

# Thermo NO/NO<sub>2</sub>/NO<sub>x</sub> Analyzer Reaction Chamber Cleaning Procedure

## Introduction

The purpose of this procedure is to give the proper cleaning procedure for Thermo NO/NO<sub>2</sub>/NO<sub>x</sub> Analyzers. Reaction Chamber basic components in all instrument models, whether C Series Units or i Series Units, are all the same.

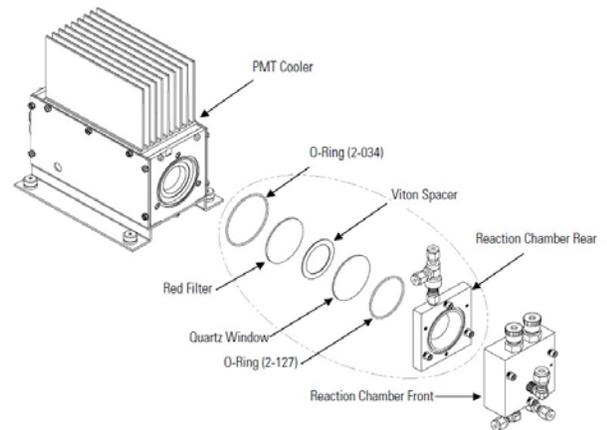
1. Remove the top cover from the unit.
2. Disconnect associated gas tubing and wiring harness cables from the cooler assembly and remove the complete cooler/pmt/reaction chamber assembly from the unit as a whole and place on work bench.
3. Remove the capillary holders from the top of the reaction chamber and remove the sample and ozone capillaries. When looking at the assembly from the front, the ozone capillary is on the left side and the sample capillary is in the right side.
4. After removing the capillaries, using a 9/64" allen head driver or wrench remove the 3 allen socket head screws from the front of the gold reaction chamber and remove the front of the reaction chamber.
5. Save the o ring between the front and the rear of the reaction chamber. It can be reused again if it is in good shape.
6. Again, using the 9/64" allen head driver or wrench, remove the 3 internal allen socket head screws securing the inner part of the reaction chamber to the cooler assembly.
7. Pull this away inner portion away from the cooler assembly. This will give access to the quartz and red filter lenses and associated o rings. Again save the o rings. If they are in good shape they may be used again.
8. When the inner portion is separated the PMT tube inside the cooler assembly will be exposed. Put a cloth over the opening on the cooler assembly to cover the pmt so as not to expose the pmt to any unnecessary excessive light. Over exposure of the pmt to excessive light can make it lose its sensitivity.
9. You are now ready to clean the reaction chamber parts.  
To clean the reaction chamber parts, you want to have a bottle of methanol and a bottle of deionized water available. Methanol is the recommended solvent for cleaning the reaction chamber. It is pure and clean and leaves no residue. Rinse all parts of the gold reaction chamber along with the red and quartz lenses in the methanol and then rinse with the deionized water. Do not use anything abrasive to clean. Usually running you finger over these items is sufficient to clean. The methanol will dissolve any contaminants or residues that may be on the surfaces. Stubborn residues may be cleaned with a methanol saturated fine kim wipe if necessary taking care to not apply too much pressure to damage the surfaces, let the methanol do the work. Squirt the methanol through all openings and ports to also clean these areas.
10. Rinse all items with the deionized water to clean away any contaminants and then blow dry with clean dry air so as not to contaminate the cleaned surfaces. Do not leave fingerprints on any surfaces on the inside of the reaction chamber including lenses that will be exposed to the gas.

11. Inspect the cleaned surfaces. The internal parts of the gold reaction chamber halves should be clean, shiny and look new. There should not be any pitting, scratches, flaking, or dull surfaces at all. If these conditions exist, replace the defective parts with new replacement parts.
  12. Inspect the red filter lens and the quartz lens. They should also be clean with no scratches abrasions, dullness, and void of any fingerprints. Hold by the edges.
  13. After cleaning, reassemble the components in the reverse order they were disassembled. Pay special attention to the o rings and that they are in good shape. If they are not, replace with new ones.
  14. After reassembly replace the now complete cooler/pmt/reaction chamber assembly into the unit and connect all associated tubing and wiring.
- Take care to protect any fittings that are covered in black. Use black electrical tape to cover the edges of the tubing at the fittings where necessary to prevent a light leak into the reaction chamber. A light leak will cause issues with background and concentration readings.
15. Restart the unit and let warm up until all alarms clear. Start from the beginning and perform pmt adjustment procedure with high span gas. See separate published Technical Bulletin for this procedure if additional assistance is required.
  16. After pmt voltage adjustment, calibrate the background with zero gas and then the high span point.
  17. After calibration you are now ready to sample.

**Reaction Chamber Replacement Parts List:**

Sample and ozone capillaries, if required, are specific for the different instrument models. Contact Thermo Technical Support for part identification.

- p/n 9455 reaction chamber front
- p/n 9454 reaction chamber back (rear) p/n 9211 capillary holder complete
- p/n 4800 capillary o ring
- p/n 9212 capillary holder o ring
- p/n 4808 o ring between the reaction chamber front and back
- p/n 4821 o ring between the cooler assembly and the red lens
- p/n 4338 red lens
- p/n 4341 viton spacer between the red lens and the quartz lens
- p/n 4339 quartz lens (window)
- p/n 4806 o ring between the quartz lens and the reaction chamber back



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