TITAN Peltier Cooling Unit (PCU)

When operating in LVI mode, inlet cooling is necessary to avoid long cycle times. Cryogenic gases have typically been used for this purpose. However, they are expensive, use a large amount of lab space and pose a safety hazard. The new TITAN PCU from JSB is an economical solution that eliminates these concerns. The TITAN PCU can be programmed to begin cooling at any time during the run and will decrease the cycle time between injections. This critical feature helps to increase productivity, lowering cost per sample. The TITAN PCU is compatible with the TITAN XL, Agilent MMI and Gerstel PTV GC Inlets.

Applications

The TITAN XL was designed to expand the applicability of a standard GC or GCMS system without losing the functionality of a standard S/SL inlet. Having the option to inject sample into a cold inlet, program a temperature profile gradient and perform large volume injections will allow you to tackle the most difficult of matrices, including:

- Trace Pesticide Analysis
- Detection of PAH's in Water
- QuEChERS extracts from food
- Analysis of Hydrocarbons in Soil & Water (ISO-9377-2)
- Flavor Analysis in Liquid Beverages
- USEPA Method 8270 LVI (10ul)

Analysis of Polyaromatic Hydrocarbons (PAH)

PAH's are a class of aromatic hydrocarbons, some of which have been shown to be carcinogenic. They are found naturally in coal and oil deposits and can be formed by combustion of fuels and plastics. Ultimately, they end up in our air and water systems. From a chromatographer's point of view, they can be hard to analyze due to their high boiling points and are sometimes contained in a complex sample matrix.

The two examples on the right show a comparable 1µl (figure 1) and 10µl (figure 2) injection of a US EPA 8270 calibration standard, at a concentration of 2PPM and .2 PPM respectively. The inlet conditions are as follows:

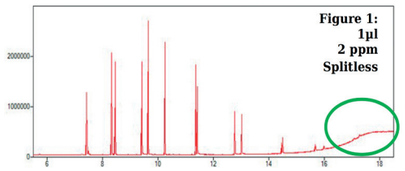

Figure 1:
Splitless mode, 325°C isothermal

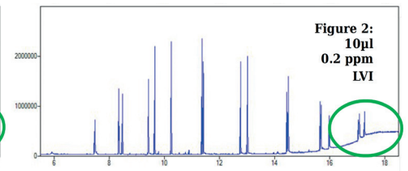

Figure 2:
Solvent Vent (LVI) mode, 35°C initial, ramp of 350°C/min up to 325°C

The second analysis (Fig.2) has a better response to the high boilers in comparison to the standard 1µl injection, without sacrificing the front end, as outlined above in green.

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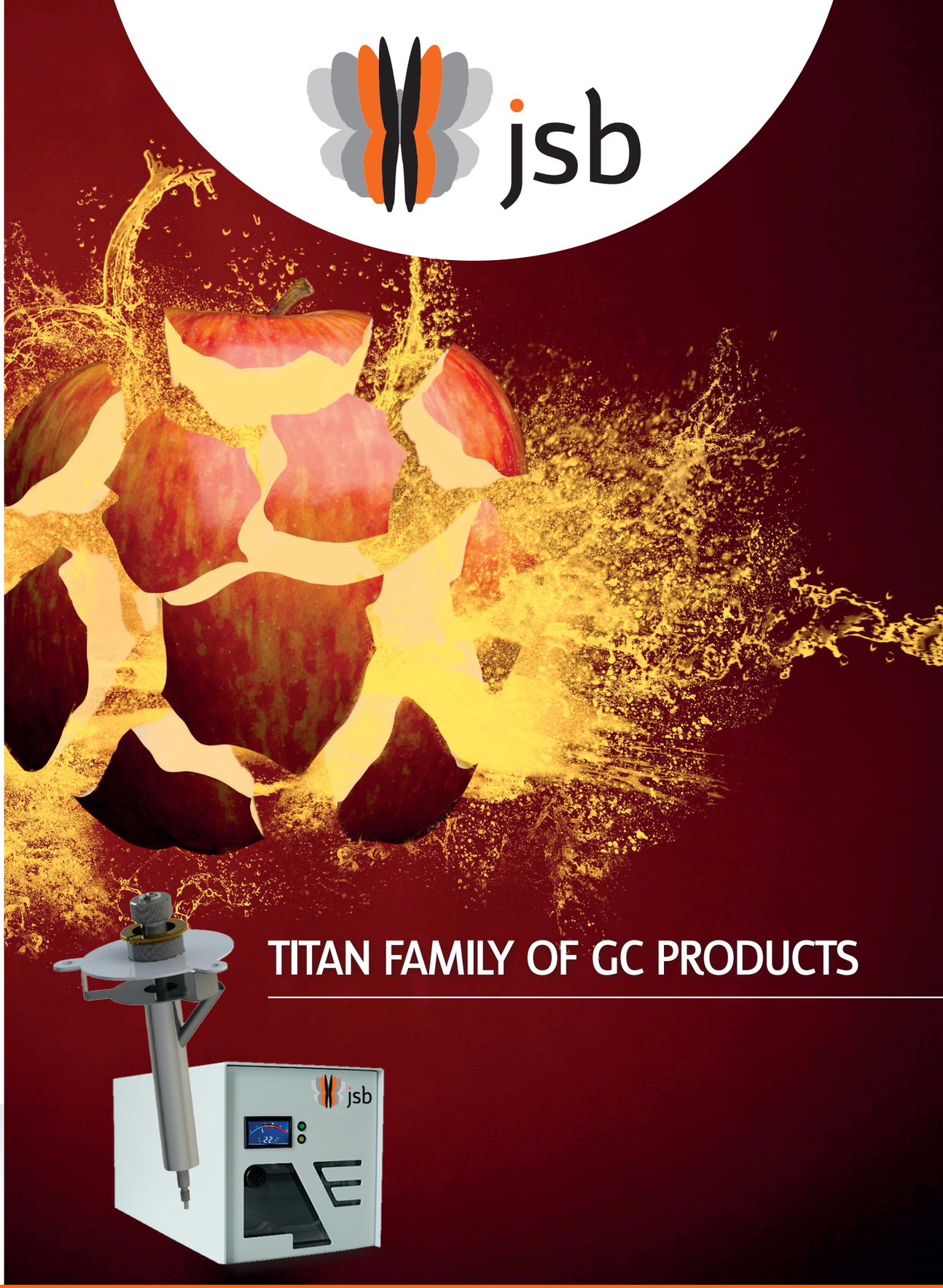


SHARPER PEAKS, BETTER SEPARATIONS

TITAN FAMILY OF GC PRODUCTS

KEY FEATURES
- Universal GC Inlet
- Low Maintenance and Easy to Use
- Improved Productivity with Faster Cycle Time
- No Additional Software or External Controller Needed
- Seamless Integration with Agilent 6890 and 7890 GC's

TITAN XL LARGE VOLUME PTV INLET FOR GC & GCMS SYSTEMS

TITAN PCU PELTIER COOLING UNIT FOR THE TITAN XL PTV

Introduction to Programmable Temperature Vaporization (PTV) and Large Volume Injection (LVI) Inlets

Traditionally, GC injections have been limited to 1uL. Larger injections create chromatographic issues by overloading the inlet and the column. The TITAN XL was designed to overcome these limitations by introducing Large Volume Injection (LVI) to a standard GC or GCMS system. The TITAN XL's use of PTV allows it to make LVI injections up to 1000uL, while maintaining the ability to inject traditional 1uL split/splitless volumes used with a standard GC Inlet.

In the PTV mode, compounds are injected into a cooled liner with the split vent open. The temperature is ramped slightly so the solvent will vaporize and escape through the open split vent, leaving analytes behind. The split vent is then closed, and the proprietary coil and cartridge heater is rapidly heated to vaporize the analytes and transfer them to the column. Control of the TITAN XL is seamlessly integrated into the acquisition software. Benefits of the programmable heating rate include discrimination free transfer of analytes, sharper peaks and improved separation. This ultimately improves accuracy and detection limits.

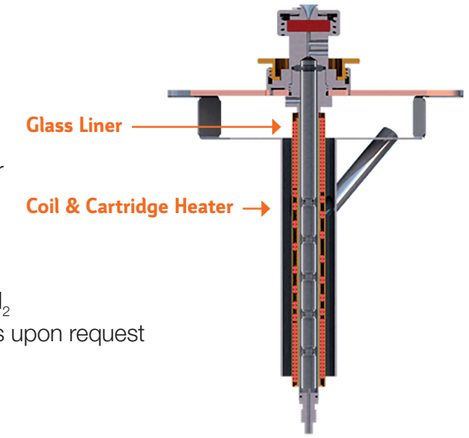
Large Volume Injection (LVI) is a useful technique for:
- Increasing Detection Limits
- Reducing Sample Prep Time
- Decreasing Starting Sample Volume

Key design features

At the heart of the TITAN XL is the proprietary coil and cartridge heater. This heater allows the TITAN XL to operate in the split/splitless mode or PTV mode without the need for hardware changes. The cartridge allows locking in a precise temperature for split/splitless injections and the coil allows temperature ramp rates of up to 720°C/min for PTV applications. Combining these features into one heater truly makes the TITAN XL a universal injector. As an added benefit, no tools are needed to change liners, septa, ferrules or o-rings.

Specifications

Injection Volume:	1-1000 µl
Max. Temperature:	500°C
Ramp Rate:	720°C/min
Cooling Options:	Peltier (Titan PCU), Liquid N_2 & CO_2, & Air
Modes of Operation:	S/SL, Pulsed S/SL, LVI
Split Ratio:	7500:1
EPC Pressure:	0-100 psi
Carrier Flow:	0-1000mL/min H_2 or He; 0-200mL/min N_2
Compatibility:	GC: Agilent 6850, 6890, 7890 and others upon request
Software:	ChemStation, OpenLab, Masshunter



Features & benefits

Universal Inlet Capability – Easy replacement for standard S/SL inlets
- 5 modes of use: Solvent Vent (LVI), Split, Splitless, Pulsed Spilt, Pulsed Splitless
- Offers maximum flexibility for a large range of sample types & sensitivities
- 500°C operation allows for analysis of even the highest boiling compounds

Inert Sample Path - All sample pathways are treated with Inertium™
- Inertium™ is a proprietary surface treatment for metal surface deactivation
- Helps reduce sample coating of inlet and active site breakdown of analytes
- Reduces sample carry over between runs

Large Volume Injection - Capable of handling injections up to 1000 µl
- Increases sensitivity by several orders of magnitude
- Reduces sample prep time– Reduced sample concentration

Several Cooling Options Available – Fast Inlet cooling for reduced cycle times
- Liquid N_2 (-160°C), CO_2 (-70°C) & Peltier (-5°C)
- Cryo and Peltier options ensure sharp peaks & maximizes separation
- Improves recovery of even the most volatile compounds