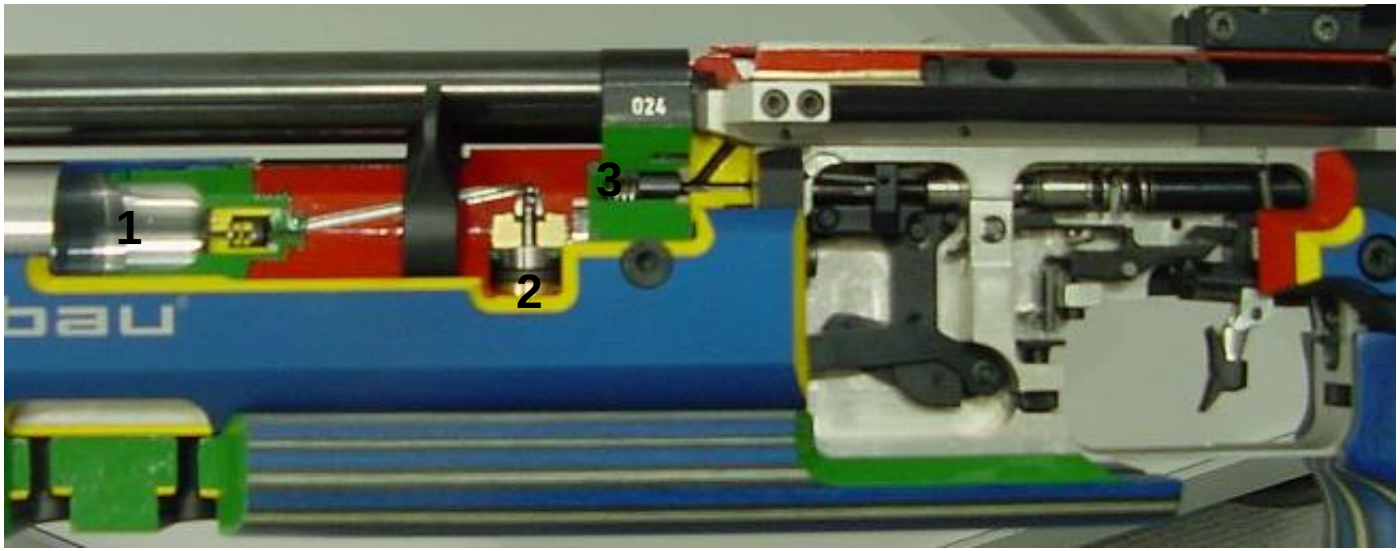
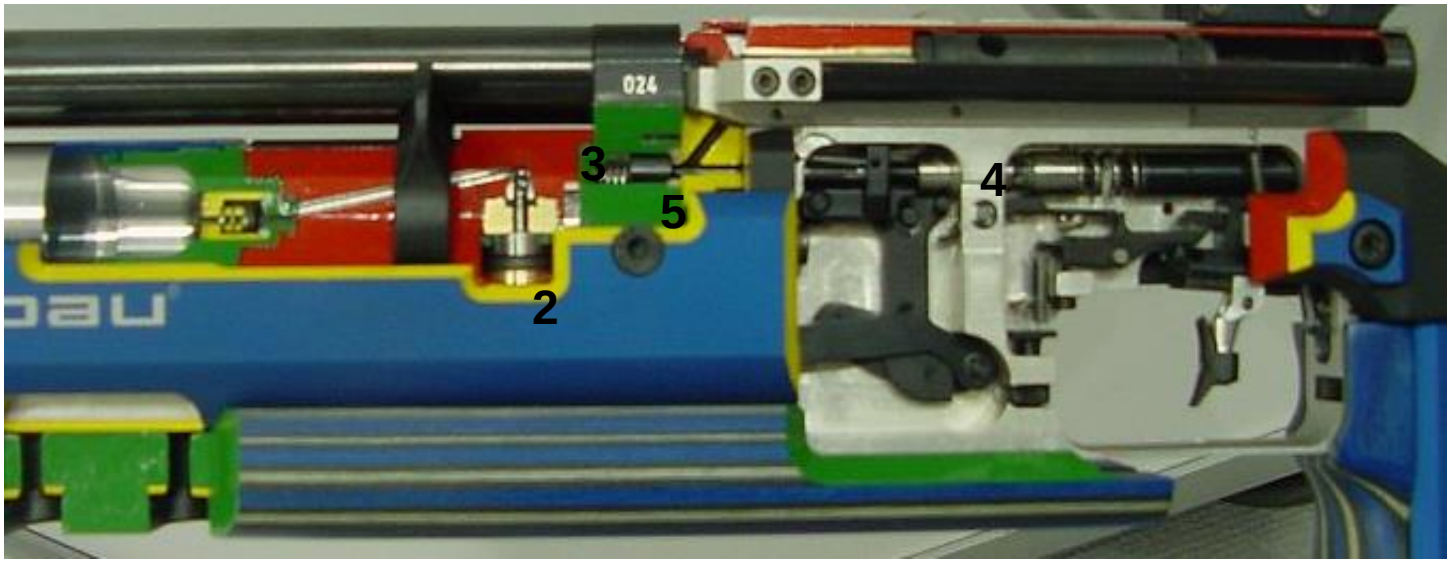
Basic Air System of a Modern SCUBA Airgun



- A detachable cylinder or pressure vessel (1) holds approximately 3000 psi of air.
- The 3000 psi air enters the regulator (2), which is the heart of a modern air gun. The regulator lowers the pressure to about 850 psi and puts a small amount of air into a holding chamber(3).

Basic Air System of a Modern SCUBA Airgun



- A striker (4) operated by the trigger opens a valve(5) in the holding chamber(3) which allows the air to push the pellet down the barrel. The regulator (2) will now cycle, allowing another batch of 850 psi air to enter the holding chamber.

Airgun safety

Are modern airguns completely safe?

If not, what can be dangerous about them?

Airgun safety

What's dangerous about airguns?

1. The projectile itself

Airgun safety

What's dangerous about airguns?

1. The projectile itself

2. Cocking arm on spring or pneumatic guns

Airgun safety

What's dangerous about airguns?

1. The projectile itself

2. The cocking arm on spring or pneumatic guns

3. The compressed air cylinder

Which is more dangerous?

SCUBA issues

- The pressurized air in a normal 80 cu tank is 3000 PSI (pounds per square inch) and has 1.3 MILLION foot-pounds of energy within its aluminum tube.

SCUBA issues

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- This is enough energy to lift a 100 ton diesel locomotive off the railroad tracks

SCUBA issues

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- This is enough energy to lift a 100 ton diesel locomotive off the railroad tracks
- A typical airgun cylinder has essentially the same power potential as a hand grenade

So which is more dangerous?

=

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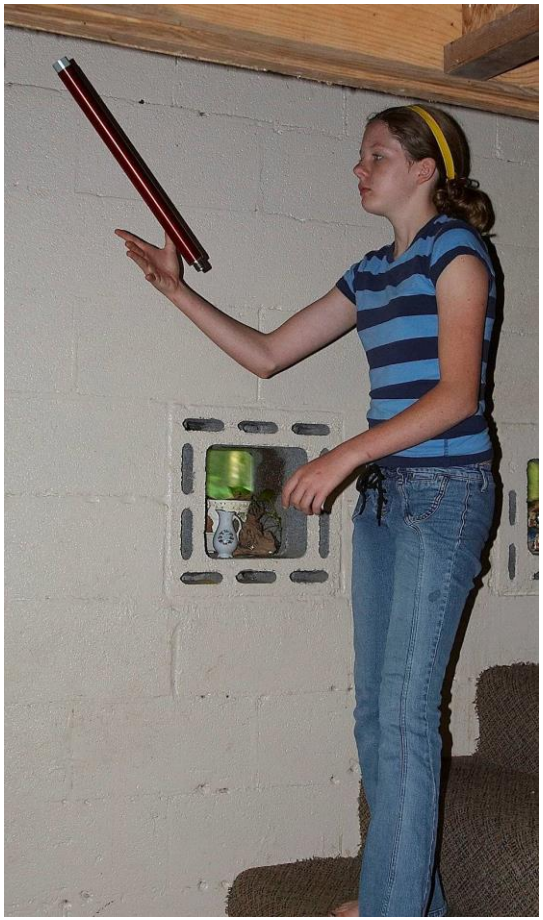
Situation



What should you say if you saw on of your athletes walking down the hall playing catch with a cylinder?

SCUBA issues

- What do we see in this picture?

SCUBA issues

- What do we see in this picture?
- Is this a safe act?

SCUBA issues

- Is this a safe act? NO

- If accidently dropped, the valve could shear off and cause the tank to become a missile
- Tank should always be carried down low to protect the valve.

SCUBA issues

- What about this? Is this safe?

SCUBA issues

- No, an accident could also cause the valve to break off and the tank become a projectile.

SCUBA issues

- Always make sure that SCUBA tanks are securely tied down to prevent damage in the case of an accident.

SCUBA issues

What about checking the pressure while filling?

Is this a good idea?

SCUBA issues

Never look directly at the gauge when filling a cylinder.

Gauges have let loose and become projectiles themselves.

SCUBA issues

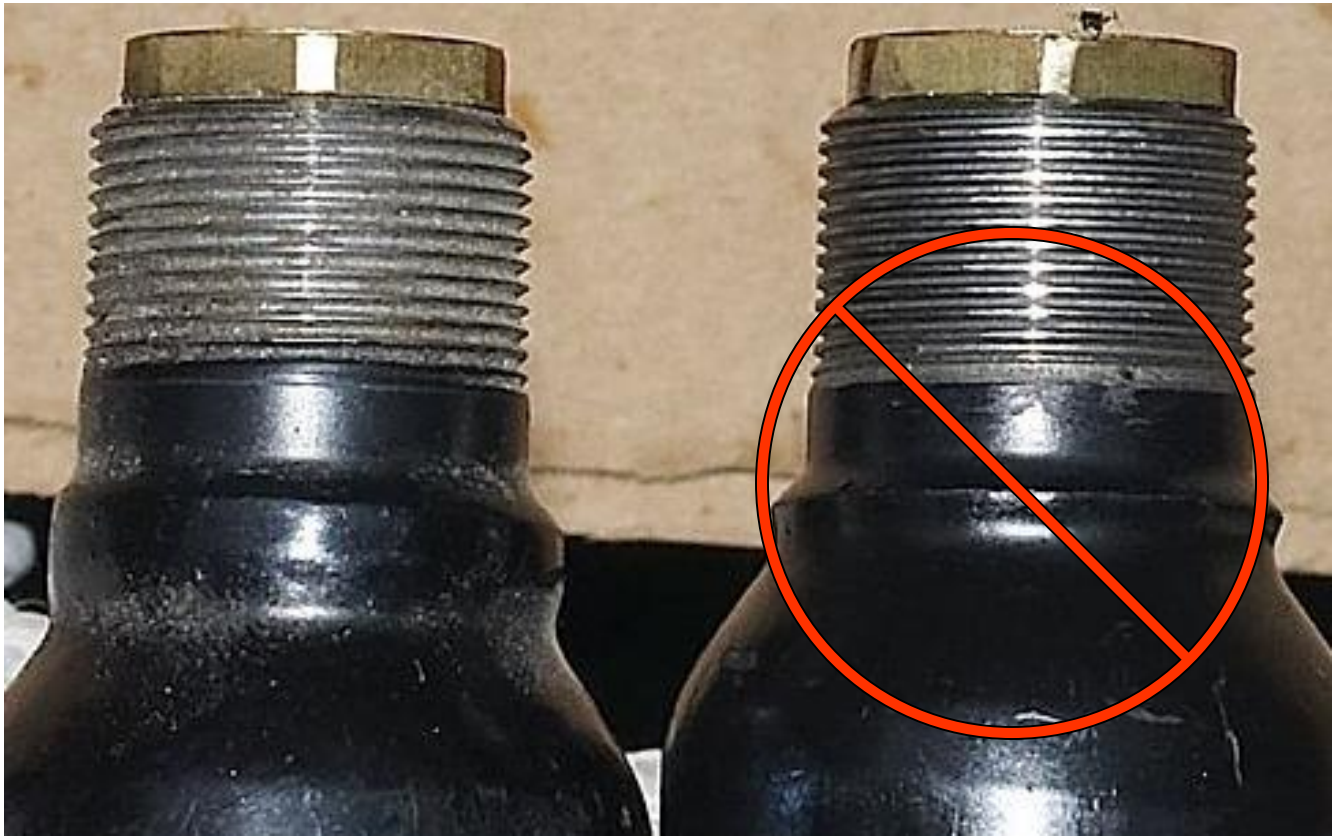
This cylinder was overfilled and the gauge stripped it's threads. Both the gauge and the cylinder body became projectiles.

You can see how much force it had when it a nearby concrete wall.

Cylinder inspection
Keep or replace?

Cylinder inspection

You should get in the habit of looking at your threads every time you fill with air. The rounded threads of the right hand cylinder indicate a problem occuring.



Cylinder inspection

Look at these threads.

Should this regulator be replaced?

Cylinder inspection

Should this regulator be replaced? YES. Threads should be perfect 60 degree angles. These have been stretched by misuse.

And if the male threads on the regulator look like this, what about the female threads on the cylinder? Maybe it needs replaced too?

It's not a good idea to share cylinders between several guns, as one bad set of threads could ruin several other guns.

Cylinder inspection

Cylinder inspection

Severe galling from misuse caused the cylinder on left to unscrew from the tube, allowing the cylinder body to become projectile.

Daisy 888

- This cylinder also unscrewed at it's base

Causes of thread wear on cylinders

Too little lubrication, causing galling

Improper lubrication, should use a fine grease, not an oil.

Overtightening, causing galling

Not keeping threads clean. Use a toothbrush with rubbing alcohol to clean threads if you are in a dusty enviroment, before adding lube

For maximum life of your airgun

- Always unscrew air cylinder just enough so that you hear a small “whoosh” of air come out of the regulator when you are not shooting for more than a few hours.
- This keeps the threads on the cylinder and regulator clean while removing the pressure on the regulator o-rings and springs, which age much faster if they are under constant pressure.

Is oil harmful to your airgun?

- Do not use normal petroleum based oils on airguns.
- It is harmful to the rubber seals and can potentially be explosive

Proper Lubes

- Use only manufacturer recommended lubricants or high heat resistant synthetic oils and greases that can withstand the pressures used in modern airguns without being subject to dieseling.
- TS-301 is a good choice for an oil or rust preventitive.
- TW-25 , Slip 2000 and other modern synthetics are also acceptable.

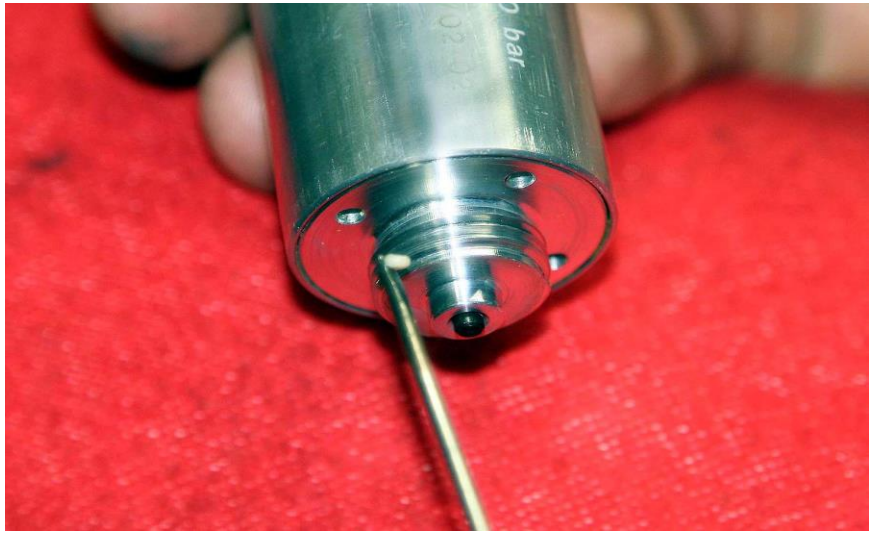
Proper Lubing Information

- Always refer to the factory owners manuals for amounts, locations and intervals needed for oils and grease applications.

- In general, we see more airguns damaged from overlubing than from underlubing.

Feinwerkbau P70 or P700

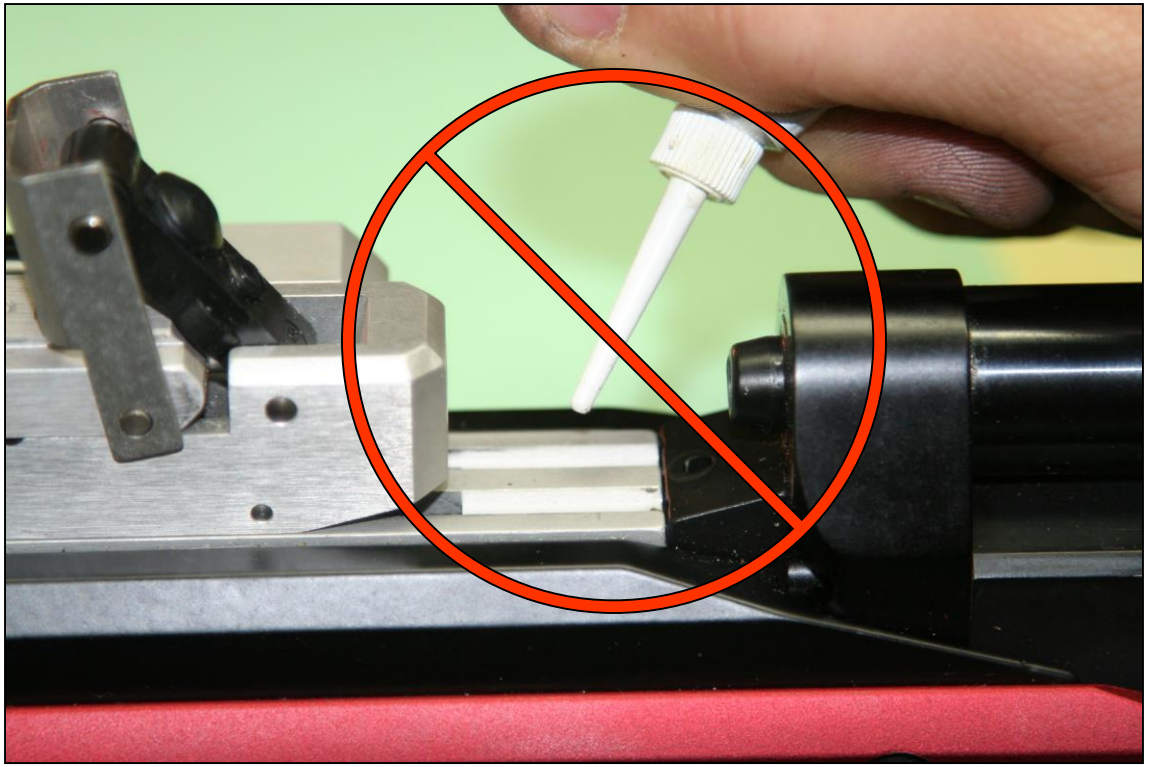
- You should put a small amount of grease on the threads of the cylinder.
- You should put a small dab of grease on the o-ring sealing surface.
- When you use more than the suggested amount in the pictures above, the grease could travel into the air path, and get in the regulator causing velocity fluctuations



Feinwerkbau P70 or P700

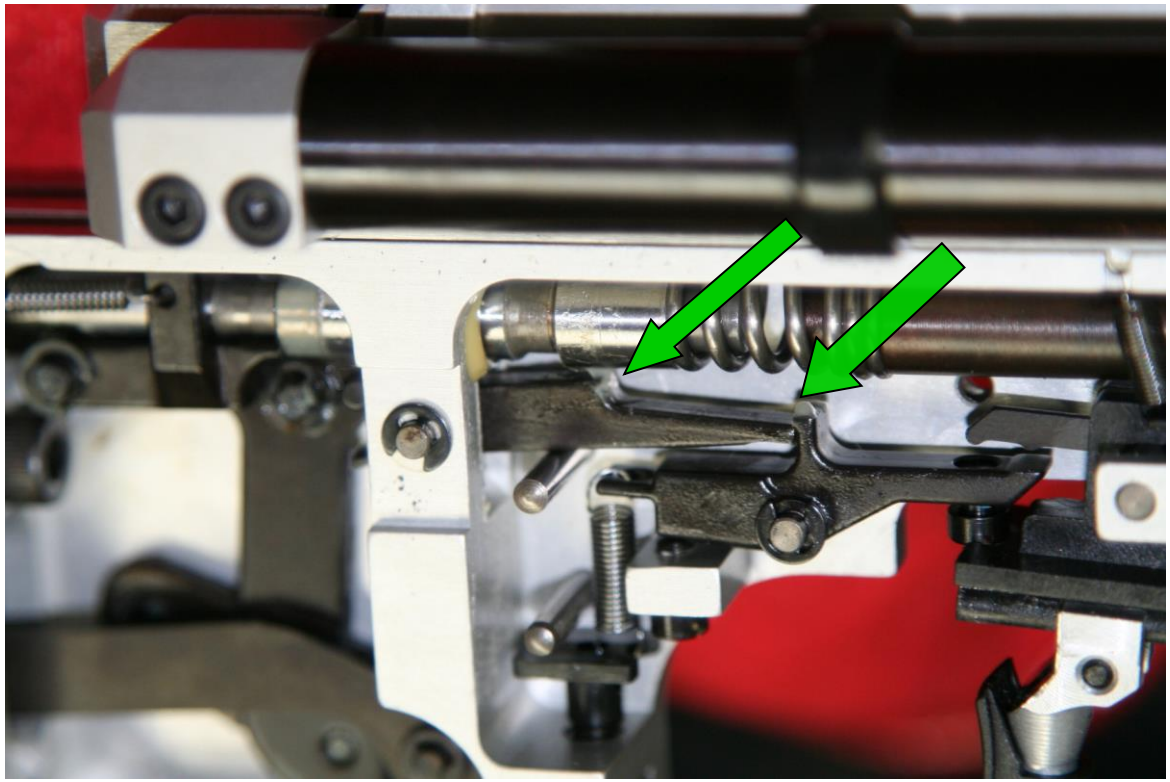
- Do NOT put grease in the valve area.

Feinwerkbau P70 or P700



- The breech area on the P70 and P700 does not require any grease.
- Grease in the area cause a collection of dust and debris and this will cause the slide to gum up.
- Do not put any grease in the air port or valve area.

Feinwerkbau P70 or P700



The high friction points of the sear and the valve catch link should have a very small put on their “bright” areas if they appear dry.

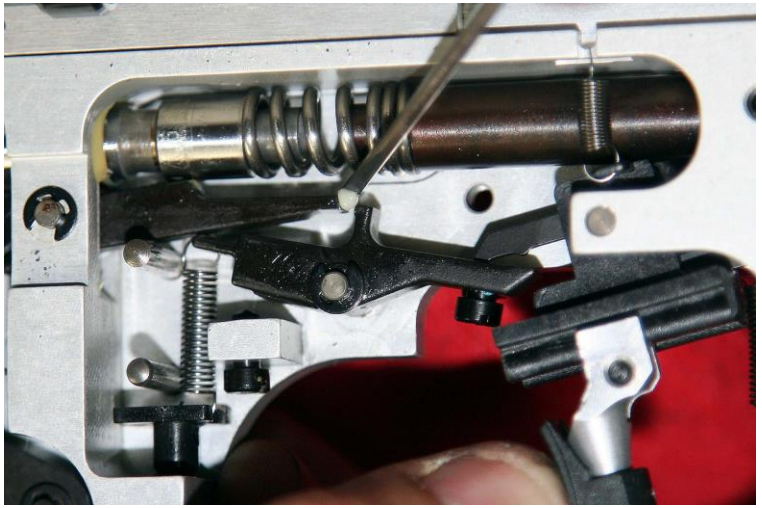
Be careful not to get the grease along the side or an abnormal trigger feel could result

Another View

Put a small amount of grease on the sear edge as shown in diagram. A tiny screwdriver or dental pick make good applicators

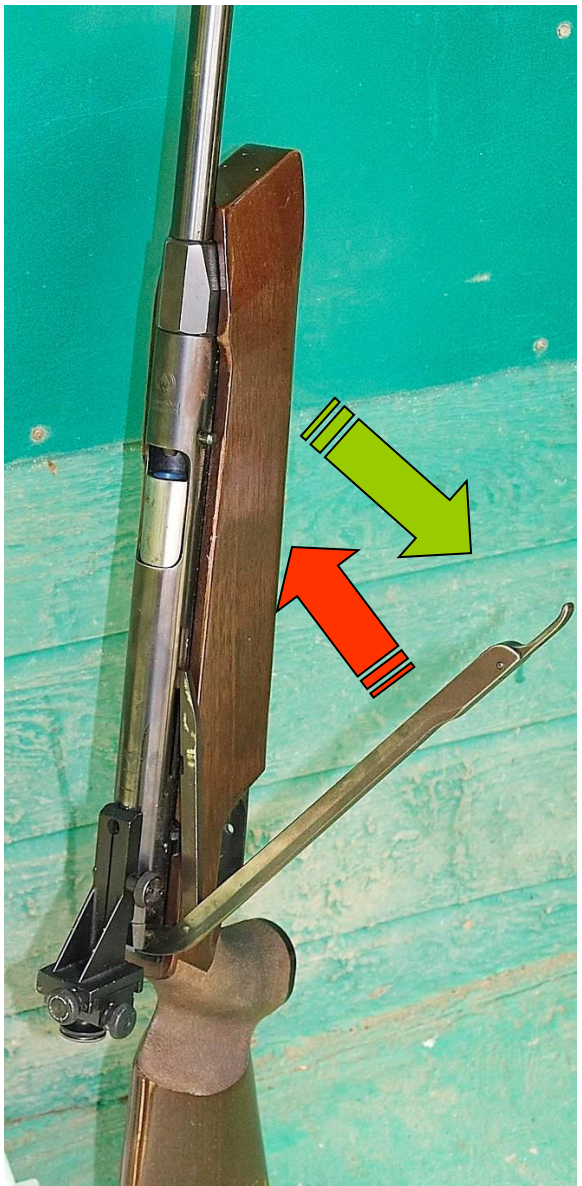
- Use the same amount of grease as shown in diagram.

- Too much grease causes a collection of debris which causes a gummy feeling trigger.

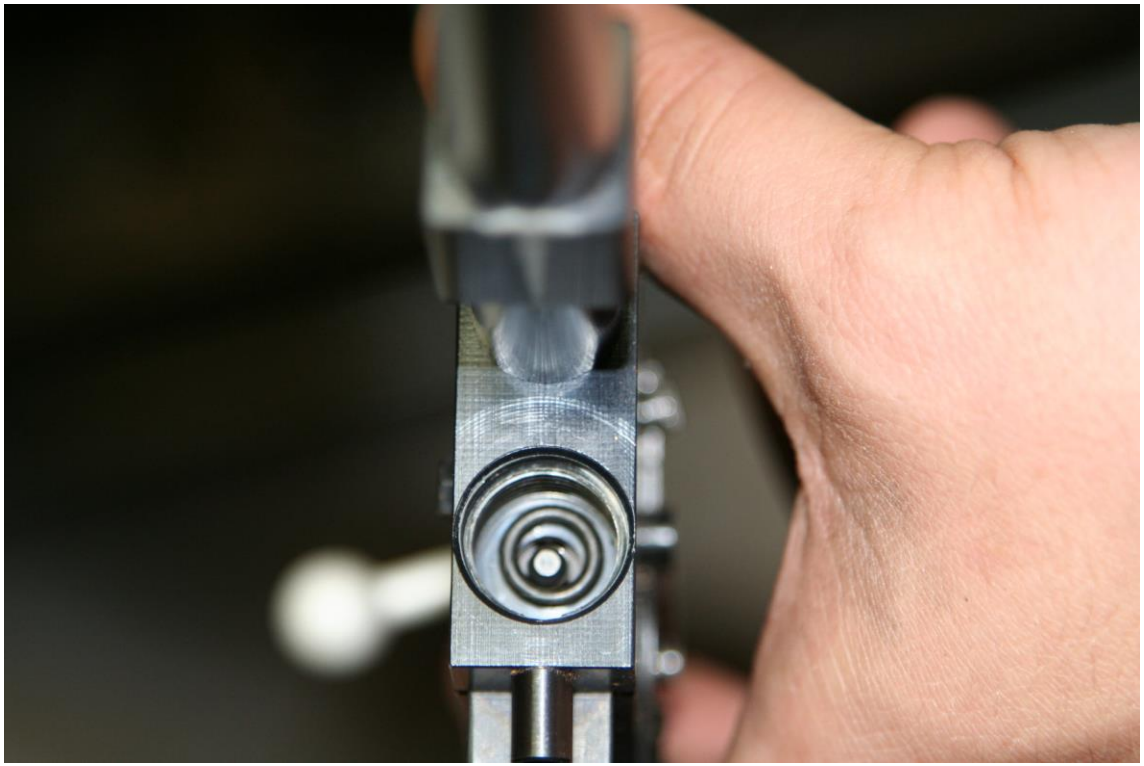


Feinwerkbau 300

- Cocking arm should rachet as it is being opened.
- If the arms “free floats” back and forth while cocking, it is in an unsafe condition and should be repaired before any other use.
- FWB 600 is the only common air rifle that does not have a ratchet system



Daisy Valiant (XS40)



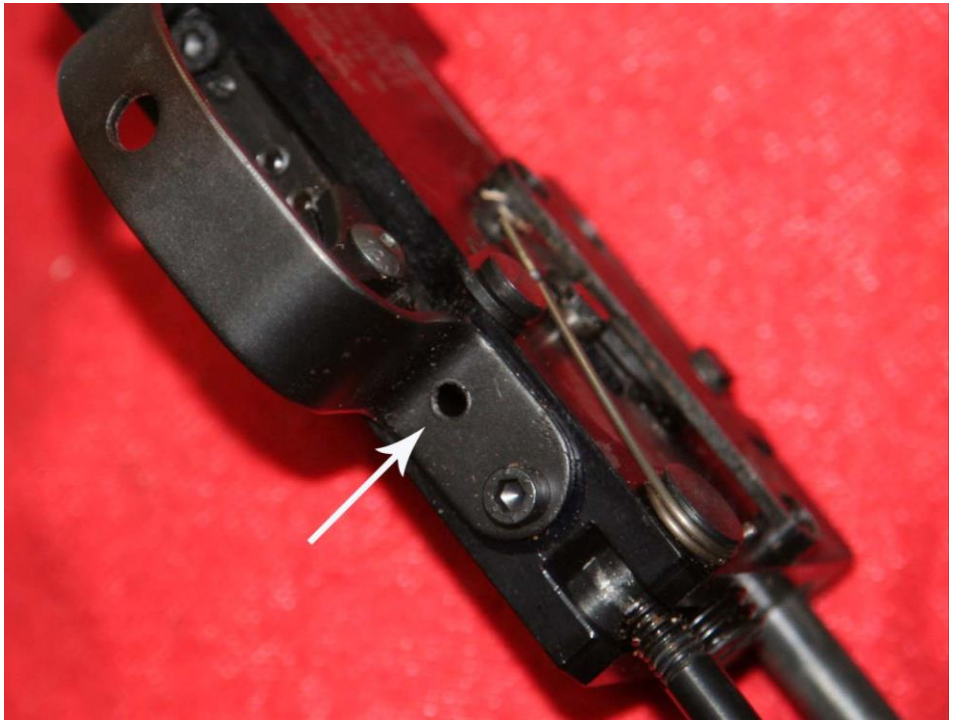
- When removing the cylinder from the action , sometimes the O-ring from the cylinder gets stuck to the frame.
- Conversely, if you are missing an O-ring on your cylinder you need to check this part of the gun before putting a new o ring on the cylinder. We sometimes get guns in for repairs with two or three O-rings mashed together in this area.

Daisy Valiant (XS40)

- If the O-ring is pulling out of it's seat, apply very small amount of grease to top of the O-ring to just barely "wet" the surface with grease.
- Amount shown is possibly too much for the entire O-ring. Be careful not to allow it into the valve area

Daisy Valiant (XS40)

- Some times screw #61 may be screwed in too far causing the screw to fall into the action. When this happens the trigger will not reset.

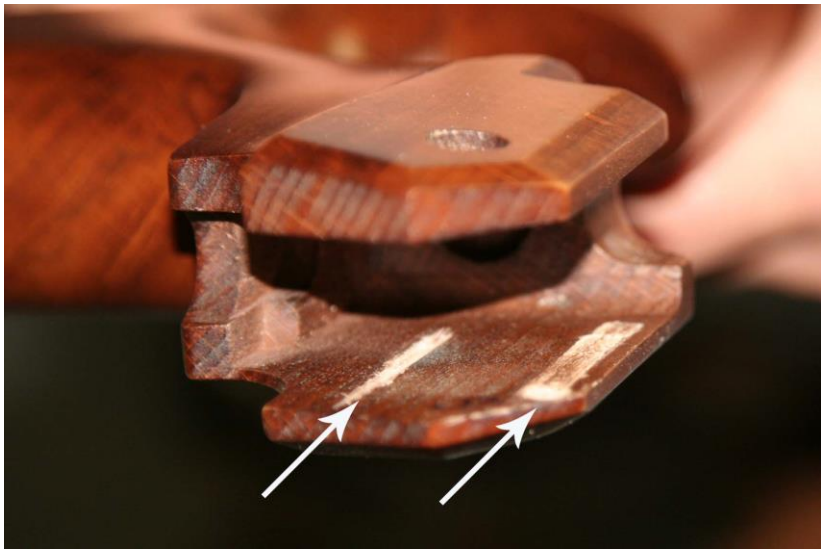


Daisy Valiant (XS40)

- This is the forward edge of the cocking arm which some times develop burrs this causes the cocking arm to get stuck in rearward position. This causes the velocity to drop.

Daisy Valiant (XS40)

- Cocking screws #18 and #27 can vibrate loose backing themselves out into the wood of the stock this causes drag marks as seen in picture. This causes slows the striker movement and causes low pellet velocity



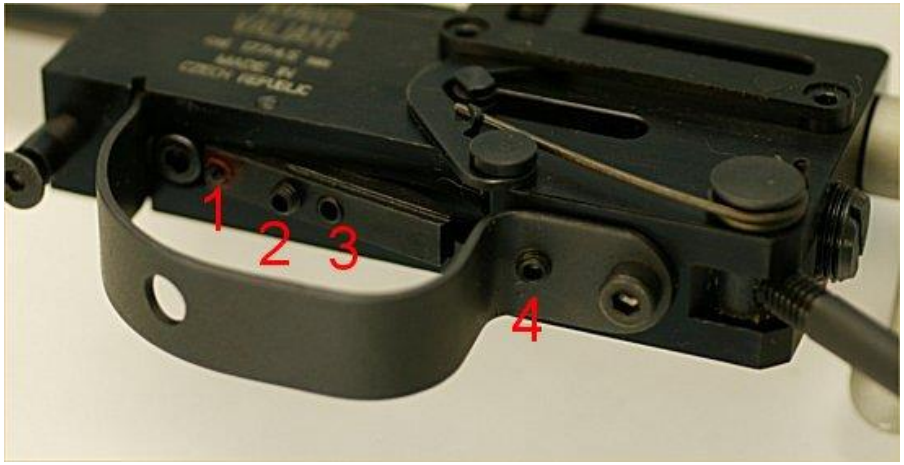
- To prevent this from happening you need to make sure the screws stay tight.

Daisy Valiant (XS40)

- This shows how the old style trigger screw is causing the plastic trigger screw to break.

- The new trigger screw has a larger head that spreads the pressure across the plastic.

Daisy Valiant



- To adjust trigger to 1 ½ lb:
  Ensure rifle is unloaded, make sure cylinder is not attached.
  1 Turn screw #4 clockwise until it is about three threads above flush. Beware of turning screw clockwise too far, it is possible it may fall inside the action.
  2 Turn screw #2 counter clockwise about three or four full turns from flush.
  3 Turn screw #3 (it may be obscured by the trigger shoe) until it is flush. Check to see if it will pick up the 1 ½ lb weight. Turn screw #3 clockwise to decrease and counter clockwise to increase weight.
  4 To adjust slack in the trigger (to make it single stage), turn screw #1 clockwise half a turn at a time. Cock the action. If it catches, pull the trigger and go another half turn. Repeat this until the action will not cock. Then turn screw #1 counter clockwise about 1/8 of a turn. Repeat until the gun will cock. We recommend this adjustment because the first stage trigger spring can be displaced or fall out if there is too much takeup.

Taken from the 10P Files on pilkguns.com

Walther LG300

- Check the o-ring on the breech bolt, it should take an indention from a fingernail, and have a rounded protusion above the bolt surface.

Walter LG300

- Cylinder mount threads are easily inspected and lubed as necessary.

Use authorized gunsmiths

Where are your pellets

Where are your pellets

Smallbore Cleaning

- Lead debris and powder residue accumulate in the corners and extractor slots, causing extraction problems and possible light strikes

Smallbore cleaning

- Use a sharp dental pick to clean out this debris from the chamber crevices
- Follow up with a good bore solvent and Q-tips for an as-new clean area.

Smallbore cleaning

- Use the dental pick to clean around the bolt face and under the extractor claws
- Remove firing pin and thoroughly clean the firing pin passageway of accumulated residue as well. Put light coat of oil in the passageway before re-installing

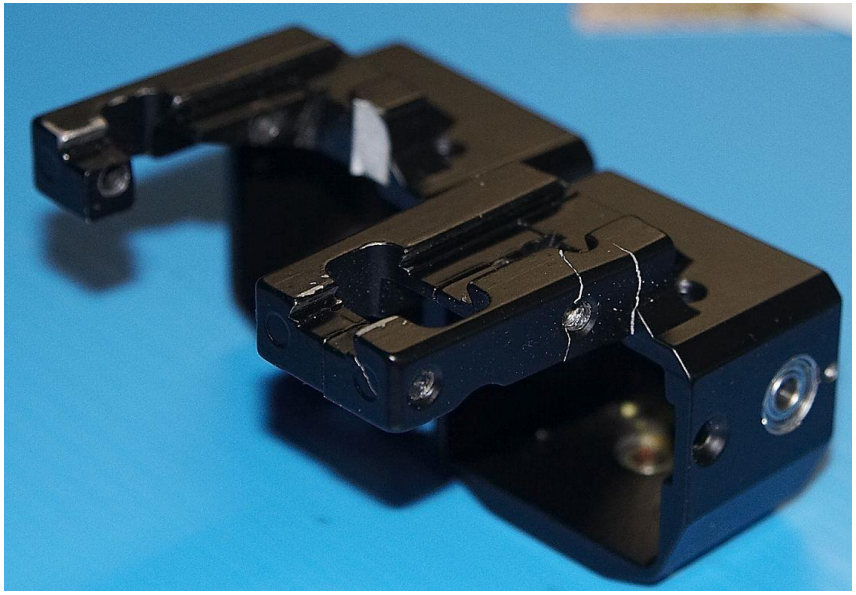
Use appropriate force

Any screws or bolt designed to be tightened or adjusted by the user, should not be over-tightened.

Overtightening can cause stripped heads, cracked frames or stripped threads.

Snug and a little past is good enough.

The same applies to cylinders



A handy tool

Service Intervals for Airguns

- When something is not right, or when your shots consistently are not on call.
- If the regulator does not release a small whoosh of air when cylinder is removed, it needs to be re-built
- For a normal usage club or high school gun, about every 3-4 years should be fine.
- For a serious top level competitor, once a year is a good idea.

Offseason Storage

- Make sure cylinder is unscrewed from regulator enough to release air. Removing air from cylinder is not necessary
- Pull an oiled patch through the barrel to leave a light coat of oil inside the bore.
- Wipe down any exterior steel surfaces with an airgun quality oil like TSI-301

The TenP Files

(Potter & Pilkington's Phantastic Phile of Precision Pellet Paper Punching Paraphenalia & Phacts)

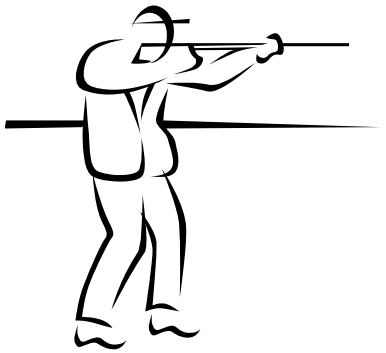
- Is a comprehensive listing of important information about target airguns and firearms; sight adjustments, trigger adjustments, disassembly instructions etc.

http://pilkguns.com/tenp/default.htm

Situation

- An athelete brings you a gun and says “Hey Coach, I can’t unscrew the cylinder.”

What do you do?



Situation

- An athelete brings you a gun and says “Hey Coach, I can’t unscrew the cylinder.”

If the cylinder requires more than a slight amount of force above hand strength to remove, then the cylinder should be completely emptied of air before attempting removal. The only safe method to do this is to cock and fire the gun (without a pellet of course) until no air is coming out of the barrel. This may require several hundred repetitions. Further removal may be then attempted. If cylinder still remains in place, a qualified airgunsmith should be consulted.

Pellet Usage

- This gun has five pellets squashed in the breech area.

- Similarly if you shot a shot and no hit is visible on the target, rather than continue shooting, use your CBI to make sure the pellet is not in the barrel.

Pellet usage

On average, we fix 10 guns a year who have ground up pellets in the trigger group, because someone spilled their pellets in their gunbox.

Pellet usage

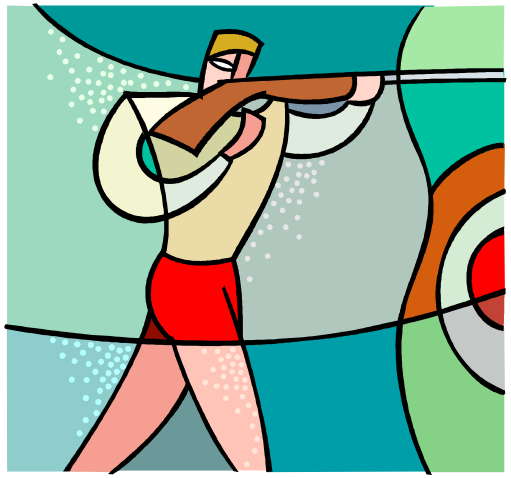
A safety sleeve is a good investment.

Always wash your hands before eating

Situation

Athlete brings you a rifle and says they can’t get the trigger to pull. The gun is loaded.

What do you do?



Situation

Athlete brings you a rifle and says they can't get the trigger to pull. The gun is loaded.

Keep the gun pointed in a safe direction, and move it to an area where it can be handled while still pointing in safe direction. Open the bolt/cocking lever and remove projectile with a cleaning rod if necessary before attempting to diagnose trigger failure. Consult qualifed airgunsmith if necessary.

Bonus Question

- What kind of air rifle is this?

Bonus Question

The Haakim Trainer was a .22 caliber spring piston air rifle made by Anschutz for the Eqyptian Army in 1954.