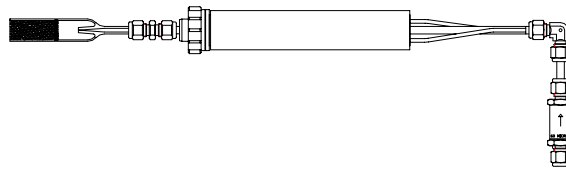
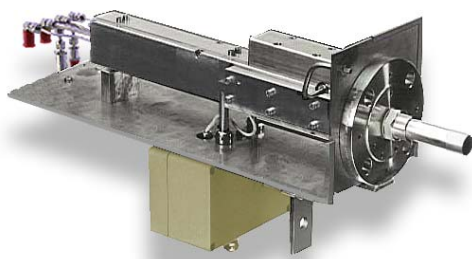




## EPM OUT-OF-STACK DILUTER SEAL UPGRADE TO ELIMINATE LEAKAGE AND SAMPLE CONTAMINATION



The original EPM Environmental **Model 797.380 Series OOS** (Out Of Stack Diluting Sampler) used a Kalrez o-ring to create the seal between the diluter tip and the inner flange assembly. This configuration, using a Kalrez o-ring, will limit the maximum operating temperature of the instrument to 572°F (300°C).



As application requirements became more demanding of greater temperature flexibility, it was decided to introduce a new Series OOS design having higher inlet sample temperature and/or heater set-point temperature capabilities.

In 1999, EPM had made a design change to the standard OOS Diluting Sampler to accomplish this. The design change consisted of the following:

1. Elimination of the Kalrez o-ring from the design. In its place would be a 3/4" Swagelok® ferrule configuration (stainless 316).
2. Modification to the diluter side of the inner flange assembly to accept the ferrules that are permanently swaged to the diluter tip.
3. Larger inside diameter of the heater mantle, so that the diluter (with 3/4" Swagelok® nut permanently attached) could pass through it.
4. Sleeve/housing attached to the outside of the diluter, to eliminate the resulting gap between the diluter and larger ID of the heater mantle.
5. Modification to the knurled nut (hand wheel), so that it fits over the 3/4" Swagelok® nut.

This design change allowed for the maximum operating temperature (sample gas temperature and/or heater set-point temperature) of up to 750°F (400°C). The new model became EPM's standard OOS known as the **Model 797.380-S Series** ("-S" in the model number denotes "Swagelok®" type diluter tip seal).

Although the design change was proven to be successful in high temperature applications, and applications where cold process or ambient conditions required higher set-point temperatures, some issues have surfaced with regard to using the Swagelok seal method.

### These issues are as follows:

1. Leakage around the diluter tip which results in ambient air being drawn into the sample chamber via the bypass pump and contaminating the sample gas.
2. Difficulty re-tightening the Swagelok nut to the full 3/4 turn from finger tight (per Swagelok specifications).
3. Requirement for routine leak-tight testing that is time consuming as the system is not closed-loop.
4. Cross-threading of the modified knurled nut and threads of the inner flange assembly.

(continued)

## **PROVEN SOLUTION**

Occasionally we are asked to convert the "S" Series OOS back to the original configuration (using Kalrez o-ring seal) to resolve these issues. Although this is indeed possible, the costs for modifications and the need for us to have the entire OOS Sampler at our shop to make the conversion makes this approach impractical and undesirable to the end user.

To resolve these issues, a very simple and low cost OOS upgrade has been implemented that has been well received and proven effective. In general, the upgrade consists of eliminating the 3/4" SS ferrule configuration and changing it to a 3/4" graphite ferrule configuration. The advantages to this upgrade are as follows:

1. Easy to tighten knurled nut.
2. Leak-tight seal at junction of diluter tip and inner flange assembly.
3. Operating temperature of up to 750°F (400°C) remains the same.
4. Quick and easy ferrule change out during scheduled maintenance.
5. Possibility of knurled nut cross-threading to inner flange assembly eliminated.
6. Diluter section and knurled nut is all that we need to perform the upgrade
7. Minimal down-time when using one of our diluters while yours is out for upgrade.

### **Scope of work:**

Simply send us the diluter section and knurled nut from your OOS Sampler. Be sure to let us know if you will need a loaner unit while your equipment is out for upgrade.

We will remove the 3/4" Swagelok® nut and ferrules from the diluter tip, and inspect the diluter tip. The existing diluter tip can be reused if it is free of any major channels or deformation that had resulted from the stainless steel ferrule configuration. If the diluter tip cannot be reused, we will provide a quote for the tip replacement.

The diluter will then go through our standard clean-up service. This consists of external and internal aspirator cleaning cycle and aspirator performance testing (test certificate with performance data is provided).

The internal threads of the knurled nut will be removed. This will eliminate the possibility of cross-threading to the inner flange assembly. The threads of the knurled nut were originally intended to retain the piece onto the inner flange assembly during diluter removal, they serve no other purpose.

A new 3/4" SS nut (modified) will be supplied with the upgraded diluter, along with a package of 5ea. graphite ferrules.

Please contact us for more information or pricing, and refer to our service code "SRVC-PRB-B2". If your systems is down for scheduled maintenance, consider sending in the entire unit for a "Full Service" (reference our service code "SRVC-PRB-B").