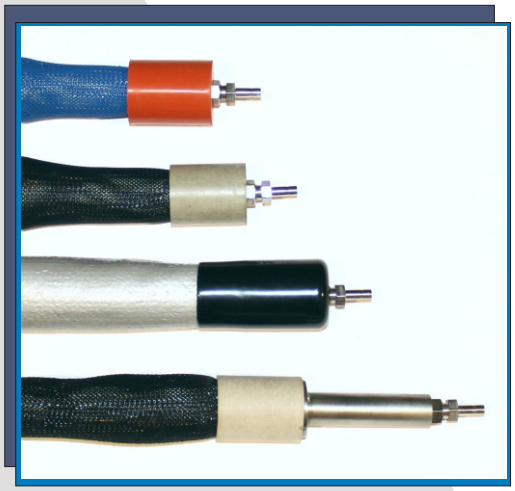
ATMO SEAL ENGINEERING, INC.
Environmental Sciences Division

Enduro-Flex Heated Sample Lines

Emissions Sample Lines for
Automotive/Diesel, Stack Testing
Process Monitoring

Atmo-Seal Engineering, Inc.(tm) *is committed to providing high quality heated sample lines to fit your specific needs. You will find ASE Sample lines used globally by Automotive and Diesel Emission Labs, Mobil and In-Situ Stack Monitoring, Military Emissions Testing, Chemical Process Monitoring, Incinerators, Aero-Space, University Research Projects, Bio-Hazard Testing, On-Site Remediation and a host of other industries.*



IGH CGH DGH Heated Hose

- Choice of AC 50-60 HZ or DC operation in a wide range of voltages
- Choice of Thermocouple, RTD, Internal Thermostat or other sensors
-Choice of Teflon, Stainless Steel or other user-changeable sample tubes
- Super-flexible design
-1/8" to 1" ID Sample Tubes
- Optional Exteriors to match your needs and operational conditions.

IGH Sample Lines - *Used in virtually all emissions testing situations where a temperature of 200 C is required.*
CGH Sample Lines - *Used for diesel engine Dyno certification and on-road testing.*
DGH Sample Lines - *Used in Stack Monitoring and Dew Point applications.*

Tough, Accurate Heated Hose

At Atmo-Seal, Inc. we know that heated lines are stretched, dropped and slammed every day. Our Enduro-Flex Heated Emission Lines are designed for their environment: Engine and Dyno Test Cells, Construction and Job Sites, Mobil Labs and CEMS. Our lines are found in the nicest labs and the toughest environments on the planet.

Our heated Lines all feature light-weight end treatments made from either high-temperature pheno-plastics (200 C + operation) or Stainless Steel with an optional silicone boot.

Exterior sleeve options include super-flexible poly mesh, corrugated rubber sleeves, conduits (suitable for burial), high temp silicone, sewn and braided high temp fabrics and rigid pipe.

Serviceable Designs

ASE heated lines are designed to be easily repaired!

End treatments may be removed quickly to perform minor repairs in the field; sample tubes may be removed and replaced easily by the end-user or our techs; back-up temp sensors are standard; heaters are durable and internal redundancy insures long life and service. An 18 month limited warranty is included

Options

With options like Internal Pulling Cables, Messenger Wires, Span/Cal Multiple Sample Tubes. Our lines can fit your needs. As always, Atmo-Seal, Inc., will customize your hose to your exacting specifications and applications. We thrive on customization and being your "Think Tank."

At Atmo-Seal, Inc., we know our continued success depends on your satisfaction!

Emissions Sampling Line Part Number Guide

Hose Type	Hose Length	Sample Tube Mat'l	Tube OD / Tube ID	Configuration Code
CGH IGH DGH	Specify in Inches or M if Metric	T - PFA/PTFE Teflon S - 316 S.S. C- Copper CS - Corrugates SS CT - Carbon Teflon	4/2 1/4"x1/8" 4/3 1/4"x3/16" 5/4 5/16"x1/4" 6/4 3/8"x1/4" 6/5 3/8"x5/16" 8/4 1/2"x1/4" 8/6 1/2"x3/8" etc etc 4m/2m 4mmx2mm 6m/4m 6mmx4mm 8m/6m 8mmx6mm 10m/8m 10mmx8mm etc. etc.	See below

CGH-Series Lines - Certified Lines, +/-6 C. Operates at 200 C. Profile Included. Requires a temperature controller
IGH-Series Lines - Instrument Lines, +/- 11 C when profiled (optional). Requires a temperature controller
DGH-Series Lines - Dew Point operation (up to 100 C+) May be either controller driven or self-limiting.

Configuration Code - The configuration code at the end our part number(s) refer to your individual design criteria. Information covered in the Configuration Code may include thermocouple or RTD type, exterior hose sleeve and environmental conditions; operation voltage, etc. The Configuration Code also covers common options such as Replaceable Sample Tube, Over-Temperature Protection, R.F. Shielded Thermocouple Wire, Messenger Wires for remote control of upstream devices, etc. These codes are assigned at the time of your quote.

Special Exteriors and Conditions - The type of exterior sleeve on a heated line will depend on the conditions the line is to operate in and customer preferences. ASE offers an ever-expanding array of exteriors. Some of the more common sleeves are listed below.
Poly Mesh - Our most common sleeve. It offers very light weight, good abrasion resistance, best flex and the lowest cost. It is used indoors in stable conditions.
Poly Mesh with Silicone under wrap. - Used indoors and out. Light weight and flexible, silicone under wrap withstands 500 F+ temps. Suited for wet or oily conditions.
Corrugated Rubber - Outdoors or wet conditions. Altitude chambers, areas subject to hose down, On-road, water resistant, good flex.
Silicone Extruded over Fiberglass - Resists High Temps, moisture resistant, chemically resistant, good flex.

Common Options

Re-Tube: Replaceable Sample Tube. This feature allows the easy removal and replacement of the sample tube. (Re-Tube kits are available from the factory.)Prevents kinking of sample tube and adds durability.
Over-Temperature Protection: Built in thermal switch(es) which will open if the hose exceeds its maximum operational temperature. Switch(es) will close again once the hose has cooled down to a safe range.
Messenger Wires: Feed through signal and/or heater wires to allow for controlling solenoids, heaters, temperature monitors, etc., via internal cables built into your hose.
Multi-Tubes: Multiple heated and/or non-heated tubes may be incorporated into one heated hose for sampling from multiple points; feeding multiple analyzers; or providing purge or calibration gases.

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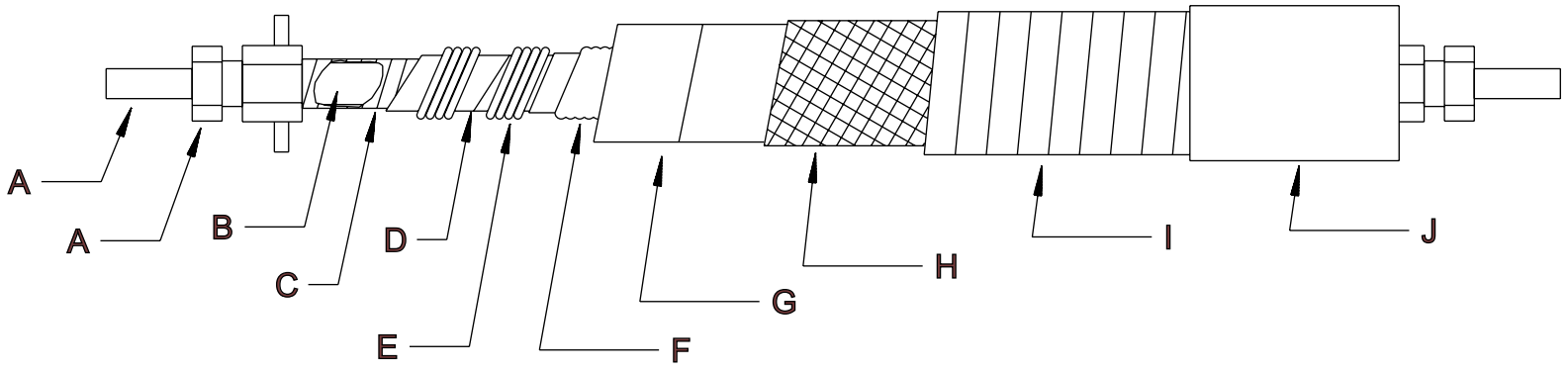
HEATED LINE CONSTRUCTION



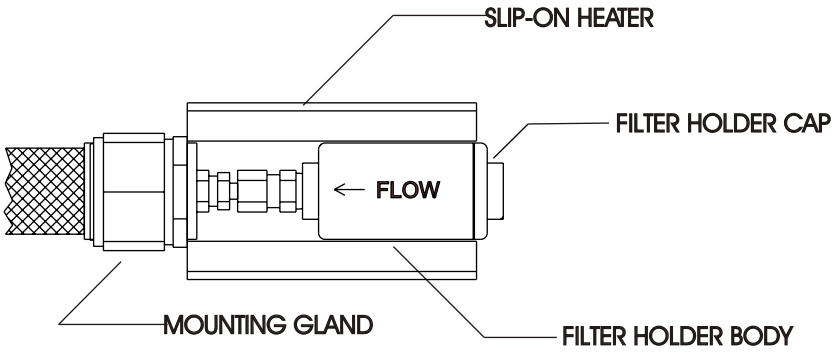
A END FITTING
B INTERNAL SAMPLE TUBE
C SUPER-FLEX SLEEVE OVER SAMPLE TUBE
D SILICONE LAYER
E HIGH-TEMP ENCAPSULATED HEATERS
F SECONDARY LAYER OF SILICONE

G MULTIPLE LAYERS OF HIGH-TEMP INSULATION
H PROTECTIVE MESH SLEEVE
I OPTIONAL EXTERIOR SLEEVES
J HEAVY DUTY END CAP

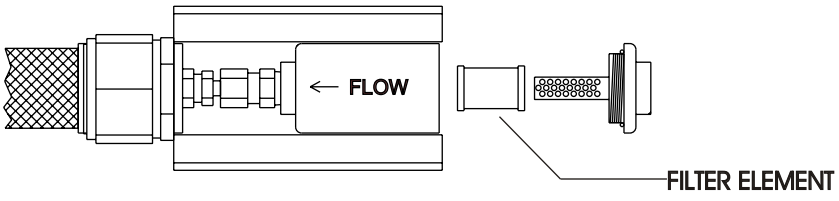
NOTE: HOSES USED OUTDOORS WILL COME WITH SEALED END CAPS AND A WATER-TIGHT SLEEVE

D & F May be silicone, fiberglass tape or Kapton Tape depending on the application
Silicone Tape meets MIL-A-A-59163 Type II Standards
(Supercedes MIL I-4685c2) Volume Resistivity 3x10 Ohms/CM, 2-3 layers under heater elements. 500 F continuous operation.
Fiberglass Tape: .007 thick, dielectric strength of 400 Volts per layer, 2 layers typ. 1000 F operation.
Kapton Tape: Dielectric strength of 10,000 V, 500 F operation
.
E The applicable UL approval is SJ-320411, both UL and ULC approvals. Heaters are sleeved in class 22 Silicone and rated at 200 C continuous, 250 C intermittent. Heaters typically operate at appx 25% of their rated ampacity.

FPI-SERIES HEATED IN-LINE FILTER INSTRUCTION SHEET
P/N FPI-X-2.25/.5-XXX & FPI-X-1/.5-XXX

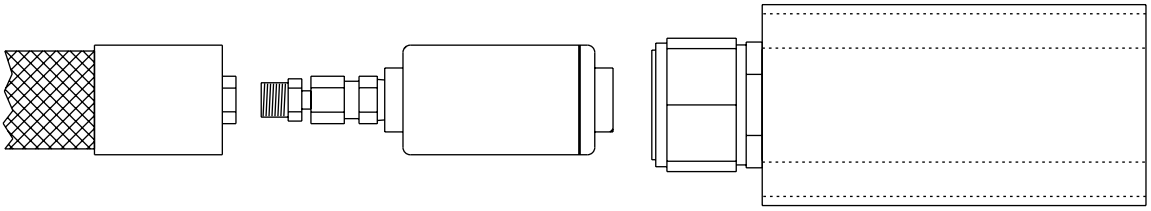


FILTER REPLACEMENT



To change the filter element, unscrew the Filter Holder Cap from the Filter holder body. Remove the filter element and replace it with a clean element. Re-tighten the cap. (Use Caution!, filter may be hot!)

REPLACING SAMPLE TUBE ON RE-TUBE HEATED HOSES (OPTIONAL)



1) Un-tighten the mounting gland on the back of the slip-on heater

2) Slip off the slip-on heater. (Note On some models, you may need to disconnect an electrical connector.)

3) Unscrew the filter assembly from the hose end nut as shown.

4) Replace the sample tube following the standard procedure for Atmo-Seal Heated Re-Tube Lines. If you are unfamiliar with this procedure, see the document titled "Replacement of Sample Tubes in Atmo-Seal Heated Lines."

5) After replacing the tube, reverse steps 1-3.

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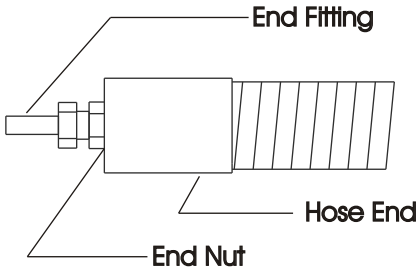
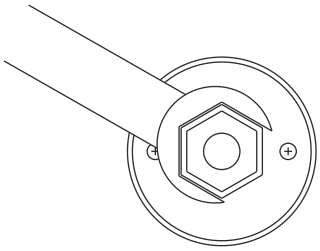
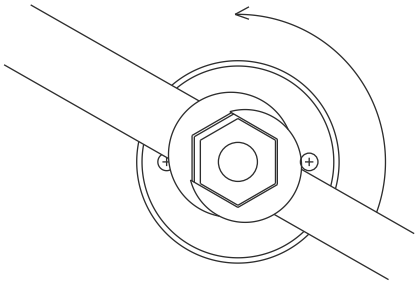
Replacement of Sample Tubes in Atmo-Seal Heated Lines

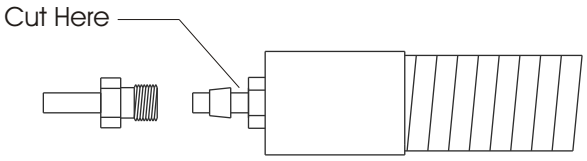




1) Firmly secure the End Nut with the appropriate wrench.



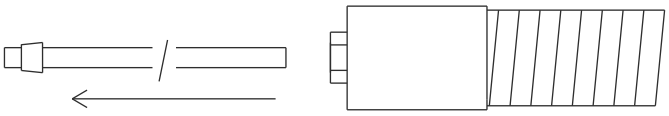
2) Secure the End Fitting with a second wrench and rotate it counter-clockwise several turns until it is free.



3) Remove the end fitting then extract the sample tube. (This may require the careful use of needle-nosed pliers). Cut off the sample tube at the base of the ferrule and discard.

Repeat steps 1 and 2 on the opposing end of the heated line.

WARNING! Do not cut off the ferrule on the second end of the sample tube!



4) After repeating steps 1 and 2, gently pull the sample tube from the heated line by grabbing the tube and ferrule with a pair of needle-nosed pliers or similar tool. (If the tube binds, heating the line to about 250 F may help free the tube.)

5) To replace the tube, reverse steps 1-4. Reseal the hose end fitting by rotating the end fitting clockwise until finger tight and (using two wrenches) continue to tighten the end fitting approx. 360 degrees or until sealed.

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