TECH TALK:

TROUBLESHOOTING COMMON REGULATOR ISSUES

07/15/2020

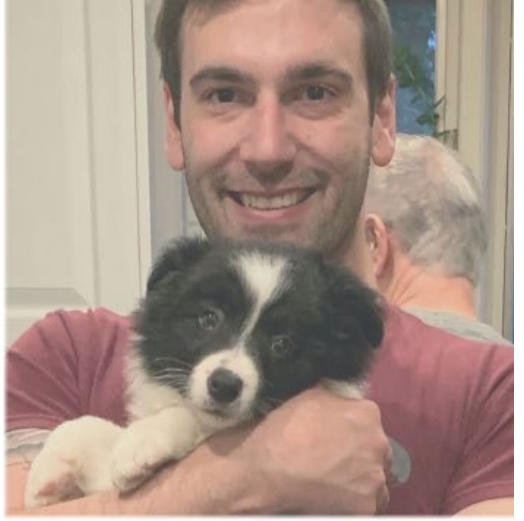
Swagelok

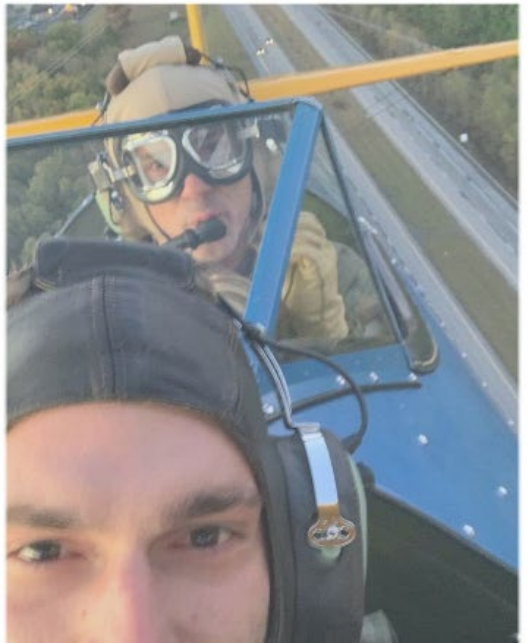
Swagelok Northwest (US)

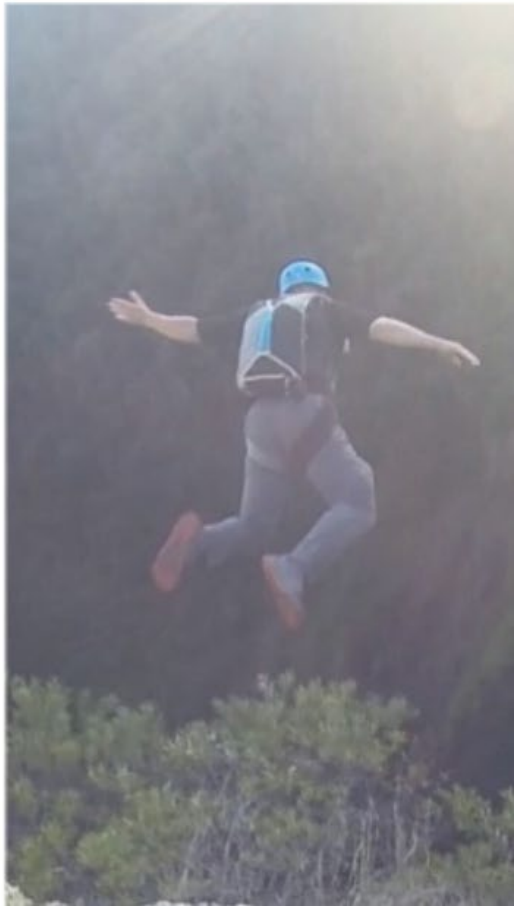
Meet Your Field Engineers

Adam Ghannoum

Field Engineer

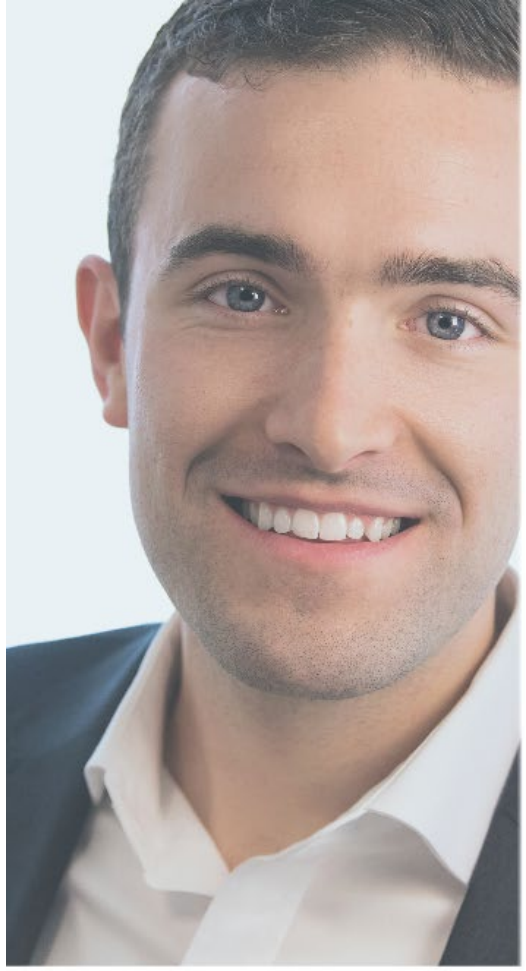


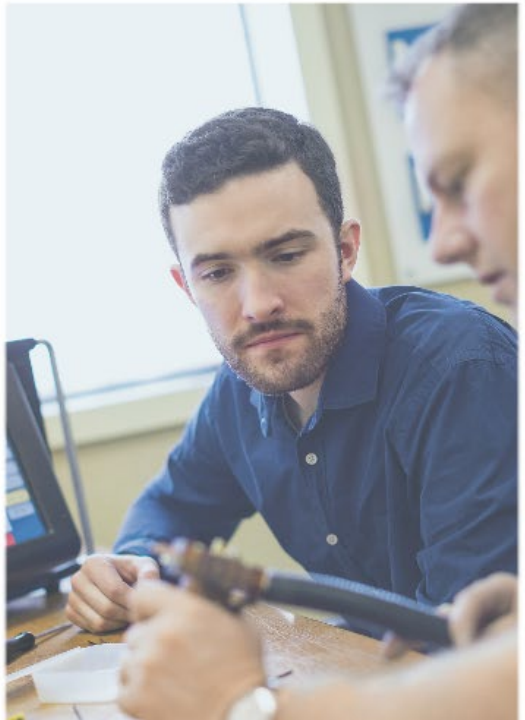


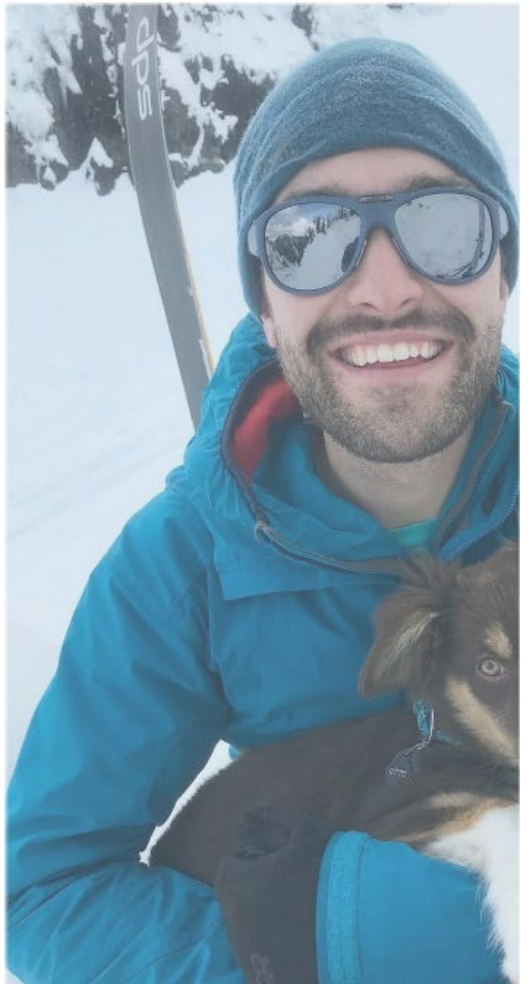


Meet Your Field Engineers

Matt Hasenohr
Field Engineer







Agenda

Swagelok Northwest (US)

- Overview
- Common Failure Modes
  - Seat creep
  - Diaphragm distortion
  - Diaphragm crack
  - Shell leak
  - Flow restriction
- Regulator Maintenance
- Questions

OVERVIEW: Troubleshooting and Maintenance

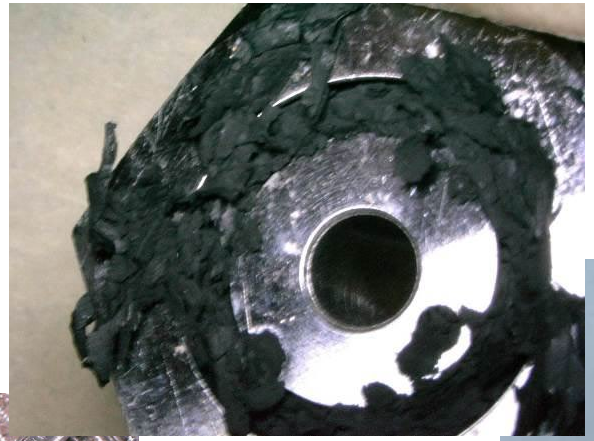
Swagelok Northwest (US)

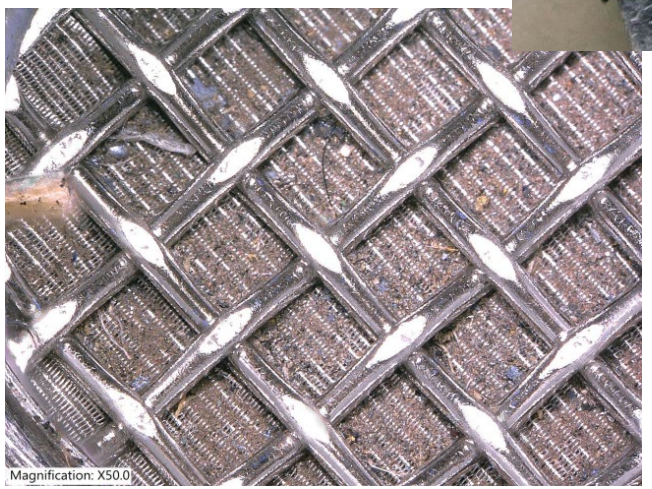
- CGA pamphlet E-15: Periodic Service Program for Industrial Gas Regulator
  - “Regulators do not have infinite service life, and they require periodic maintenance. Materials used in regulators, particularly elastomeric or rubber materials, will deteriorate over time. Aged elastomeric materials may exhibit hardening, stress cracking and other physical property degradation.”
- CGA recommends overhaul at least every 5 years
  - Also recommends adding tag to indicate in-service time

Common Failure Modes

Swagelok Northwest (US)

- Seat creep
- Diaphragm distortion
- Diaphragm crack
- Shell leak
- Flow restriction

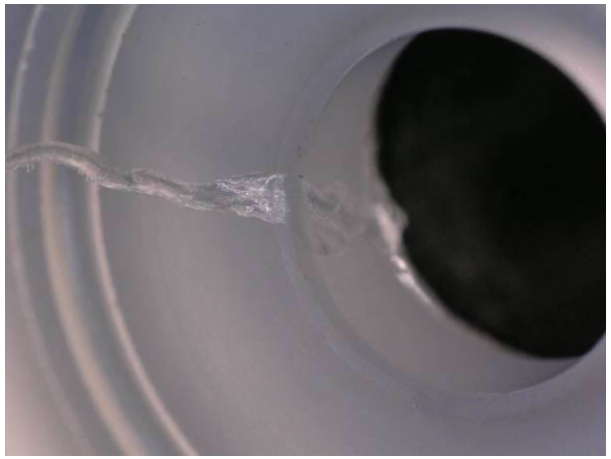


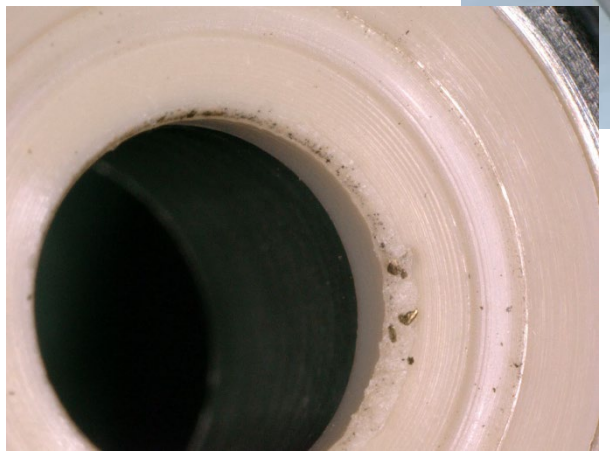


Common Failure Modes

Swagelok Northwest (US)

- *Symptom*: Downstream system pressure unexpectedly exceeds previous set pressure





Common Failure Modes

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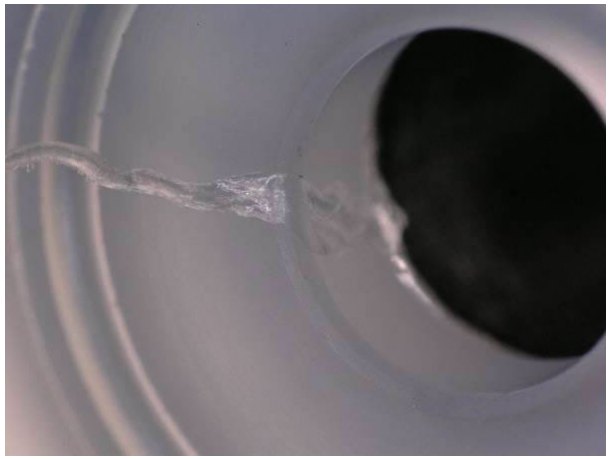
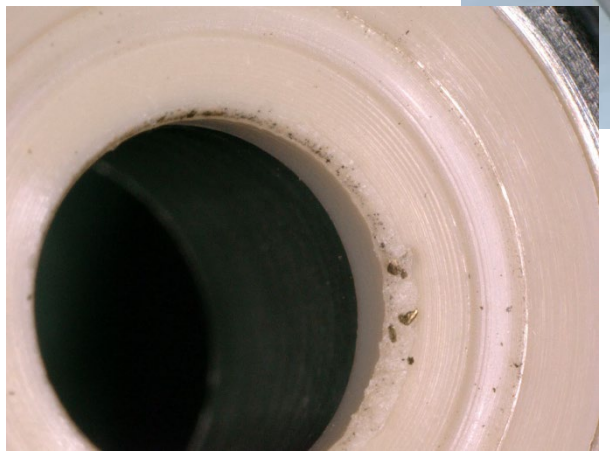
- Seat Creep
  - *Cause*: Particulate or damage to seat
  - *Solution*: Clean or replace seat
  - *Prevention*: Add filtration upstream





Common Failure Modes

Swagelok Northwest (US)

- *Symptom*: Difficulty adjusting downstream pressure during normal operating conditions

Common Failure Modes

Swagelok Northwest (US)

- Diaphragm Distortion
  - *Cause*: Downstream overpressure
  - *Solution*: Replace diaphragm
  - *Prevention*: Add or adjust downstream over pressure protection

Common Failure Modes

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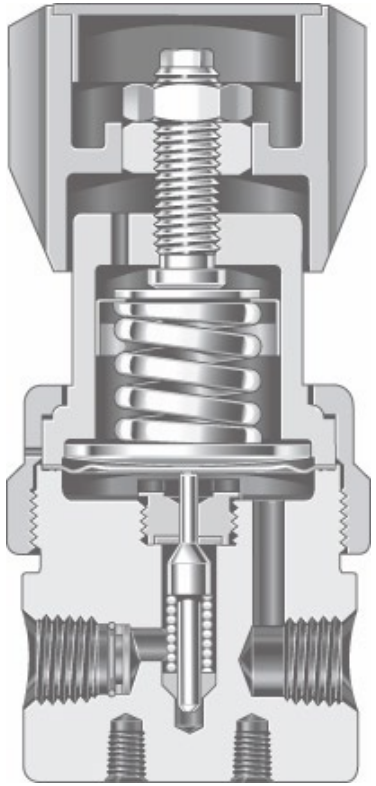
- *Symptom*: Loss of downstream pressure control and possible process fluid leakage from pressure regulator body cap



Common Failure Modes

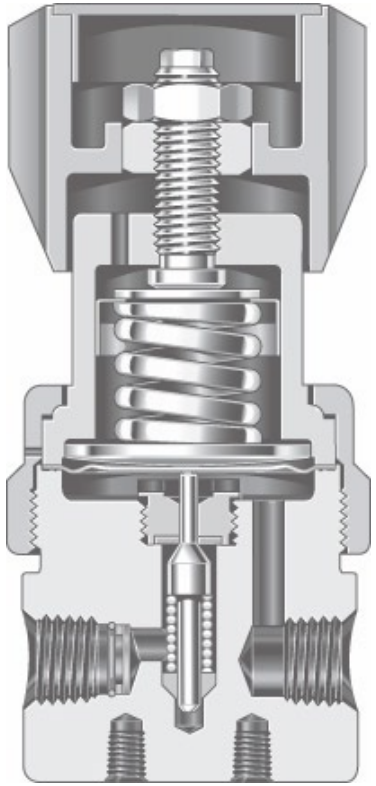
Swagelok Northwest (US)

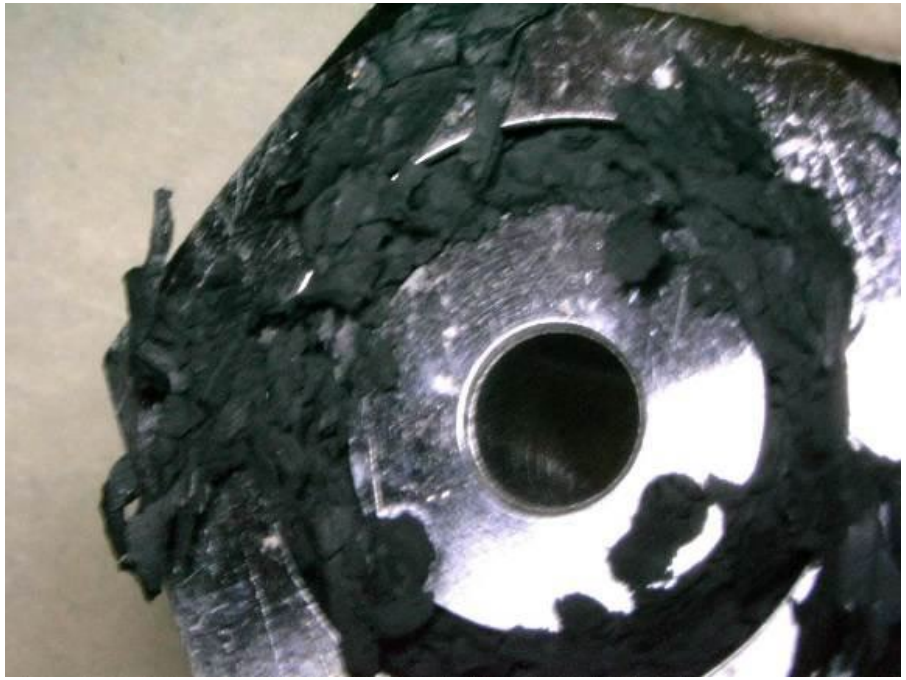
- Diaphragm Crack
  - *Cause*: Cycle fatigue or chemical attack
  - *Solution*: Replace diaphragm
  - *Prevention*: Add pulsation dampener or switch to piston style regulator

Common Failure Modes

Swagelok Northwest (US)

- *Symptom*: Process fluid leakage from pressure regulator body





Common Failure Modes

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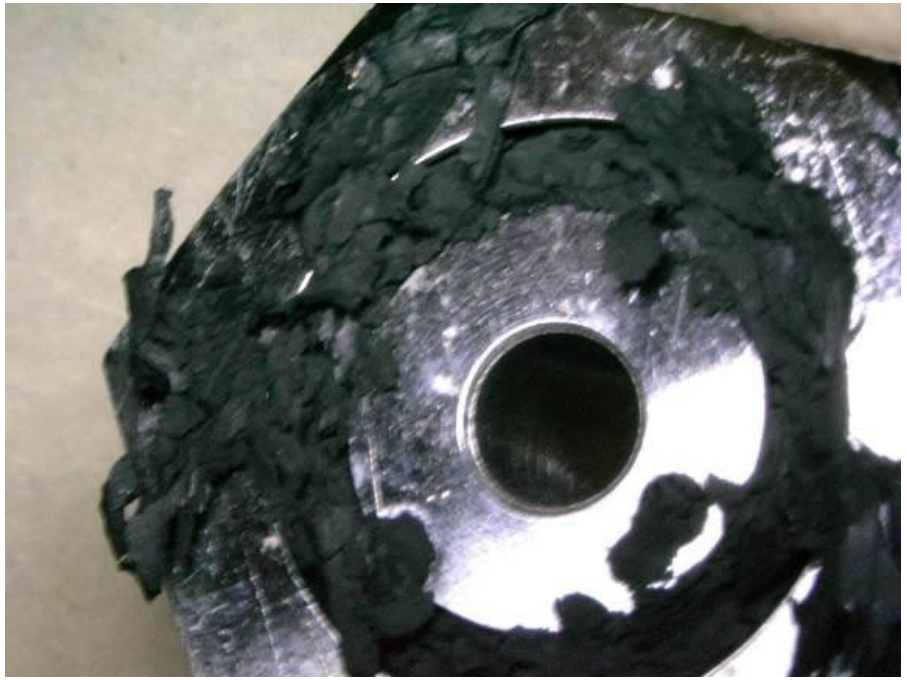
- Shell Leak
  - *Cause*: Chemical attack
  - *Solution*: Replace damaged seal
  - *Prevention*: Determine appropriate seal compound for system process fluid



Common Failure Modes

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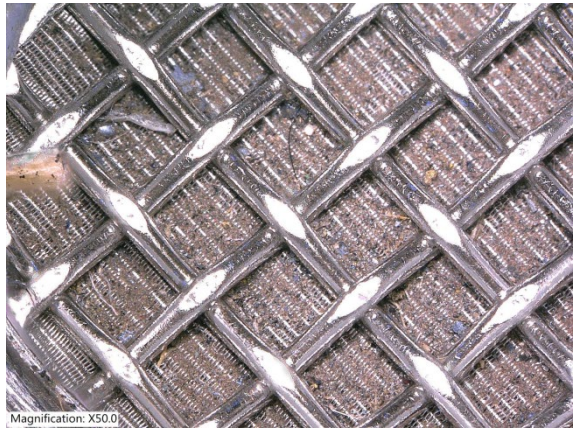
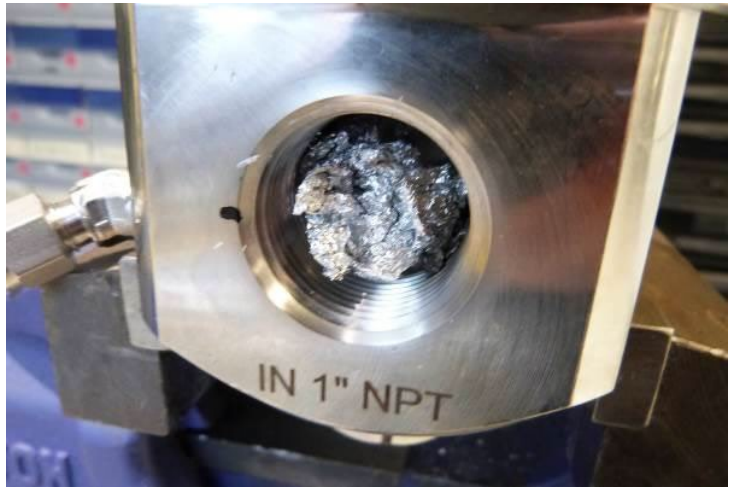
- *Symptom*: Reduction in flowrate through regulator without adjustment made to the set pressure and/or flow control valves





Common Failure Modes

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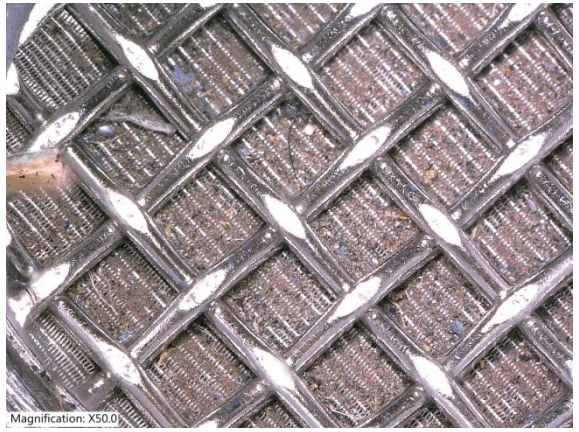
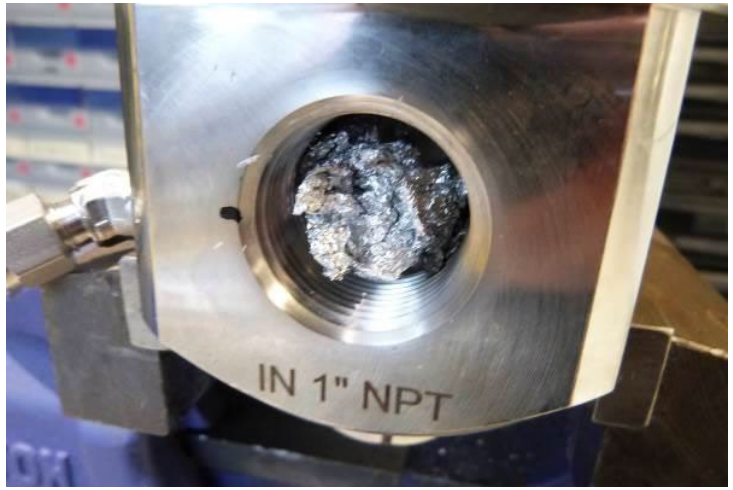
- Flow Restriction
  - *Cause*: Clogged filter
  - *Solution*: Replace/clean filter
  - *Prevention*: Add upstream filtration or increase frequency of change out





Regulator Maintenance

- Types of service/maintenance
  - Test
  - Inspect
  - Maintain
  - Overhaul
  - Replace

Regulator Maintenance

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- Test
  - Verify regulator operation
- Inspect
  - Examine components
    - Seat
    - Poppet
    - Diaphragm
- Maintain
  - Replace components based on test/inspection results
- Overhaul
  - Replace all internal wear components
- Replace
  - Remove current regulator
  - Install new regulator

Get In Touch

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