These tubes are designed to function with the following brands of thermal desorption instruments: DANI, Markes, and Shimadzu. Each tube is etched with a unique number for sample identification.

### Single Bed Tubes

<table>
<thead>
<tr>
<th>Sampling Tube</th>
<th>Adsorbents (mesh size)</th>
<th>Cat. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tenax®-TA</td>
<td>Tenax TA 60/80</td>
<td>28715-U</td>
</tr>
</tbody>
</table>

### Multibed Tubes

<table>
<thead>
<tr>
<th>Sampling Tube</th>
<th>Adsorbents (mesh size)</th>
<th>Cat. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tenax-TA &amp; Carboxen™-1018</td>
<td>Tenax TA 60/80, Carboxen-1018 60/80</td>
<td>28718-U</td>
</tr>
</tbody>
</table>

### Custom Packing

G004769

### Tube Storage

These reusable sampling tubes contain high purity adsorbents that have been thermally conditioned and are ready-to-use. However, if the tubes have been in storage for an extended period of time, re-conditioning prior to use is recommended. To prevent contamination do not remove the storage caps before use. After sampling, reinstall the storage caps and store at a reduced temperature (4 °C) if they’re not analyzed immediately.

### Conditioning

To condition the tubes, use the thermal desorber if it has a conditioning option, or use a tube conditioner. Position the tubes so the gas enters the sampling outlet and exits through the sampling inlet (opposite of the arrow on the tubes). Heat the tubes to approximately 10-15 °C above the desired desorption temperature. Do not exceed the maximum temperature for the least stable adsorbent in the tube listed in Table 1. During heating use high-purity, moisture-free, helium, or nitrogen at a flow rate of 30-100 mL/min. Conditioning the tubes for 30 minutes to 1-hour is usually sufficient for most applications.

### Reconditioning

After analysis, the tubes should be re-conditioned for future use. Follow the steps listed above. Re-seal the conditioned tubes in the storage caps provided.
Sample Collection
Collect the sample in the direction of the arrow on the tube. Typical sampling rates are 10 to 100 mL/min. Typical sample volume range from 0.25 to 10 Liters.

Desorption
Desorb the tube in the opposite direction of the sample collection flow. A desorption time of 5 to 10 minutes is sufficient for most applications. See Table 1 for the recommended desorption temperature. Rapid heating of the adsorbent tube is preferred to heating the tube at slow rate.

Storage Caps
The brass Swagelok® storage caps seal with a replaceable PTFE ferrule. To prevent damage to the tubes, do not overtighten the storage caps. Caps should be tighten by hand, and then tighten ½ to ¾ turn using a wrench. Caps and ferrules can be re-conditioned by placing them in a convection oven at a maximum temperature of 100 °C for 1 to 3 hours.

Optional Storage Containers
The TDS³™, Thermal Desorption Tube Storage and Sampling System is an alternative to the brass storage caps. The TDS³ system eliminates internal dead volume, minimizes the risk of contamination from outside sources, and protects the tube from damage. The storage caps seal with a replaceable PTFE-faced septa, eliminating the need for extensive cleaning or thermal conditioning of the container between uses. Optional sampling caps are available to convert the storage container into a device for taking samples, connecting tubes in series, and attaching the tube to a sampling pump.

Empty Tubes
Empty tubes are available for packing other adsorbents, or sample prep applications.

Table 1

<table>
<thead>
<tr>
<th>Sample Tube</th>
<th>Approximate Sampling Range</th>
<th>Conditioning Temperature</th>
<th>Desorption Temperature Range</th>
<th>Maximum Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tenax TA</td>
<td>n-C7 to n-C26</td>
<td>320 °C</td>
<td>200 to 300 °C</td>
<td>350 °C</td>
</tr>
<tr>
<td>Carboxen-1018</td>
<td>n-C2 to n-C5</td>
<td>350 °C</td>
<td>200 to 330 °C</td>
<td>400 °C</td>
</tr>
</tbody>
</table>

Trademarks
Carboxen, TDS³ — Sigma-Aldrich Biotechnology LP
Swagelok — Swagelok Co.
Tenax — Buchem B.V.