



Stainless Steel Cylinder Fitting Nut removal (After Galling or lock-up of the threads)

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Scope:

This procedure covers the cutting and splitting of the SS cylinder fitting nut to remove a galled cylinder SS pigtail fitting or leaking galled outlet seal from a gas cylinder. Galling is a common event with over torqued Stainless Steel cylinder valve fittings, and once the fitting is galled, only cutting the nut will release it. Cutting carefully and then “dressing” the valve threads with the jewelers file will allow a cylinder valve outlet vapor tight cap to be installed for safe shipment. The SS Valve threads must be fixed enough so the vapor tight cap will not repeat the galling process with the seal installation at the end of this procedure. Using milk or heavy cream (sour or curdled milk is fine, does not need to be fresh) can help save the threads from re-galling when trying the vapor tight cap.

Personnel required:

2 – 1 cutter, and 1 safety observer with gas detector appropriate for the product.

Personnel Qualifications:

Only ERT trained persons with experience in operations should utilize this procedure. Product Awareness and ERT Training are minimum prerequisites.



Photo of Nut cut on one side



Photo of Dremel tool being used to cut a nut. (towels protecting valve are not necessary, but won't hurt)

Tools Required:

1. Dremel tool (or similar)
2. Cutoff wheels, 15-16 steel cutting wheels about 1" diameter
3. Jeweler's files, 1 ea Flat and triangle
4. Small Chisel and Hammer
5. Hacksaw
6. Appropriate gas detector



7. 1 Dry Chemical Fire Extinguisher (if flammable)

Parts Required:

Valve outlet seal with good gasket (if gasket is required)

PPE Required: (modify as required for the product - see ER PPE matrix)

1. 2 Splash suit or Nomex (product dependant)
2. 2 sets long sleeve leather gloves
3. 2 Safety Goggles
4. 2 Face shields

The included photos are from different cutting operations so various PPE is shown, (including a poorly posed nut splitting photo without the appropriate leather gloves!).

Always use the ER and site PPE matrix to choose the correct PPE.

Procedure:

1. Both operators dress out in all PPE required.
2. The cylinder is to be moved to an outdoor area clear of any traffic or fire hazards.
3. Warm up and zero the appropriate gas detector in clean air of the same temperature as the cylinder's environment where cutting is to take place.
4. Position the fire extinguisher nearby, in case it is needed. Do not place the extinguisher in the immediate workspace to prevent tripping over it while working.
5. Ensure the valve handle is tightly closed.
6. Tie Wire the valve closed for toxics.
7. Sniff the entire valve and pigtail area with the Matheson (or appropriate detector).
8. The gas detector will be constantly sniffing the valve area during the complete procedure that follows, held by the safety observer.

If at anytime in this operation gas is detected or flames are present, all work must stop. Check with plant supervisor, EH&S, and ER Coordinators before resuming work. The SCBA will be the backup equipments located on site

9. If the pigtail interferes with this cutting operation, it can be cut off close to the fitting nipple as a first step, using the hacksaw.
10. Cut the Nut with the Dremel tool on one side or flat of the fitting from the valve end to the pigtail end. Cut slowly and carefully down to the thread crests trying to do as little damage as possible to the valve threads. Valve thread damage will occur, but try to keep this as minimal as possible.
11. Recheck that the valve handle is tightly closed.



12. Once the thread crests are first seen, switch to the opposite side of the nut and repeat.
13. The cuts need to be very deep at the pigtail end where there is no thread, and the body is thickest.
14. Recheck again, that the valve handle is tightly closed.
15. Once the cuts are complete, use the small chisel to attempt to crack the nut. The nut may be removable even if it does not split entirely in two pieces as the galled threads possibly are released.
16. If this nut splitting does not succeed, more cutting will be required. Again, use shallow cuts to try to save the valve threads as much as possible.
17. Repeat the cutting, chiseling, and Valve handle checking steps in 10 through 15 until the nut can be removed.
18. Once the cylinder valve fitting nut is removed, the jewelers file is used to clean and dress the valve outlet threads to accept the valve outlet seal. File for a few moments and then try the cap, repeating the file try/process as needed.
19. Tighten the Outlet seal in place and the cylinder is **Almost** ready to ship.



Heat will be minimal so wet towels are not necessary, but can keep any sparks away.



Splitting the nut with Chisel after cutting the nut with the grinder tool (but use gloves!).



CGA Nut after splitting (Silane example)



DISS Nut after splitting (NH₃ example)



Galled threads after nut removal



"Cleaning" or "dressing" the threads with jewelers file



Removed Pigtail

Place vaportight cap onto valve outlet before shipment

Feel the Heat

Eugene Ngai

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