WHITEPAPER

Trajan CB Emitters

Precision engineered for reliable LC-MS performance

Introduction

Trajan CB Emitters are defined by their constant internal diameter (ID) – known as 'constant bore'. This plays a critical role in maintaining stable electrospray ionization (ESI) whilst **resisting clogging** for LC-MS analytical performance and uptime.

But not all constant-ID emitters are created equal. Even slight variations in tip geometry, cleaving quality, or internal diameter can significantly affect LC-MS performance. Trajan maintains tight control over critical dimensions by **precision-drawing fused silica tubing** in-house. This approach delivers a precision engineered product for stable and efficient electrospray, reproducible flow, and precise alignment with MS interfaces – minimizing variability and delivering consistent, reliable results.

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Certificate of Conformance

Trajan CB Emitters

This package contains fused silica nanospray emitters produced in accordance with defined specifications and tolerances, manufactured under a quality management system certified to ISO 9001.

	Measurement method	Specifications	Result
Inner diameter (ID)	Solvent flow rate test	10 µm ±2 µm 20 µm ±2 µm	Pass
Tip angle	Digital microscopy	13° ±1°	Pass
Precision cleaved ends	Digital microscopy	Visual	Pass

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Trajan CB Emitters are supplied with a Certificate of Conformance.

Precision that sets Trajan CB Emitters apart

At Trajan, precision engineering underpins every aspect of our work – because even the smallest imperfection can disrupt electrospray stability and efficiency, ultimately compromising the accuracy and reproducibility. Through rigorous manufacturing control processes and high-resolution microscopic inspection of every single emitter, Trajan ensures that all emitters conform to tight tolerances for reliable and consistent analytical performance.

Microscopic inspection of emitter tip to confirm tip angle and tip diameter

For more information on Trajan CB Emitters, visit **www.trajanscimed.com/emitters**

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Trajan CB Emitters engineered with key design features

Trajan CB Emitters are engineered with key design features that translate to higher sensitivity and improved reproducibility, better chromatographic resolution, and quantitative accuracy – critical for LC-MS proteomics workflows.

Precision-cleaved ends for zero dead volume (ZDV) connections

Trajan CB Emitters are precision-cleaved using advanced technology. Smooth cleaves help eliminate dead volume and reduce band broadening, resulting in sharper peaks, expanded proteome coverage, and greater analytical accuracy.

Optimized tip geometry

Carefully optimized tip angles and tip diameter ensure stable and efficient electrospray performance, enhancing sensitivity and increasing peptide identification. Each emitter undergoes rigorous inspection to confirm tip angles remain within tight tolerances of 13° ±1°, delivering consistent electrospray stability, high spray efficiency, and reproducible results.

Constant ID with tight tolerances

Trajan ensures precision in every emitter by maintaining strict internal diameter tolerances of 10 µm ±2 µm and 20 µm ±2 µm, delivering stable flow and consistent electrospray performance for reproducible results. Each emitter undergoes microscopic inspection of the constant bore to identify any particulates and surface irregularities.

Are all constant ID emitters created equal?

Although some emitters feature a constant internal diameter, their analytical performance may vary depending on manufacturing precision. Therefore, when assessing emitters, it is worth considering whether they show:

Hand-cleaved or roughly cut ends

These can introduce dead volume, which may lead to peak broadening, reduced sensitivity and even glass fragment contamination – potentially causing blockages, increased back pressure, and unplanned downtime.

The constant bore is inspected for particulates; the geometry of the tip is also checked.

Inconsistent internal diameters

These can result in variable flow characteristics and reduced reproducibility.

Suboptimal tip geometry

This can compromise electrospray stability and efficiency, which may lower sensitivity and reproducibility across analyses.

Conclusion

Trajan CB Emitters combine Trajan's precision manufacturing and rigorous quality control to deliver consistent, high-performance electrospray every time. By drawing our own fused silica tubing and maintaining full control over every production step, we ensure each emitter meets standards for optimal LC-MS performance.

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