


GERSTEL


Thermal Desorption Unit

TDU

Specifications

TDU

Uses

- thermal desorption of analytes that have been concentrated on a GERSTEL Twister® or on adsorbent placed in a TDU tube
- direct thermal extraction of analytes from solid or liquid samples
- direct introduction of liquid samples to the TDU and subsequently onto the Cooled Injection System CIS
- direct introduction of liquid samples with a heavy matrix load into micro-vials placed in the TDU, followed by thermal extraction and removal of the matrix residue along with the used micro-vial
- introduction of liquid standards

System configuration

- compatible with most standard GCs
- GERSTEL Cooled Injection System CIS fitted with a special TDU liner is used for analyte focusing prior to GC or GC/MS analysis

Cooling options

- cryostatic cooling CCD
- peltier cooling UPC

Minimum temperatures

- -40 °C (with cryostatic cooling CCD)
- +10 °C (with peltier cooling UPC, depending on the transfer temperature)

Cooling rate

- from 300 °C to 20 °C in 30 seconds (using UPC)

Temperature programming

- 2 temperature ramps
- heating rate maximum 720 °C/min
- initial temperature 10 ... 350 °C
- 1. hold temperature 10 ... 350 °C
- 2. hold temperature 10 ... 350 °C
- hold time maximum 650 min for each hold temperature

Sample transfer modes to Cooled Injection System CIS

- split
- splitless
- solvent venting

Transfer temperature

- maximum 350 °C
- fixed or in TDU tracking mode (with max. 120 °C/min.)

Desorption mode

- Standard
Following desorption the sample tube is cooled to the initial temperature and held at this temperature until the end of the GC run.
- Sample Remove
Following desorption the sample tube is cooled down to the initial temperature and is replaced with an empty tube. The GC run is started immediately thereafter.

Pneumatics

- Pressure release for sample loading and unloading
- Flow, pressure and split ratio controlled through the GC pneumatics, depending on the GC model, or through the CIS pneumatics.



Thermal Desorption Unit TDU

Control

- based on one of the controllers C505 or C506
- in combination with the GERSTEL MAESTRO software, integrated in the Agilent® Technologies ChemStation software or operated in stand-alone mode
- only one method and one sequence table required for the complete system including GC/MS when integrated in the ChemStation software

Automation

- Twister Option for automated processing of up to 196 Twisters® using the GERSTEL MultiPurpose Sampler MPS 2

Regulatory Certifications and Standards

- DIN EN 61010-1/A2:1996
- DIN EN 61326:2004-05
- IEC 61010-1:1990/A1:1992/A2:1995
- IEC 61326:2002
- UL STD 3101-1;93
- CAN/CSA C22.2 NO.1010.1-92

Operating conditions

- 15 ... 35 °C
- relative humidity max. 50-60%, non-condensing
- max. 4615 m above sea level

Storage conditions

- -20 ... 50 °C
- relative humidity max. 50-60%, non-condensing
- max. 4615 m above sea level

Dimensions (H x W x D)

- 94 x 124 x 77 mm

Weight

- 1.2 kg

Power consumption

- max. 110 Watt

Tube types

- TDU tubes for GERSTEL Twister®
60 x 6 x 5 mm (L x OD x ID)
- TDU tubes 60 x 6 x 4 mm (L x OD x ID)
- length of heated area approximately 20 mm
- empty or packed
- special micro-vials for up to 100 µL sample volume available
- more detailed information is available in a separate flyer

TD pneumatics box

- switches between TDS split and CIS split
- controls pressure release for sample loading and unloading
- 4 LEDs provide quick status overview
- 1 x split output to CIS pneumatic
- 1 x TDU split input
- 1 x CIS split input
- 1 x compressed air input
- 1 x valve control interface
- 1 x pneumatic control interface
- dimensions 200 x 100 x 175 mm (L x H x W)
- weight 1.5 kg

Accessories and options

- MPS Twister Option
for automated processing of up to 196 GERSTEL Twisters® using the GERSTEL MultiPurpose Sampler MPS in combination with the Thermal Desorption Unit TDU
- DHS,
for automated dynamic headspace analysis of up to 98 samples
- ATEX Option
for automated liquid injection to the TDU liner, typically using a micro-vial insert, followed by thermal extraction of the liquid and tube exchange in a GERSTEL Thermal Desorption Unit TDU
- Tube Conditioner TC 2
for simultaneous thermal conditioning of up to ten TDS tubes or up to 50 Twisters® under a flow of inert gas
- Gas Sampler GS 1
compact, microprocessor controlled whole air sampler with built-in sample changer for up to 10 TDS tubes



Thermal Desorption Unit TDU

Uses

Standard Thermal Desorption/ Twister®-Desorption

Principle

Analytes that have been concentrated on a GERSTEL Twister® or on an adsorbent placed in a TDU tube are thermally desorbed in the TDU.

Features

- No transfer line, analytes are transferred directly from the TDU to the CIS without loss of analytes.
- Short cycle times and limited power requirement due to small thermal mass.
- When transport adapters that enable introduction of liquids are used, automated standard addition can be performed using the MPS autosampler.

Applications

- Thermal desorption of analytes from liquid samples, that have been concentrated on a GERSTEL Twister®
- Thermal desorption of analytes from gaseous samples that have been concentrated onto an adsorbent.

Accessories required

- adsorbent filled TDU tubes
or
- TDU tubes for desorption of GERSTEL Twister®

Adsorbents

- Tenax TA™
- PDMS
- PDMS coated magnetic stir bar, GERSTEL-Twister®

Types of Twister®

- length 10 mm, coating 0.5 mm, PDMS volume 24 µL
- length 10 mm, coating 1.0 mm, PDMS volume 63 µL
- length 20 mm, coating 0.5 mm, PDMS volume 47 µL
- length 20 mm, coating 1.0 mm, PDMS volume 127 µL

Automation

- using Twister Option and MultiPurpose Sampler MPS 2
- max. 196 Twisters® per sequence

Direct Thermal Extraction

Principle

Direct thermal extraction of analytes from solid or liquid samples. Samples are kept inside sealed TDU tubes in an autosampler tray prior to analysis. Liquid samples are normally placed in micro-vials inside the TDU tube, solid samples are kept in place by a glass frit inside the TDU tube.

Features

- Samples are loaded into TDU tubes off line.
- No cross-contamination since a new TDU tube is used for every sample.
- When transport adapters for liquid sample introduction are used, it is possible to perform automated standard addition using the MPS autosampler.

Applications

- Direct thermal extraction of samples that are not compatible with syringe introduction. Examples are viscous liquids or solids.

Accessories required

- TDU tubes with micro-vials
or
- TDU tubes with glass frit

Automation

- using Twister Option and MultiPurpose Sampler MPS 2
- max. 196 Twisters® per sequence



Direct sample introduction

Principle

The liquid sample is directly introduced to the TDU tube inside the TDU and subsequently onto the Cooled Injection System CIS.

Features

- Direct introduction of liquids to the CIS is possible without first removing the TDU.
- Venting of low boiling compounds possible for samples with a heavy matrix load.

Applications

- Analysis of samples with a heavy matrix load.

Accessories required

- transport adapter for liquid injection
- TDU tubes with glass frit
- or
- TDU tubes packed with glass wool

Automation

- using ATEX Option and MultiPurpose Sampler MPS 2
- max. 196 Twisters® per sequence

Liquid Sample Introduction to Micro-Vials

Principle

The liquid sample is introduced to a TDU tube inside the TDU immediately prior to the extraction.

Features

- Sample introduction to a closed TDU system.
- Sample can be introduced without having to use programmed speed.
- No system contamination since sample matrix is removed with the used micro-vial and the used TDU tube.
- No loss of analytes from the TDU tube through evaporation prior to extraction.
- No contamination of the TDU tray.
- Automated Standard Addition can be performed by the MPS 2.

Applications

- Analysis of samples with a heavy matrix load, for example oils.
- Analysis of large volume samples including solvent evaporation step.
- Dynamic Headspace of liquid sample volumes of up to 100 µL.

Accessories required

- transport adapter for liquid injection
- TDU tubes with micro-vials

Automation

- using ATEX Option and MultiPurpose Sampler MPS 2
- max. 196 samples/Twisters® per sequence