

# Selection, Installation, Tuning, Cleaning and Troubleshooting Guide for Glass Expansion's Sample Cone and Insert-Free Skimmer Cone for the Thermo Q/RQ/TQ/RQ Plus

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## Selection

Thermo has discontinued the sale of the 3.0mm insert and currently offers a patented 2.8mm, 3.5mm and 4.5mm insert-ready skimmer cone option. Glass Expansion's skimmer cone design eliminates the need for properly fitting and securing an insert. Glass Expansion's insert-free skimmer cone designs are fully compatible with the Thermo Q/RQ/TQ/RQ Plus. Nickel cones are ideal for most routine sample analyses, and platinum cones are best for high TDS and aggressive acids such as HF. Refer to [Glass Expansion's Cone Resource Guide](#) in the "Cleaning" section for more details on choosing cone types for your specific instrument and analysis. All of our products are guaranteed to provide equal to or better performance than OEM design.

### Sampler Cone Options (Figure 1):

- GE P/N [TG1021-Ni/Cu](#) Nickel Sampler Cone with Copper Core (Replaces OEM P/N 3600812). Standard sampler cone for most applications.
- GE P/N [TG1026A-Pt/Cu](#) Platinum Sampler Cone with Copper Core (Replaces OEM P/N 3601289). For corrosive samples (e.g., hydrofluoric acid) and high TDS.
- GE P/N [TG1021-Al](#) Aluminum Sampler Cone. For lowest Ni background and Laser Ablation applications.

Figure 1. Sampler Cone Options for Thermo Q/RQ/TQ/RQ Plus.



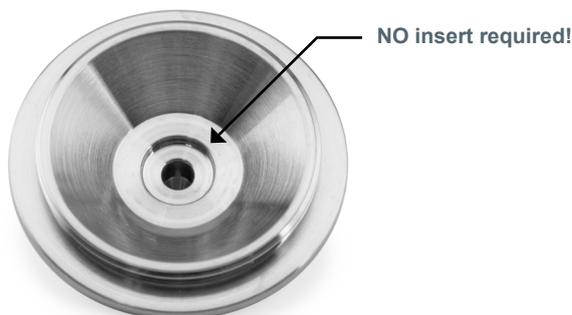
Skimmer Cone Options (Figure 2):

- GE P/N [TG1044-Ni](#) Nickel Skimmer Cone - High Matrix and High Sensitivity (Replaces combination of OEM P/Ns 1311870 and 1318480 (3.5 mm High Matrix Insert); and OEM P/Ns 1311870 and 1311880 (2.8 mm High Sensitivity Insert). Standard skimmer cone for most applications.
- GE P/N [TG1045-Ni](#) Nickel Skimmer Cone - Robust Plasma (Replaces combination of OEM P/Ns 1311870 and BRE0006591 - 4.5mm Insert). Ideal for long-term analysis of high matrix samples that would normally require a dilution, and helps minimize drift and cone maintenance.
- GE P/N [TG1035-Ni](#) Nickel Skimmer Cone – Cold and Hot Plasma (Replaces OEM P/N 1341420). TG1035-Ni is specifically designed to operate ONLY with the Cold Plasma Lens Kit (OEM 1341380). This skimmer cone can be used with the Cold Plasma Lens Kit to operate in both Cold (RF Power 550 W) and Hot Plasma conditions (RF Power 1550 W).
- GE P/N [TG1048-Pt](#) Platinum Skimmer Cone - High Matrix and High Sensitivity (Replaces combination of OEM P/Ns 1324540 and 1318480 (3.5 mm High Matrix Insert); and OEM P/Ns 1324540 and 1311880 (2.8 mm High Sensitivity Insert).
- GE P/N [TG1039-Pt](#) Platinum Skimmer Cone – Cold and Hot Plasma (Replaces OEM P/N 1341430). TG1039-Pt is specifically designed to operate ONLY with the Cold Plasma Lens Kit (OEM 1341380). This skimmer cone can be used with the Cold Plasma Lens Kit to operate in both Cold (RF Power 550 W) and Hot Plasma conditions (RF Power 1550 W).

Figure 2. Skimmer Cone Options for Thermo Q/RQ/TQ/RQ Plus.



Figure 3. Underside of Insert-Free Skimmer Cone P/N TG1044-Ni



## Installation

Before installing your cones, it is important to carefully follow and note these three steps. When handling cones, always wear gloves.

1. Remove the old sampler and skimmer cones from the interface and set aside.
2. Remove the old graphite sampler cone gasket ([TG5001](#), see Figure 4) and discard. Inspect the gasket flange on the interface to ensure it is clean. If any residual gasket remains it is imperative to clean this surface to ensure a proper seal. If any remaining gasket material is caked on the flange surface, use care removing it such that the surface of the flange is not scratched or damaged. For example, using a [plastic razor blade](#) scraper (not metal), gently scrape off the remaining graphite gasket material. If necessary, soak any remaining gasket material in a suitable solvent (e.g., methanol, ethanol, propanol, acetone) to allow it to soften. Proceed to gently scrub away the softened material using a stiff nylon brush or non-abrasive pad. After removal, thoroughly clean the surface with a lab detergent to eliminate any remaining residue. In general, use caution when cleaning the interface so no foreign material enters the interface region or threads. Avoid abrasive methods on the gasket flange and threaded regions.

**a. Technical Note:** Every time the sampler cone is removed for cleaning or replacement, a new graphite sampler cone gasket must be installed. There's always a level of uneven flatness between the cone and instrument interface. These surfaces are also exposed to extremely high temperatures that result in some deformation. Once the cone is removed it can very slightly deform due to relief of the stresses. The gaskets are used to fill-in these irregularities, but once the gasket has been compressed or used for a period of time it loses its flexural properties to compensate for those irregularities. Therefore, always replace the gasket to ensure a long sampler cone life and to avoid problems with passing performance reports (e.g., Bkg4.5). If the interface vacuum pressure is >2.2 mbar, it is an indication that the graphite gasket could be damaged. Therefore, routinely replacing the graphite gasket will minimize the chances of any performance issues when replacing the cones.

Figure 4. Graphite Gasket and Cone Extraction Tool



## Tuning

Ignite plasma and warm up instrument for a minimum of 15 minutes, ideally 30 minutes to ensure thermal stability, before proceeding to the next steps. If you normally condition your cones, this is a good time to do it; however, it is not necessary to do this before moving on to the steps below. Please note that while conditioning your cones is not mandatory, conditioning your brand new or cleaned cones can significantly improve the signal stability. Condition your cones for about 30 minutes by aspirating interferent check standard solution (ICSA/ICSAB) or a similar multielement salt matrix. It is best to follow the conditioning step with your rinse blank solution or 1% nitric acid for about 10 minutes. To ensure successful tuning of the new cones, follow the steps below. These steps are provided for the operation of the typical acquisition combination of STD and KED modes for Glass Expansion's High Matrix and High Sensitivity skimmer cone ([TG1044-Ni](#)). If you need any further assistance with other modes (e.g., Robust etc.), please contact your local Glass Expansion office for technical support.

1. [Optional] While this step is optional, it is highly recommended, especially if a mass calibration has not been performed recently. Aspirate the 5A Set-up solution, and in the "Mass Calibration Wizard" perform a mass calibration. This ensures your mass calibration is accurate and current.
2. [Optional] While this step is also optional, it is highly recommended, especially if a detector cross calibration or full detector setup has not been performed recently. Continue aspirating the 5A solution, using the "Detector Calibration Wizard" perform a "Full Detection System Calibration". This ensures detector system calibration is accurate and current before performing any autotunes.
3. If any of the above steps were performed, rinse out the 5A solution thoroughly, then aspirate your 1 ppb Tune B solution. If you are tuning for High Matrix conditions, using the "Autotune Wizard", first start with a "iCaliTuneSTDs" STD autotune and then perform the "iCaliTune STD-100V". Once these STD mode autotunes are complete, run the STD mode performance report. The STD mode performance report should pass on the first or second attempt, if it doesn't, please contact your local Glass Expansion office for technical support.

**a. Note:** Depending on your instrument model, this tuning process may vary from what is described above, so please follow the appropriate tuning and performance check procedures and use the necessary cone configuration in the interface as per your usual practice. For example, if you are tuning for High Sensitivity conditions using TG1044-Ni, simply eliminate the "iCaliTune STD-100V" autotune from step 3 above, and then follow the remaining instructions through step 4 below. For more detailed instructions, please refer to Thermo's operating or software manuals.
4. Once the STD mode performance report completes and passes, then initiate a "iCaliTune KEDS Line1" autotune. Once the KED mode autotune is complete, run the KED mode performance report. The KED mode performance report should pass on the first or second attempt, if it doesn't, please contact your local Glass Expansion office for technical support.

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## Cleaning

For cleaning cones, we recommend following the “Maintenance” instructions on pages 21-23 in our [Glass Expansion Cone Resource Guide](#), which is full of great information that will also help you cross reference OEM cone part numbers.

- GE P/N [70-803-1028](#) Skimmer ConeGuard Thread Protector — Skimmer cone thread protector for Thermo X Series/PQ/Q/RQ/TQ/RQ Plus. Used to protect cone threads from acid during cleaning ensuring a good vacuum seal over the life of the cone.
- GE P/N [70-803-1923](#) Magnifier Inspection Tool — 10x magnification and built-in LED illumination. Used to inspect condition of cone orifice and can also be used to inspect nebulizers and capillary tubes for clogs.

Figure 5. Skimmer ConeGuard Thread Protector and 10x Magnifier Inspection Tool.



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## Troubleshooting Poor Performance

Given that sample introduction components can accumulate dirt, wear, or damage, leading to adverse effects on your analysis, performance, and potential performance test failures, we strongly advise thorough inspection. If sensitivity is lost, check the nebulizer for blockages caused by salt deposits or undissolved particles in the sample or gas line. Clean or replace the nebulizer if needed. For detailed nebulizer maintenance, refer to our [Nebulizer Maintenance guide](#). Inspect the injector tip and torch outer tube for damage or deposits; clean or replace as necessary. If you experience poor RSDs, inspect your pump tubing. If it is flattened or stretched, it can affect your sample flow. Replace it if needed. Check your spray chamber; any droplets that stick can disrupt the cyclonic flow, so clean the spray chamber. Also, check cones and extraction lenses for material deposits that can block the ion beam and reduce sensitivity. Follow cleaning recommendations stated in the above cleaning section. For detailed information on caring for nebulizers, torches, spray chambers, and cones, please refer to our [Product Care](#) guides available on Glass Expansion’s website [www.geicp.com](http://www.geicp.com).