

**GERSTEL**  
certified **SUPPLIES**



**Thermal Desorber TD 3.5<sup>+</sup>**





## Thermal Desorber TD 3.5+

### Offering more for Material Emissions and Air Monitoring



The Thermal Desorber TD 3.5+ is a flexible automated solution for thermal desorption and thermal extraction. The TD 3.5+ fits on top of any modern GC without the need for additional bench space and it is perfectly suited for the analysis of materials and for thermal desorption of sorbent tubes used to sample whole air. The TD 3.5+ handles standard 3.5" tubes, as prescribed in several standard methods, in addition to GERSTEL plus tubes, which hold up to 20 % more sorbent for enhanced break-through volume, improved recovery as well as improved limits of detection.

The TD 3.5+ incorporates the latest advances in thermal desorption technology. During desorption, tubes are heated over the entire length of the sorbent bed, as well as the sampling end for best possible recovery. Intelligently designed and based on a "Liner-in-Liner" concept, the TD 3.5+ has no valves or transfer lines. The TD 3.5+ is connected directly to the GERSTEL Cooled Injection System (CIS), which serves both as a cryo-focusing trap and as a temperature programmable GC inlet. Active sites are eliminated, reducing the risk of analyte loss, discrimination and memory effects to an absolute minimum.

The TD 3.5+ can be operated in single split, dual split or true splitless mode enabling it to cover the widest range of concentrations, to protect the column from water and contamination and to achieve the lowest possible limits of detection. The TD 3.5+ low-flow split pneumatics provide improved flexibility and performance. For extreme sensitivity, the multi-desorption mode can be selected in MAESTRO.

Techniques supported by TD 3.5+:

- Thermal desorption of sorbent tubes used for air sampling
- Dynamic Headspace (DHS 3.5+) based on standard headspace vials
- DHS 3.5+ Large based on sample containers up to 1 L volume
- Thermal extraction of solid samples placed in fritted TD tubes
- Stir Bar Sorptive Extraction (SBSE) using the GERSTEL Twister®
- Thermal extraction of liquids placed in  $\mu$ -vials inside the TD tube

Part No.



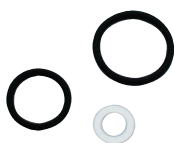
**Transport adapter for GERSTEL TD 3.5+**

10 Units	<b>021005-010-00</b>
100 Units	<b>021005-100-00</b>



**Transport adapter for liquid injection**

10 Units	<b>020960-010-00</b>
100 Units	<b>020960-100-00</b>



**O-ring set**  
for Transport adapter

10 Units	<b>021052-010-00</b>
100 Units	<b>021052-100-00</b>



**Inner O-ring**  
for Transport adapter,  
conditioned

10 Units	<b>020966-010-00</b>
100 Units	<b>020966-100-00</b>

**Septum for Transport adapter for liquid injection**

10 Units	<b>015608-010-00</b>
100 Units	<b>015608-100-00</b>



**Glass inserts**  
for Twister sample tray

40 Units	<b>012565-640-00</b>
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**Preventive maintenance kit for TD 3.5+**  
consists of:

- Injection unit
- Glass liner kit (012440-004-00)
- GRAPHPACK 3D ferrules; 5 Units

<b>CIS 4</b>	<b>014100-926-00</b>
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**Recommended Kit for TD 3.5+**  
consists of:

- Glass liner kit (012440-004-00)
- GRAPHPACK 3D ferrules; 2 Units
- Transport adapter for desorption Liner; 2 Units
- Desorption liner for TD 3.5+, empty; 5 Units

<b>CIS 4/6</b>	<b>012753-535-00</b>
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Part No.

## Desorption tubes for TD 3.5+

The following desorption tubes are designed for the GERSTEL Thermal Desorber TD 3.5+.



### with glass frit

User packed liners

5 Units **020801-005-00**

### packed with Tenax® TA

in storage container  
>200 mg  
Maximum temperature: 300 °C

10 Units **020586-010-00**

### packed with Tenax® GR

in storage container  
>200 mg  
Maximum temperature: 300 °C

10 Units **020603-010-00**



### packed with Carbotrap® 300

in storage container  
Maximum temperature: 330 °C

10 Units **020604-010-00**

### packed with Carbopack™ B und Carbopack™ X

in storage container  
Maximum temperature: 330 °C

10 Units **020605-010-00**

### packed with Tenax® TA+

in storage container  
>260 mg  
Maximum temperature: 300 °C

10 Units **020602-010-00**

### Microvials for TDU / TD 3.5+

For injection of high-boiling or matrix laden samples e.g. oil or food samples into the Microvial. The inserts are placed in the empty TD 3.5+ desorption liners.

20 Units **014756-500-00**

200 Units **014756-002-00**

2000 Units **014756-020-00**



## CIS glass liners for use with the TDU/TD 3.5+

The glass liners listed in the following are designed for CIS 4/6 in combination with the GERSTEL TDU/TD 3.5+ only. Unless specified separately, the dimensions are:

**CIS 4/6** OD 3 mm (ID 2 mm); length 78 mm.

For all liners for any particular CIS type inlet, the same GERSTEL®-Graphpack® ferrules can be used.

### Important Information:

With exception of the Siltek™ coated liners, the deactivation is only stable at temperatures up to 275 °C. Higher temperatures can be used, but this will create more active sites inside the liner

### GERSTEL Headspace:

For standard Headspace Split injection, we recommend a deactivated baffled liner. For splitless introduction, it can be necessary to refocus the analytes in the liner. In this case, depending on the application, a liner packed with an sorbent such as Tenax® TA or Carbotrap™ B or even a sorbent such as PDMS foam can be used.

### Tenax® TA

Tenax® TA is a porous material based on 2,6-diphenylene oxide polymer, with a specific surface area of 35 m<sup>2</sup>/g. The material has low affinity for water and methanol and adsorbs compounds in the C<sub>5</sub>-C<sub>28</sub> range. The particle size is 60/80 MESH.

### Carbotrap® B

Carbotrap® B has a particle size of 20/40 MESH. It has a specific surface area of 100 m<sup>2</sup>/g. This sorbent is especially suited for trapping and thermally desorbing compounds in the range from C<sub>5</sub> to C<sub>20</sub> (depending on the size and structure of the molecule).

### PDMS

The GERSTEL PDMS foam has an open porous structure. The non polar material is very well suited for focusing and thermally desorbing non polar analytes (a distribution equilibrium occurs between the PDMS foam and the vapor phase). Maximum temperature: 300 °C. Minimum temperature: glass transition temperature -10 °C.

### Maximum temperatures:

Liner type	maximum temperature
Deactivated liner	275 °C
Siltek™ coating	350 °C
Not deactivated	450 °C
Packed with Carbotrap® B	400 °C
Packed with Tenax® TA	350 °C
PDMS foam	300 °C

Part No.

## CIS glass liners for use with the TDU/TD 3.5+

### straight with notch

deactivated

For initial system evaluation. Used for custom-packed liners

Maximum temperature: 275 °C

1 package (10 Units)

CIS 4/6

013775-010-00

### baffled

deactivated

Suitable for very labile and for high boiling compounds.

(Warning: Breakthrough of analytes is possible)

Maximum temperature: 275 °C

1 package (10 Units)

CIS 4/6

012436-010-00

### with silanized glass wool

2mm, deactivated

For special uses: For trapping of low boilers. At 2 mm ID (CIS 4), a lower linear gas velocity is achieved, enabling trapping of low boilers even if no sorbent material can be used

1 package (10 Units)

CIS 4/6

012742-010-00

### with glass beads

deactivated

improved cryofocusing across a wide boiling range and improved splitless transfer to the column due to the optimized flow restriction.

1 package (10 Units)

KAS 4/6

015620-005-00

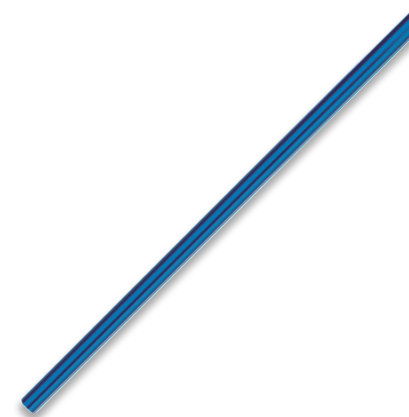
### with silanized glass wool

Topaz coated

1 package (10 Units)

CIS 4/6

019867-005-00



Part No.



## CIS glass liners for use with the TDU/TD 3.5+

### straight with notch

Special use liner e.g. for custom-packing.

1 package (10 Units)

CIS 4/6 013885-010-00

1 package (100 Units)

CIS 4/6 013885-100-00

### baffled

Used for high boiling and stable compounds.

1 Package (10 Units)

CIS 4/6 013884-010-00

1 package (100 Units)

CIS 4/6 013884-100-00

### with silanized glass wool

1mm ID

Especially useful for focusing of semi-volatiles due to small amount of packing material combined with high linear gas velocity for efficient transfer von analytes to the column.

1 package (10 Units)

CIS 4/6 013409-010-00

### straight without notch

For special uses e.g. in combination with TDU/TD 3.5+ analyte trapping (for more information contact your local GERSTEL representative)

1 package (10 Units)

CIS 4/6 013911-010-00

### Standard liner kit

included glass liners:

Empty (baffled) deactivated, 2 units

Packed with silanized glass wool deactivated, 2 units

1 mm/2 mm ID, packed with silanized glass wool

deactivated, 2 units

Packed with Tenax™, 2 units

Packed with Carbotrap B™, 2 units

CIS 4/6 012440-004-00



Part No.

## CIS glass liners for use with the TDU/TD 3.5+

### packed with Tenax® TA

Low affinity to methanol and water (optimal water purging at 40 °C). For trapping from C5 to high boilers.

1 package (10 Units)      **CIS 4/6**      **012438-010-00**

### packed with Carbotrap® B

For trapping of low boilers.

1 package (10 Units)      **CIS 4/6**      **012439-010-00**

### packed with quartz wool

More inert than glass wool. For trapping of difficult compounds (acidic, alkaline, etc.).

1 package (10 Units)      **CIS 4/6**      **012437-010-00**

### packed with PDMS foam

Polydimethylsiloxane (PDMS) is an open porous foam packing, used for analyte trapping. PDMS strongly retains non polar analytes and can be used for analytes as high boiling as n-C40. Ideal mid-range sorbent, useful when glass wool retains too little and Tenax® TA is too strong. Allows trapping at moderate temperatures, reducing the need for cryogenic cooling compared to glass wool. Maximum temperature: 300 °C. Minimum temperature -10 °C (glass transition temperature). At lower temperatures the analytes will just freeze out at the surface. The PDMS foam liner is much more inert than a glass wool liner. 5 mm packing length retains semi volatiles. 10 mm retains intermediate volatiles. 30 mm retains very volatile organic compounds.

#### packed with PDMS foam, 5 mm

1 package (10 Units)      **CIS 4/6**      **014597-110-00**

#### packed with PDMS foam, 10 mm

1 package (10 Units)      **CIS 4/6**      **014599-110-00**

#### packed with PDMS foam, 30 mm

1 package (5 Units)      **CIS 4/6**      **014600-105-00**

### PDMS glass liner kit

included glass liners:

Packed with PDMS foam, 5 mm length, 2 units  
 Packed with PDMS foam, 10 mm length, 2 units  
 Packed with PDMS foam, 30 mm length, 2 units

**CIS 4/6**      **014602-104-00**



Part No.

## Quartz liners for CIS 6 in combination with TDU/TD 3.5+

Quartz liners can be used at temperatures up to 650 °C and are marked with a red dot.



### baffled

For cold split injections, baffles create good mixing of sample and carrier gas. For liquid injections of moderate/high boilers and for labile compounds. Suitable for high temperature usage (up to 650 °C) with a CIS 6.

1 package (5 Units)

CIS 6

016070-005-00

### packed with quartz wool

Suitable for large volume injections into the PTV. The large surface area helps retain analytes while the solvent evaporates. The packing can be used as a filter for particulates. More inert than glass wool. For liquid injections of difficult compounds (acidic, alkaline etc.). Suitable for high temperature usage (up to 650 °C) with a CIS 6

1 package (5 Units)

CIS 6

016072-005-00

### GRAPHPACK® 3D mounting tool for glass liners

The mounting tool is designed for use only with glass liners used in combination with a TDU/TD 3.5+

CIS 4/6

012781-004-00

### GRAPHPACK® 3D ferrules for glass liners

#### Standard ferrules

1 package (5 Units)

CIS 4/6

007541-005-000

1 package (10 Units)

CIS 4/6

007541-010-000





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