

# Plasma Pro Tips

Sharpen your Skills  
with Short, Practical  
Tips

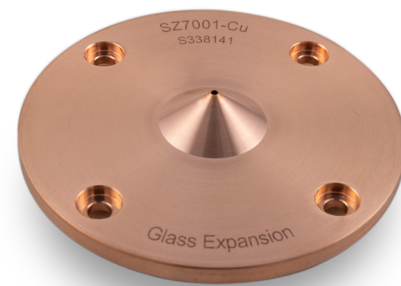


**GLASS EXPANSION**

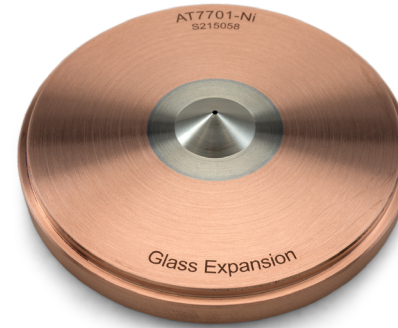
Quality By Design



# General Guidelines on Cone Material



Copper



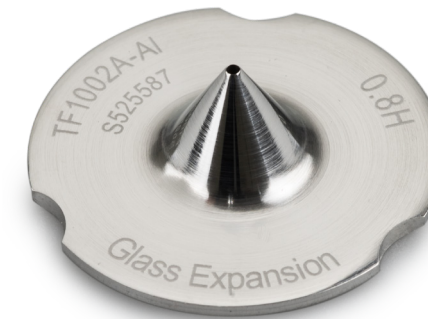
Nickel



Nickel Plated



Platinum

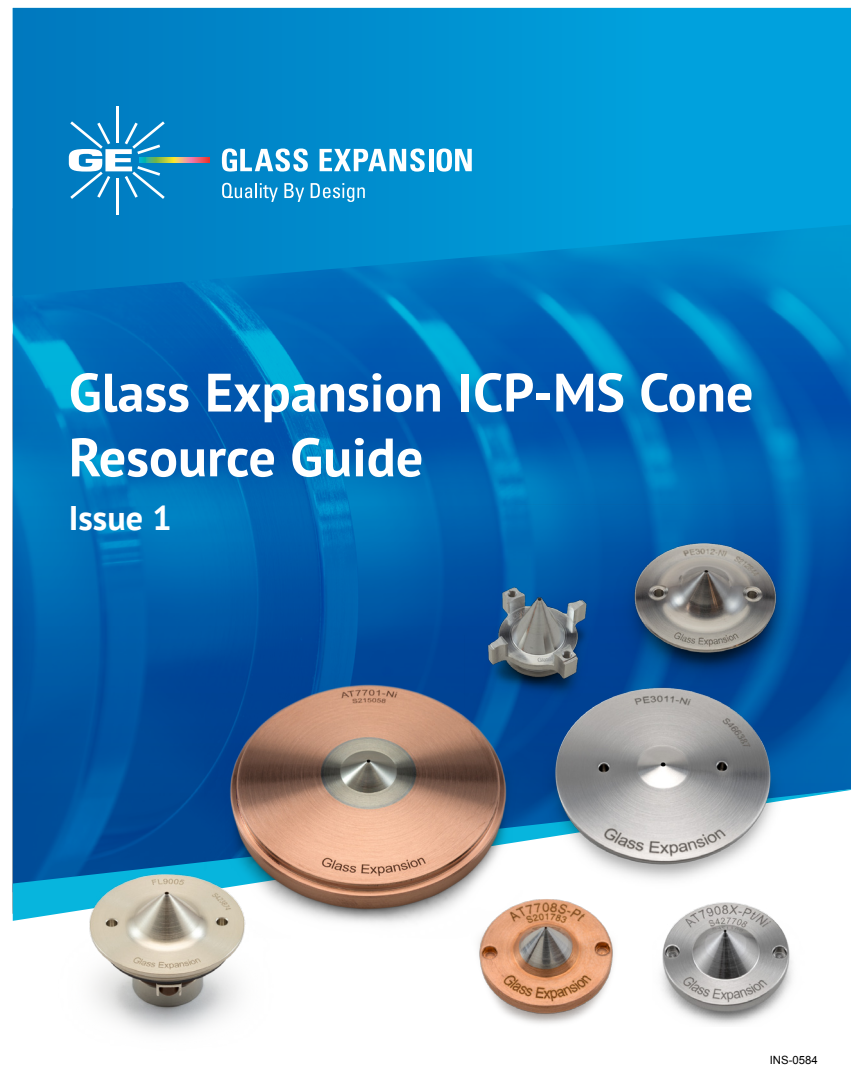


Aluminum

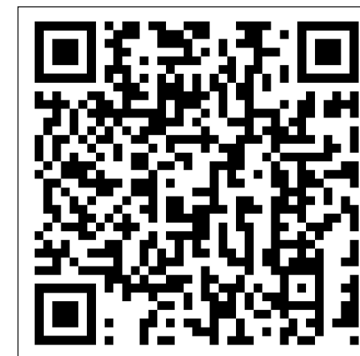


**GLASS EXPANSION**  
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# Cone Resource Guide



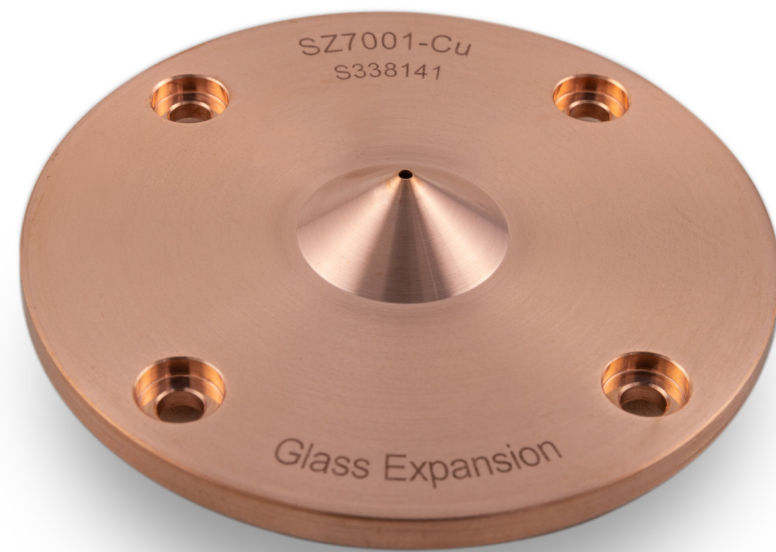
- **Guidance on cone selection**
  - Advantages of different cone raw materials
  - Selection based on matrix and performance
- **Organized by ICP-MS Model**
  - Cross-reference OEM product numbers
- **Tips on Care and Maintenance**



Scan the QR Code to view our  
ICP-MS Cone Resource Guide



# Copper



Copper Sampler Cone

- Solid copper is often the lowest-cost option.
- Runs “colder”—since copper has the most efficient heat transfer compared to other cone materials, this also makes **copper the most-susceptible to matrix effects, corrosion, and sample deposition, resulting in shorter lifetime, more frequent cone orifice clogging/blockage, and increased background from sample deposits.**
- Often needs more frequent cleaning.
- **Can be used for low-level Al, Ni or Pt measurements.**



# Nickel



**Solid Nickel Tip with Copper Base**

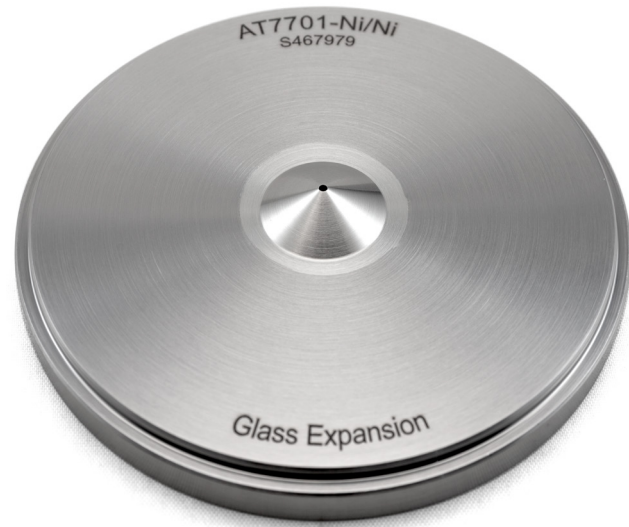


**Solid Nickel Tip and Base**



- Often the “standard” configuration due to the balance between cost and performance.
- Options can include a **solid nickel tip with copper base, solid nickel tip and base, or a solid nickel tip with a nickel-plated copper base** (next slide).
- Suitable for the most common applications (routine aqueous environmental samples, <5% acid matrix, non-HF, non-organic).
- Good thermal and chemical resistance – solid nickel and nickel-plated cones (see below) are more resistant to matrix effects, corrosion, and sample deposition compared to copper.
- Runs “hotter” than copper—since nickel is less efficient at heat transfer compared to copper, nickel cones will usually stay cleaner longer than solid Cu cones, providing longer operating times between cleaning, and provide more stable signals with less background.

# Nickel Plated



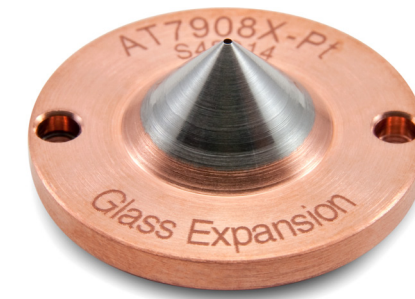
**Solid Nickel Tip with Nickel  
Plated Copper Base**

- Often times a nickel-plated base is chosen **when samples have an acid concentration >5%.**
- The nickel plating **improves the chemical resistance** of the bare copper while maintaining the heat transfer properties of the copper base. **Some instruments require a cone with copper base to maintain a lower temperature,** or an optional skimmer base can be used.
- If a cone runs too hot, it can degrade rapidly, especially at the orifice, which is responsible for sensitivity and good signal stability.
- **Glass Expansion's proprietary electrodeless nickel-plating process allows us to maintain the highest level of precision, quality and reliability standards for these popular nickel-plated cones.**



# Platinum

- Typically, the **most durable** and **longest-lasting** option, but also the **highest cost**.
- Options include a platinum tip with a copper base, platinum tip with a nickel-plated copper base, and platinum tip with a solid nickel base. **These multiple options are to offer choices with balancing heat transfer and chemical resistance.**
- Excellent chemical resistance - greatest resistance to matrix effects, corrosion, and sample deposition.
- Example of applications include: **high-matrix samples** (high TDS), **aggressive acids** or **high concentration of acids (>5%)**, **volatile organic solvents**, and when the **lowest detection limits are required**.
- Least efficient heat transfer compared to copper and nickel, this means the platinum tip **runs hotter** than both copper and nickel. The advantage to the hotter platinum tip is that it will usually **stay cleaner longer than Nickel tipped cones**.



Platinum Tip and  
Copper Base



Platinum Tip and Solid  
Nickel Base



Platinum Tip and Plated  
Nickel Base



# Platinum Continued

- When using platinum cones in certain ICP-MS model systems, instead of using a stainless-steel skimmer base, a brass skimmer base is necessary to assist with the transfer of heat in the cone-interface region.
- A sampler cone with a larger diameter platinum tip can increase the cone lifetime. For some ICP-MS models a sampler is available with a 10, 15, or 18 mm platinum tip.
- If well maintained, platinum cones can usually be refurbished 2 to 3 times, thereby greatly extending their useful operating lifetime, compared to all other cone options.
- When a platinum cone can no longer be refurbished, you can recycle it through Glass Expansion for the platinum reclaim value, which is then credited toward purchasing any other sample introduction consumables.



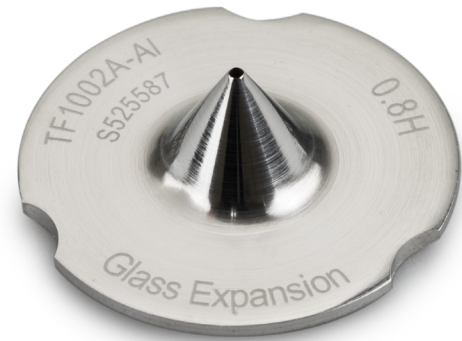
**Stainless Steel Skimmer Base**



**Brass Skimmer Base**



# Aluminum



- Similar cost to copper.
- Like copper, also susceptible to matrix effects, corrosion, and sample deposition.
- Great option if a low-level detection limit for copper, nickel, and/or platinum is required.
- Commonly used in Laser Ablation ICP-MS (LA-ICP-MS).

Aluminum



# Summary

- **Choosing the best cone material to suit your sample matrix, performance goals, and instrument requirements has many benefits:**
  - Reduced frequency of maintenance
  - Increased efficiency
  - Lower operating costs
  - Improved analytical performance
- As a cone designer and manufacturer, Glass Expansion has the expertise to manufacture specialty cones, in addition to the OEM design. These specialty cones may not be available from the instrument manufacturer, but are designed to provide improved performance for specific applications.





# See you next time!

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