Polypropylene Screw-Top Vial Metal Content - Tech Information

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Understanding the trace-metal profile of sample-handling components is essential for high-sensitivity LC/MS, ion chromatography, elemental analysis, and metal-sensitive bioanalytical workflows. This advisory provides a technical explanation of what users can expect from MicroSolv polypropylene screw-top vials and caps.

1. Metal Content in Polypropylene Screw-Top Vials

MICROSOLV polypropylene screw-top vials (e.g., **9502S-PP-CLEAR**) are not specifically tested for trace metal content. Although polypropylene resins used for molding typically do not include sodium, potassium, magnesium, or calcium within their formulation, MicroSolv does not certify that the vials are metal-free.

Why?

- Polypropylene molding does not intentionally introduce these metals, so expected metal levels are naturally low.
- However, no guarantee can be made once vials are opened in lab environments where metal exposure is possible (e.g., dust, contact surfaces, metal instrumentation).

This is an important distinction for users conducting ultra-trace metal analysis: *low expected metal content is not the same as certified metal-free materials*.

2. Metal Content in Polypropylene Screw Caps

MICROSOLV screw caps (e.g., **9502S-30C-B**) are manufactured intentionally free of sodium, potassium, magnesium, and calcium.

Because caps are produced using materials and processes that avoid these metals, they represent a lower-risk component for metal leaching compared with vials.

3. When Absolute Metal-Free Assurance Is Required

For laboratories performing work such as:

- ICP-OES or ICP-MS quantitation
- Metal-sensitive biopharmaceutical assays
- Trace-level elemental impurity profiling

…the only way to guarantee the absence of trace metals is to submit representative vial and cap samples for third-party analysis (ICP or ICP-MS). MicroSolv specifically recommends this approach for certainty.

ICP-MS and ICP-OES can confirm elemental contamination at ppb–ppt levels, providing validated assurance for GMP, GLP, or regulated workflows.

4. Practical Guidance for Technical Users

When polypropylene vials may still be suitable:

- Routine chromatography
- Bioanalysis of non-metal-sensitive analytes
- Organic LC and CE workflows
- Applications where glass-related adsorption or ionic interaction must be avoided

In these situations, polypropylene vials offer advantages such as chemical inertness, compatibility with biopolymers, and minimized ionic interactions.

When additional verification is recommended:

- Multi-element metals analysis
- Stability studies sensitive to elemental extractables
- Any assay with regulatory oversight requiring confirmed container cleanliness

In such workflows, only ICP-verified data can provide full assurance.

Summary for Technical Chromatographers

MICROSOLV polypropylene vials are low in expected metal content but not guaranteed metal-free, while screw caps are manufactured intentionally without Na/K/Mg/Ca. For applications requiring strict confirmation of metal absence, third-party ICP-based testing is the recommended and industry-accepted approach.

This ensures confidence in low-level metal measurements and prevents false positives originating from consumables rather than samples.

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