

# DS-5

## Microflow Concentric Nebulizer



### Micro-Volume Sample Introduction

The DS-5 Microflow Nebulizer is a specialized device for very low-flow applications (3 to 10  $\mu\text{L}/\text{min}$ ), including micro-HPLC coupled with ICP-MS. The DS-5 nebulizer kit includes a dedicated low-volume spray chamber which connects directly via a glass socket to the base of the ICP-MS torch.



## DS-5 Microflow Concentric Nebulizer



Very limited volume samples and/or the need to introduce neat organic solvents to the ICP-MS may require the use of a very low flow rate nebulizer. The Teledyne CETAC DS-5 Nebulizer is a concentric type that couples a proprietary capillary and gas orifice design for stable liquid flow.

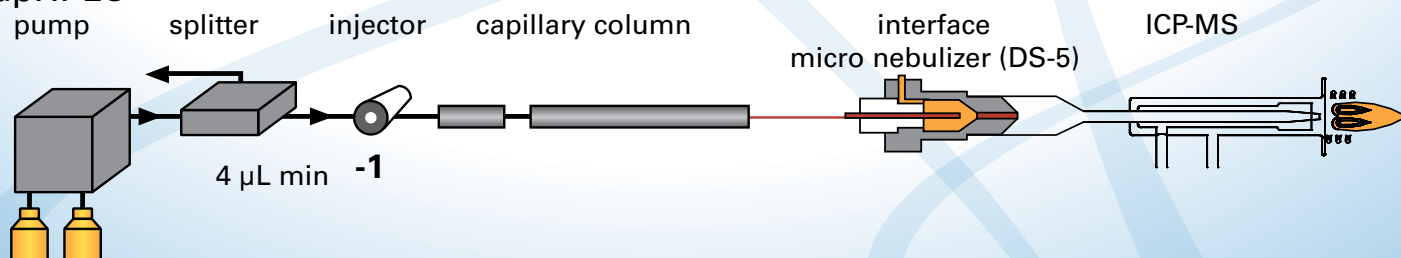
Samples may be self-aspirated to the DS-5 or pumped via a micro-HPLC pump; nebulizer gas is supplied to the DS-5 from the host ICP-MS instrument. The DS-5 can be inserted into the included low-volume (8 mL) spray chamber which can attach directly via a 12/5 glass socket to the base of the ICP-MS torch. This arrangement enables rapid sample stabilization and washout times and maintains chromatographic peak resolution. Note that the DS-5 is a total consumption nebulizer system, as no liquid waste accumulates in the spray chamber at such low flows.

The figure below shows the typical arrangement of the setup of the DS-5 for online chromatography with ICP-MS.

Application areas for the DS-5 include nano-volume flow injection analysis of very toxic or radioactive samples and metallomic studies.

## $\mu$ HPLC-ICP-MS with DS-5

### CapHPLC



## References

1. D. Schaumlöffel, J. Ruiz, R. Lobinski. "Development of a Sheathless Interface between Reverse-Phase Capillary HPLC and ICPMS via a Total Consumption Nebulizer for Selenopeptide Mapping", *Anal. Chem.* 2003, 75, 6837.
2. D. Schaumlöffel, P. Giusti, M.V. Zoriy, C. Pickhardt, J. Szpunar, R. Lobinski, J.S. Becker. "Ultratrace Determination of Uranium and Plutonium by Nano-Volume Flow Injection Double Focusing Sector Field Inductively Coupled Plasma Mass Spectrometry," *J. Anal. At. Spectrom.*, 2005, 20, 17.
3. J. Ellis, R. Grimm, J.F. Clark, G. Pyne-Gaithman, S. Wilbur, J.A. Caruso. "Studying protein phosphorylation in low MW CSF fractions with capLC-ICPMS and nanoLC-CHIP-ITMS for identification of phosphoprotein.", *J. Proteome Res.* 2008, 7(11), 4736-4742.

## Specifications

- Nebulizer Construction:** PVDF body with fused silica capillary
- Sample Uptake Rate:** 3 to 10  $\mu\text{L/min}$ , pumped or self-aspirated
- Nebulizer Gas Flow:** 0.8 to 1.2 L/min
- Nebulizer End (outer diam):** 15.5 mm
- Nebulizer Overall Length:** 40.2 mm
- Spray Chamber:** Quartz, 8 mL volume, 12/5 glass socket adapter
- Warranty:** 12 month limited