

Cooling options

Chilled out

The GERSTEL Cooled Injection System (CIS) is a PTV-type GC inlet that is also used as cold trap in GERSTEL GC sample introduction solutions such as thermal desorption. To maximize performance, a cooling system that matches the application is needed. The available cooling options and where they best fit are described below.

Liquid Nitrogen (LN₂)

LN₂ based cooling provides the widest range of trapping temperatures, and greatly simplifies method development. Thanks to being able to cool the CIS to as low as -180 °C, you can always be sure you are trapping even the most volatile compounds. Physics-based cryogenic trapping with LN₂ ensures that all unknown analytes are trapped without chemical transformation and are consequently transferred to the GC column discrimination free. The use of LN₂ eliminates the need to use chemical sorbents that have specific trapping characteristics and are designed to trap a range of compounds or a specific compound type (i.e. sulfur compounds). Solving critical problems requires that you see all compounds in your sample, but with chemical trapping you can never be sure that you have selected the right adsorbent/adsorbents. They should never be used unless performing target analysis where you validate trap performance through the use of standards



Illustration: GERSTEL / Dr. Malte Reimold

The GERSTEL product range includes cooling options to meet every application need. To find out which cooling option is best for you, contact GERSTEL to discuss with our experts.

Universal Peltier Cooling (UPC Plus)

When using the CIS strictly as a PTV-type GC inlet for liquid injections the electrically powered Universal Peltier cooling module (UPC Plus) can be used. The UPC plus is based on Peltier Cooling and it continuously circulates coolant to remove heat. UPC Plus requires very little maintenance and operates quietly in the background. Temperatures as low as 10 °C can be reached reliably and the UPC Plus doesn't require additional bench space, it is mounted on the GC. The UPC Plus is also used to cool all GERSTEL modules where cooling aids in decreasing analysis cycle time such as the TDS, TDU, TD 3.5+, and DHS. It can also be used when cooling is needed for sample trays and agitators.

Carbon Dioxide (CO₂)

When you know that your compounds of interest are in a higher volatility range, but you still do not want to use adsorbents for trapping, liquid CO₂ can be used to reach temperatures as low as -70 °C. Liquid CO₂ has the advantage of being stored conveniently in a gas cylinder at ambient temperature. However, compared to LN₂, LCO₂ has less cooling capacity; the number of analysis cycles that can be performed using a single cylinder is significantly smaller when compared to LN₂.

Cryostatic Cooling Device (CCD 2)

When performing targeted analysis where the use of adsorbent traps is acceptable or non-target analysis of, for example, SVOCs, the GERSTEL Cryostatic Cooling Device (CCD 2) is a perfect replacement for cryogenic cooling. It provides continuous, reliable cooling of the CIS to as low as -40 °C. The CCD 2 provides two separate cooling channels with independent temperature control so it can also be used to cool a TDS, TDU, or a TD 3.5+.