reach the tapered portion of the punch



Next, you will need pliers or hemostats to grab the protruding spent e-match  
If the Cap was well lubed as instructed prior to loading, the e-match, o-ring and epoxy will all come out together and entirely with relative ease.  
Sometimes the e-matches are stubborn and come out in pieces and need to be pushed out.  
An Allen wrench or a piece of 12ga solid wire works well for this.



### **Step 1-P Disassemble/Remove Spent E-match**

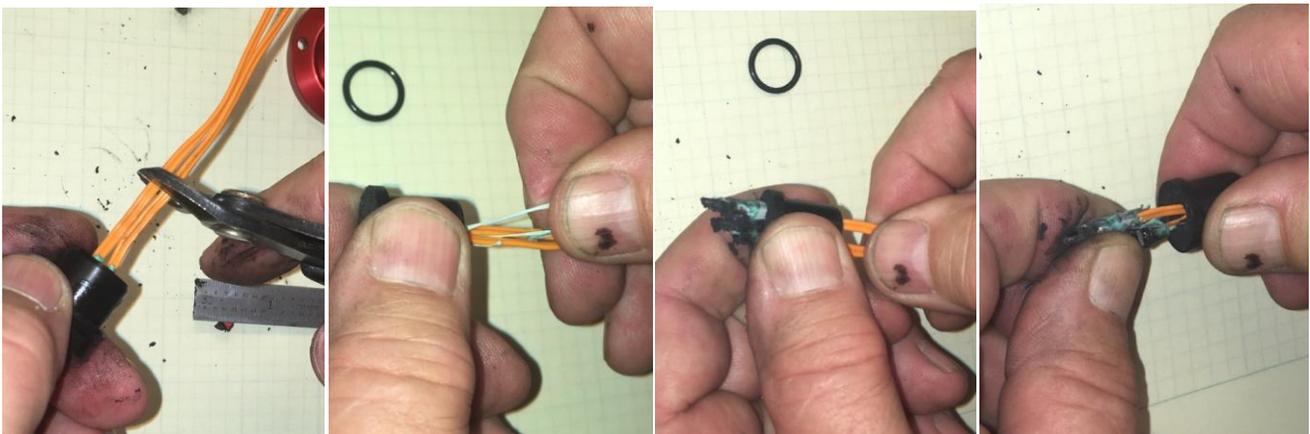
**(Use these instructions if you if you sealed the Charge Cup with Putty)**

Clip the wires to about an inch or so from the Charge Cup  
With your fingers, peel back and remove any putty that is on the wires.

Grab the wire with your finger and push it out

Pull the remaining wire out with pliers or your fingers.

**(Now tell yourself how easy that was!)**



FWIW, this "Putty" method of sealing is the only method I ever use any more. Turnaround time is less than 10min from firing to the next firing and for me, because I am testing these things, this 10 minute turnaround time INCLUDES setting up to take video of the device firing!

## Step 2 Cleaning and lubing

Some thoughts on cleaning the device...

In the ideal world, you would be able to find a sink with warm water and you would be able to thoroughly clean all parts with soapy water, allow all parts to **completely dry** before re-lubing and re-loading. In the field, it may be difficult to accomplish ALL of these things.

In my testing, where I may fire the same device again and again and again, I want my turn around time to be a minimum and I want NO CHANCE of any part that may come in contact with pyro powder, to contain ANY moisture. As a result, during the many tests that I might perform one right after another,

I never wash any of the dirty parts in water between tests, **never!**

Instead, I use several cotton swabs dipped in lube to wipe the parts until they are relatively clean. Where cotton swabs are not appropriate, paper towels are used and all parts get reasonably clean then properly lubed.

By "cleaning" the parts with lubed Q-tips, I can do a test every 10 minutes (Using the Putty Method of sealing the e-match)

**The moral of this story is that these devices have been thoroughly tested under less than ideal conditions and have been found to work perfectly 100% of the time!**

### Cleaning and lubing

Clean the Housing by washing or wiping with lubed Q-tips

Thoroughly lube the inside with the supplied lube ESPECIALLY at the bottom!

Scrape the burnt pyro from the bottom of the Push Piston

Wipe/wash clean and re-lube the Push Piston (With a paper towel, wipe the excess lube off the bottom of the Push Piston)

Wash and dry the Alignment Collar (Some Discoloration of the plastic is normal and expected)

Note: If you chose to wash these parts in soapy hot water, an old toothbrush helps to remove the burnt pyro. Do not struggle to remove all of the old lube! This lube is quite tenacious and is difficult and not necessary to remove!

Wash and dry the Push Piston - DO NOT remove the o-ring on the Push Piston unless it needs to be replaced. (Note: The push Piston o-ring does not wear and may actually **never** need to be replaced!)

**VERY IMPORTANT:** If you ever feel that you need to replace the Push Piston o-ring, YOU MUST USE THE SUPPLIED O-RING AND NOT ONE THAT YOU FOUND AT THE LOCAL HARDWARE STORE!! The supplied replacement o-rings for the Push Piston are very hard and must be used!

**WARNING:** If you use replacement o-rings you find locally, your Peregrine device will likely FAIL and will likely damage the device and will likely fail to release the CO2 properly for deployment and you know what that means for your rocket!

Wipe the inside of the Mounting Cap with lubed cotton swab

**Once clean and dry your Peregrine CO2 ejection device is ready for storage until next time...**

## **Plain talk about Pyro Powder**

Black Powder (BP) or BP substitutes in the 3F (fffG) or "pistol" granulation (Also 4F) are the only pyro powders that are to be used in the Peregrine CO2 Ejection device.

As BP becomes more difficult to find, be assured that BP substitutes such as Triple Seven (Made for BP pistols) or Pyrodex P (Also made for BP pistols), work very well in the Peregrine CO2 Ejection device.

Please note that since the small amount of pyro powder is determined by the precise volume of the Powder Measure Vial, no weighing of this very small amount of pyro is needed.

**Also note that BP or the BP substitutes are all measured by volume, not by weight as they do have different weights for a given volume.**

**Under no circumstance should you ever use smokeless powder in the Peregrine device!**

(Do not use smokeless powder in any Tinder Rocketry device for that matter! )

**Use black powder or black powder substitutes such as Triple Seven or Pyrodex P ONLY!**

**The powder from a "disassembled bullet" is NOT black powder!**

**The powder from a "disassembled fire cracker" is NOT black powder!**

Much to my surprise, I have found that a few people have used these other pyro powders with bad results.

**Under no circumstance should you ever use any pyro powder other than BP or the BP substitutes listed above in this or ANY Tinder Rocketry device!**

## Choosing the Right CO2 Cartridge for your Rocket

*"Make everything as simple as possible, but not simpler."*

This is a quote from a really smart guy with bad hair, Albert Einstein.

Simple is good and simple is what we are going to try and do here...

### **Choosing the right CO2 cartridge for your rocket:**

#### **Method 1:**

You may choose this method if you have flown your rocket (or you have ground tested it) and a known qty of BP has been determined for deployment. **The factor is 5. Whatever the qty of BP that you have used in your rocket, measured in GRAMS, multiply that by 5 to get the equivalent grams of CO2 needed for the same deployment pressure.**

For example: A rocket that has been flown (or ground tested) with **1.5 grams** of BP, would need about 7.5 grams (**1.5 gms x 5**) of CO2 to achieve the same ejection pressure. In this example you would choose an 8gm CO2 ctg and that would very likely work just fine, but you will still ground test this in your rocket!

Example #2: A rocket that has been flown (or ground tested) with **2 grams** of BP, would need about 10 grams (**2 gms x 5**) of CO2 to achieve the same ejection pressure. In this case, round up and choose the 12 gram CO2 ctg and then ground test!

#### **Method 2:**

You may choose this method if you have never flown nor tested your rocket and have no idea as to how much BP you might need for adequate deployment. I recommend that you first follow this link to the Rocketry Calculator website (<https://rocketrycalculator.com/rocketry-calculator/bp-estimator/>) where they have a very useful BP calculator and thoughts about how to determine how many grams of BP your rocket might need for BP deployment in your rocket.

**Warning: Do not let your head explode with all this discussion!**

Simply use this discussion to determine a STARTING POINT for your ground testing!

Once you have determined how many grams of BP that you would need to use in your rocket, use this number and go to Method 1. Then you must GROUND TEST!

There you go! The focus here is to get you to a starting point where you will then ground test this CO2 deployment system in your rocket before flight!

*(Have I mentioned that you should ground test?)*

#### **A word on CO2 cartridges:**

For rocketry flights using CO2 for deployment, more is OK! Unlike BP, it is really difficult to use too much CO2! Always use enough gas and **error on the high side when choosing a CO2 ejection cartridge!**

#### **Another word on CO2 cartridges:**

The CO2 cartridges that are used in the Peregrine are very easy to find locally. In addition, if you buy local, you help to support your local merchant and you don't have to pay shipping! If you cannot find these common CO2 cartridges locally, you can always order replacement CO2 cartridges directly from Tinder Rocketry.

## **Final note:**

This device has been specially designed and manufactured to the highest standards to do a job and do it well. I have gone to great effort to explain how to use this most excellent little device! If this device is used exactly as described, you can expect it to work 100% of the time, 100% as expected!



**Contact me if you see or feel that there have been omissions or if you still have questions.**

*[cameron@tinderrocketry.com](mailto:cameron@tinderrocketry.com)*