Simple Ways to Boost Lab Productivity and Save Money
by choosing the right sample containment products

Vials and Sample Containment Product Manager
Craig Douglas
Sept 21, 2017
By the end of this webinar you should be able to….

✓ Better describe vials*, caps*, septa* and inserts*
✓ What makes a “better” vial
✓ How vials* work together to provide confidence in sample containment
✓ Available ranges for each
✓ Making better choices based on application
✓ How vials can impact lab productivity
✓ Why aren’t vials considered a more important part of the flow path
✓ Why Agilent should be your one stop shop for sample containment

*For the purposes of being succinct I may refer to “vials” when discussing all products underlined above
Sample Containment – up close

1. The Vial and or insert can be made of glass or polymer, clear or amber, screw, crimp or snap style – *it contains the sample*

2. The Cap can be made of aluminum, steel or polymer – *it holds the septa*

3. The Septum (septa – plural) can be made from PTFE, silicone, rubber, butyl or combination – *it acts as a pierceable barrier between sample and atmosphere*
Location of **vials** in your analytical work flow?
Different vials for different platforms

GC/FID

1 The Vial is usually made of glass, clear or amber, crimp in style.
2 The Cap is almost always aluminum or steel (if magnetic is important).
3 The Septa is usually a bilayer of PTFE and silicone but not pre-slit.

Recommendations

Main Industries: Environmental, Energy and fuels, Flavours, Forensics
Different vials for different platforms

LC/UV

What’s in an LC/UV sample?

Analyte which can be separated by liquid phase.

Main Industries: Pharmaceutical, Bio-Pharmaceutical, Food, Material Science

3 steps to LC/UV sample containment

Recommendations

1 The Vial is usually made of glass, clear or amber, screw, crimp or snap style.

2 The Cap is usually polymer-based but can be aluminum.

3 The Septa is usually a bi-layer of PTFE and silicone. We recommend pre-slit.
Different vials for different platforms

GC/HS

What’s in a HS sample?
Analyte which can be separated by gas phase.

Main Industries: Environmental, Energy and Fuels, Foods and Flavours

3 steps to GC/HS sample containment

1 The Vial is usually made of glass or polymer, clear or amber, screw or crimp in style.
2 The Cap can be made of aluminum, steel or polymer.
3 The Septa can be made from PTFE, silicone, rubber, butyl or combination.

Recommendations

September 21, 2017
Different vials for different platforms

**LCMS** or **GCMS**

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**What’s in an MS sample?**

Analyte which can be separated by ionic charge.

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**3 steps to MS sample containment**

1. **The Vial** is usually made of polymer for LC/MS and glass for GC/MS, clear or amber, screw (LC-version), crimp (GC-version).

2. **The Cap** is almost always a polymer for LC/MS and aluminum for GC/MS.

3. **The Septa** is usually a bi-layer of PTFE and silicone. We recommend pre-slit for LC/MS and non pre-slit for GC/MS.

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September 21, 2017
A "safe" place to store your customer’s samples prior to analysis

✓ A need for low metal glass, high quality cap/septa materials
✓ Open and closed cap versions
✓ Available in amber and clear
✓ Screw style cap only

### Storage Vials 4-40ml

<table>
<thead>
<tr>
<th>Vial Size</th>
<th>Unit</th>
<th>Cap Size</th>
<th>Vial Type</th>
<th>Septa Type</th>
<th>Closed Top</th>
<th>Open Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 mL, 15 x 45</td>
<td>100/pk</td>
<td>13-425</td>
<td>Clear</td>
<td>PTFE/silicone</td>
<td>5183-4311</td>
<td>5183-4331</td>
</tr>
<tr>
<td>100/pk</td>
<td>13-425</td>
<td>13-425</td>
<td>Amber</td>
<td>PTFE/silicone</td>
<td>5183-4321</td>
<td>5183-4321</td>
</tr>
</tbody>
</table>

Extract from page 24 of new Vials brochure

**Agilent Technologies**
Ever wonder how a glass vial is made?

The following 4 step guide will...

✓ Give you some insights into the process of making a vial
✓ Help you to appreciate the complex nature of the manufacturing process
✓ How each step is critical to making a better vial
Vials are made from a selection of basic materials

- Silica
- Soda Lime

*Followed by…*
- Up to 25 metals

You have all of your materials at the ready. *Now what?*
Turning raw material into tubular glass

The “hot end” process

All raw materials are placed “or fed” into a huge furnace at >1500 degrees Fahrenheit

Next…

“Press-and-blow”

The individual section machine takes the molten material and feeds it through simultaneously to form glass tubes.

The biggest cost related to vial manufacturing is the energy used to form the product.
You now have 2-4m sections of glass tubing ready for step 3:

Place tubes into a conversion machine

✓ Flame is used to split the tubing rods into vial length sections
✓ Flamed again forming the opening at the top of the vial
✓ Flamed a third time to close the bottom of the vial

No cutting device is used to make the vial. This limits microfracturing and allows for a smoother surface.
Reducing the stress in glass during manufacture

The structure of the vial is made but you are not finished yet!

✓ The previous processes caused stress which has accumulated in the glass
✓ At any time the glass could crack if not explode and would be of no use
✓ This final and important step called *annealing* helps to reduce this stress

Stop your screaming! Vials which rub against each other during manufacturing can cause microfractures or abrasions impacting containment performance
Shedding some light on **colored glass**

For light sensitive analytes

We all call it amber glass, however, its actually **colored glass**

The “**amber**” tint can vary widely but still be effective

Must meet USP660 requirements

- Wavelengths 290-490nm
- Containers <1ml thru >20ml

**Sulfur**, together with **carbon** and **iron** salts, is used to form **iron** polysulfides and produce **amber** glass ranging from yellowish to almost black!
Glass versus plastic
Which vials are better?

• There isn’t one simple answer!
• And you will not be surprised – Its application dependent
• Each have there own pluses and negatives

**Plastic**

*Also known as:* polypropylene-based vials and inserts

*Comes in:* <2ml fill volumes of <1ml or less

*Visually:* “almost” transparent to opaque

*Material characteristics:* limited sodium interference, elevated levels of extractables

*Uses:* LCMS, Bio-Molecular, CE

**Glass**

*Also none as:* silica-based vials and inserts

*Comes in:* 0.1ml – 60ml volumes

*Visually:* clear to dark amber

*Material characteristics:* elevated metals on glass surface, control of raw material sourcing

*Uses:* broadest use in analytical labs
In summary

You should now have a better understanding of the vial manufacturing process.

Coming up…

Making a cap and septum for your vial
Microvials High Recovery Vials and Inserts <2ml
Limited or high value sample?

Inserts - continued 150-400ul (0.15-0.40ml)

✓ You may have limited sample
✓ Expensive to prepare analyte
✓ Must be used in accompaniment with wide-opening 2ml vials
Limited or high value sample?

High recovery vials **15μl-0.8ml**

✓ Available in both glass and polymer materials, and combined materials
✓ Minimal residual volume of 1-2μl
✓ Available in clear and amber
✓ Silanized or not

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<table>
<thead>
<tr>
<th>Description</th>
<th>Sample volume</th>
<th>Material</th>
<th>Certified</th>
<th>Unit</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microvials</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glass shape, 12 x 32 screw top</td>
<td>15 μL</td>
<td>Glass, clear</td>
<td>100/pk</td>
<td>5184-3550</td>
<td></td>
</tr>
<tr>
<td>Glass shape, 12 x 32 screw top</td>
<td>15 μL</td>
<td>Glass, amber</td>
<td>100/pk</td>
<td>5184-3554</td>
<td></td>
</tr>
<tr>
<td>Glass shape, 12 x 32 crimp top</td>
<td>15 μL</td>
<td>Glass, clear</td>
<td>100/pk</td>
<td>5184-3551</td>
<td></td>
</tr>
<tr>
<td>Glass shape, 12 x 32 crimp top</td>
<td>15 μL</td>
<td>Glass, amber</td>
<td>100/pk</td>
<td>5184-3555</td>
<td></td>
</tr>
<tr>
<td>Crimp top, tapered, 8 mm</td>
<td>100 μL</td>
<td>Glass, clear</td>
<td>500/pk</td>
<td>5180-0844</td>
<td></td>
</tr>
<tr>
<td>Crimp top, round bottom, 6 mm, for HTS and HTC PAL</td>
<td>300 μL</td>
<td>Glass, clear</td>
<td>500/pk</td>
<td>5180-0841</td>
<td></td>
</tr>
<tr>
<td>Liquid injection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crimp/snap top</td>
<td>700 μL</td>
<td>Polypropylene</td>
<td>100/pk</td>
<td>5182-0567</td>
<td></td>
</tr>
<tr>
<td>Crimp top, flat bottom</td>
<td>800 μL</td>
<td>Glass, amber</td>
<td>1,000/pk</td>
<td>5183-4487</td>
<td></td>
</tr>
</tbody>
</table>
Limited or high value sample?

High recovery vials **1.5ml**

- Available in both glass and polymer materials, and combined materials
- Minimal residual volume of 1-2ul
- Available in clear and amber
- Salinized or not

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**Extract from page 13 of new Vials brochure**

<table>
<thead>
<tr>
<th>Description</th>
<th>Sample volume</th>
<th>Material</th>
<th>Certified</th>
<th>Unit</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crimp top</td>
<td>1.5 mL with 30 µL reservoir</td>
<td>Glass, clear</td>
<td>100/pk</td>
<td></td>
<td>5182-3454</td>
</tr>
<tr>
<td></td>
<td>1.5 mL with 30 µL reservoir</td>
<td>Glass, clear (silanized)</td>
<td>100/pk</td>
<td></td>
<td>5183-4497</td>
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<tr>
<td>Screw top</td>
<td>1.5 mL with 30 µL reservoir</td>
<td>Glass, clear</td>
<td>100/pk</td>
<td></td>
<td>5183-2030</td>
</tr>
<tr>
<td></td>
<td>1.5 mL with 30 µL reservoir</td>
<td>Glass, amber</td>
<td>100/pk</td>
<td></td>
<td>5183-2073</td>
</tr>
</tbody>
</table>
Limited or high value sample?

Vials with integrated inserts **250-300ul**

- Similar to high recovery vials but lower in price
- Not certified
- Come in amber and clear glass
- Crimp and screw cap styles

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**Extract from page 13 of new Vials brochure**

<table>
<thead>
<tr>
<th>Vials with Integrated Inserts</th>
<th>Screw top, with glass insert</th>
<th>250 µL</th>
<th>Polypropylene</th>
<th>100/pk</th>
<th>5188-5390</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crimp/snap top, with glass insert</td>
<td>250 µL</td>
<td>Polypropylene</td>
<td>100/pk</td>
<td>9301-0977</td>
<td></td>
</tr>
<tr>
<td>Screw top, with fixed insert</td>
<td>250 µL</td>
<td>Polypropylene</td>
<td>Y</td>
<td>100/pk</td>
<td>9301-0978</td>
</tr>
<tr>
<td>Crimp top, with fixed insert</td>
<td>300 µL</td>
<td>Glass, clear</td>
<td>100/pk</td>
<td>5188-6591</td>
<td></td>
</tr>
<tr>
<td>Screw top, with fixed insert</td>
<td>300 µL</td>
<td>Glass, clear</td>
<td>100/pk</td>
<td>9301-1388</td>
<td></td>
</tr>
<tr>
<td>Crimp top, with fixed insert</td>
<td>300 µL</td>
<td>Glass, amber</td>
<td>100/pk</td>
<td>5188-6592</td>
<td></td>
</tr>
<tr>
<td>Crimp top, with fixed insert</td>
<td>300 µL</td>
<td>Glass, amber</td>
<td>100/pk</td>
<td>5188-6572</td>
<td></td>
</tr>
</tbody>
</table>
Standalone sample containment

**Test Tubes 3.5-60ml**

Are used for…

- ✓ Sample collection
- ✓ Fractionation
- ✓ Centrifugation
- ✓ Reconstitution

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Extract from page 24 of you Vials brochure

<table>
<thead>
<tr>
<th>Test Tubes</th>
<th>Description</th>
<th>Size</th>
<th>Certified</th>
<th>100 /pk</th>
<th>250 /pk</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 x 48 mm</td>
<td>3.5 mL</td>
<td></td>
<td></td>
<td>5022-0534</td>
<td></td>
</tr>
<tr>
<td>16 x 48 mm</td>
<td>7 mL</td>
<td></td>
<td></td>
<td>5022-0533</td>
<td></td>
</tr>
<tr>
<td>12 x 100 mm</td>
<td>8.5 mL</td>
<td></td>
<td></td>
<td>5022-0531</td>
<td></td>
</tr>
<tr>
<td>16 x 100 mm</td>
<td>20 mL</td>
<td></td>
<td></td>
<td>5022-0532</td>
<td></td>
</tr>
<tr>
<td>30 x 48 mm round bottom glass</td>
<td>20 mL</td>
<td>Y</td>
<td>5042-6470</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25 x 100 mm round bottom glass</td>
<td>40 mL</td>
<td></td>
<td>5042-6450</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30 x 100 mm round bottom glass</td>
<td>60 mL</td>
<td></td>
<td>5042-6458</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Caps
The Cap

There are mainly 2 types of materials used in the manufacture of autosampler caps
✓ Polypropylene (screw and snap styles)
✓ Aluminum (crimp style)
Followed by…
✓ Steel (screw)
✓ Polyurethane (screw)

But how do you get from raw material to finished cap?
Put a cap on it!

*We talked earlier about making a vial; that’s only half of the story*

The following slides will…

✓ Provide some insights into cap and septum manufacturing
✓ Help you to appreciate the complex nature of the various processes
✓ What’s “essential” to make a better cap and septa
Making a cap
Sourcing the raw materials

It’s trickier than one might think

- When it comes to polymers there are many options in the market
- Purer materials are more expensive
- Some manufacturers source recycled materials which are cheaper but lead to leachable contamination of the flowpath

Extractables are compounds which have the potential to leach (producing leachables), both organic and inorganic, into the analytical flowpath.
Making a cap
Making a Mould

Like any “formed” plastic product a mould has to be designed:

- Usually involves a chamber made from stainless steel containing a cavity shaped like the product being designed.
- Pellets are dropped into the hopper and are pushed through with heat and fill the cavity, again, again, …

Agilent uses a proprietary processes inclusive of patented internal locking nib, shorter thread, unique external grip pattern and, of course, the Agilent logo.
The Septum (septa plural)

- Determined by sample matrix and analyte of interest
- Can be made from a broad range of materials are used including natural red rubber, various synthetic silicones, butyl rubber, Viton and other synthetic rubber products
- Hardness of septum material will influence sealing; getting this correct is essential
- PTFE – in most cases is used to provide an “inert”/barrier layer facing the sample

**Pierce** and **Tear force** testing are important vetting steps to determine septum appropriateness after all septa are a component which directly interacts with moving components of the instrument.
Making a septum

**Step 1:** Source the raw materials

**Step 2:** Form the “Glob” and press it into sheets, as well as “curing” the material

**Step 3:** Punch the sheets to form septa

*Curing* is done to polymerize the layers insuring a bond between the PTFE and the silicone.

See more about curing in Slide 49
When 2 becomes one
Combining the cap and septa

We are nearly there…

✓ Now take the cap and either manually or automate the placement of the septa within the cap
✓ Agilent uses automated systems which lower the variability of manual placement
✓ We offer caps in both pressfit and bonded varieties

Why do you now recommend bonded caps? Bonding is a newer technology which keeps the septa from being pushed out of the cap. No chemicals are used in the adhesion process.
Resources available

General Reference poster

Agilent Vials and Sample Containment Solutions

CONSISTENT QUALITY, MAXIMUM PRODUCTIVITY

Why settle with your results? Agilent vials are the only vials that deliver time-saving, and cost-saving, advantages like these:

30+ improved yields. Do more with less using higher quality, better-designed vials.

10+ increased speed. Get more out of your operation with better vials.

127 real growing. Customers are not only more productive, but also more profitable.

100s of millions of vials sold per year. Vials are used worldwide.

50% lower costs. Lower costs for customers. More money saved per year.

33/51 users choose Agilent vials. "It's faster, cleaner, more consistent."

120 seconds. With Agilent vials, you can do it all.

For an in-depth look at the Agilent Vials portfolio, including product brochure, case studies, and white papers, visit www.agilent.com/chem/vialresources

Choose the right vials for your sample

Every sample's needs are different. Choosing the right vials ensures you get the most out of your application. Click on the right data sheet for your application.

Publication no. 5991-6960

September 21, 2017
How large does your sample container need to be?

The optimal sample size can be a function of many things, including analysis type, analytical platform, and sample availability. Agilent vials offer the same consistent performance across the entire size range, from 15 µL to 60 mL. What’s more, they are manufactured to perform seamlessly with a variety of analytical instruments—regardless of make or model.

Sample Volume

<table>
<thead>
<tr>
<th>Sample Volume</th>
<th>&lt; 2 mL</th>
<th>2 mL</th>
<th>&gt; 2 mL</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 µL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Microvials</td>
<td>(15 µL to 80 µL)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High recovery vials</td>
<td>(30 µL to 1.5 mL)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inserts</td>
<td>(100 µL to 400 µL)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wellplates</td>
<td>(150 µL to 1.2 mL)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polypropylene vials</td>
<td>(250 µL)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Microcentrifuge tubes</td>
<td>(500 µL)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vials with integrated inserts</td>
<td>(250 µL to 300 µL)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glass vials</td>
<td>(2 mL)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polypropylene vials</td>
<td>(2 mL)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deactivated/silenced vials</td>
<td>(2 mL)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 mL vials</td>
<td></td>
<td></td>
<td>For Archon purge and trap</td>
</tr>
<tr>
<td>6 mL vials</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Headspace vials: (10 mL to 20 mL)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High recovery vials</td>
<td>(5 mL)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storage vials</td>
<td>(4 mL to 40 mL)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test tubes</td>
<td>(3.5 mL to 60 mL)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
What do they look like when filled?
Good chemistry?

Always make sure the septa you select are chemically compatible with your sample and solvent. Use this chart as a guide, but remember that chemical compatibility can vary based on solvent concentration, molecular weight, and temperature.

### Septa Chemical Compatibility

<table>
<thead>
<tr>
<th></th>
<th>PTFE</th>
<th>PTFE/Silicone</th>
<th>PTFE/Silicone/PTFE*</th>
<th>PTFE/Red Rubber</th>
<th>PTFE/Butyl</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetonitrile</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Hydrocarbons (hexane, heptane, methane)</td>
<td>+</td>
<td></td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Methanol</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Benzene</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>THF</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
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<tr>
<td>Toluene</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>DMF</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>DMSO</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Ether</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
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<tr>
<td>Chlorinated solvents (methane chloride)</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Alcohols (ethanol)</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Acetic acid</td>
<td>+</td>
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<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Acetone</td>
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<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Phenol</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Cyclohexane</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

*PTFE/Silicone/PTFE* charts the chemical compatibility of PTFE ONLY DATA (NOT DPOD).
Put a cap on it
And don’t forget about the septum combination!

Use this chart to determine the right cap and septa combination, based on your application. Note: septa that are too thick can prevent the cap from fitting properly on the vial.

### Cap and Septa Compatibility

<table>
<thead>
<tr>
<th>Part number</th>
<th>High Performance Septa</th>
<th>Thin PTFE</th>
<th>PTFE/Silicone*</th>
<th>PTFE/Silicone/PTFE*</th>
<th>PTFE/Red Rubber</th>
<th>PTFE/Butyl</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5190:3886 (18 mm)</td>
<td>6062:3682 (11 mm)</td>
<td>5190-7021 (9 mm)**</td>
<td>5182-0723 (9 mm)</td>
<td>5181-1210 (11 mm)</td>
<td>5183-4479 (20 mm)</td>
</tr>
<tr>
<td>Temperature range</td>
<td>40 to 300 °C for up to 1 hour</td>
<td>Up to 260 °C</td>
<td>-40 °C to 200 °C</td>
<td>-40 °C to 200 °C</td>
<td>-40 °C to 90 °C</td>
<td>-50 °C to 150 °C</td>
</tr>
<tr>
<td>Use for multiple injections</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Price</td>
<td>Most expensive</td>
<td>Very economical</td>
<td>Economical</td>
<td>Most expensive</td>
<td>Very economical</td>
<td>Economical</td>
</tr>
<tr>
<td>Resistance to coring</td>
<td>Excellent</td>
<td>None</td>
<td>Excellent</td>
<td>Excellent</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Recommended for storage</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Best for</td>
<td>High temperature headspace applications</td>
<td>Superior chemical inertness, short cycle times, and single injections</td>
<td>Most common HPLC and GC analyses, not as resistant to coring as P/S/P</td>
<td>Superior performance for ultra analyses, repeat injections, internal standards</td>
<td>Chlorosilanes more economical option for single injections</td>
<td>Organic solvents, acetic acids, impermeable to gasses</td>
</tr>
</tbody>
</table>

1. Agilent silicone is peroxide cured; making it more inert and less likely to interfere with samples.
2. *Note available in limited quantities.
3. The above options are just a few; many more are available.

September 21, 2017
How can vials reduce common **pains** you face?

**Working with vials and caps**

**What’s on your mind?**
- Productivity
- Client satisfaction
- Cost efficiency
- Technical problem
- Downtime

**Procuring vials and caps**

**What’s on your mind?**
- Financial benefit
- Strategic partnership
- Simplified buying process
- Purchasing costs
## Common productivity issues faced if you are a **Purchasing Manager**

<table>
<thead>
<tr>
<th>Issue Type</th>
<th>Is it common?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reducing labor costs</td>
<td>Yes</td>
</tr>
<tr>
<td>Reducing downtime</td>
<td>No</td>
</tr>
<tr>
<td>Increasing throughput</td>
<td>Yes</td>
</tr>
<tr>
<td>Improving well-being</td>
<td>No</td>
</tr>
<tr>
<td>Product availability</td>
<td>No</td>
</tr>
<tr>
<td>Training and support</td>
<td>No</td>
</tr>
</tbody>
</table>
Common productivity issues faced if you are a **Scientific/Technical user**

<table>
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<tbody>
<tr>
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<tr>
<td>Training and support</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Co$t versus benefit$ of using better vials

Choosing the correct vial or cap can...
✓ Limiting sample reruns
✓ Limit downtime
✓ Lower Instrument repair and service calls
✓ Reduce troubleshooting
✓ Improve customer well-being
✓ Reduce environmental impact

Refer to Business Case Publication no. 5991-7845EN
Business Cases
Positive financial Impact of switching to Agilent A-Line vials

Crimp your vial not your style

*Does your customer crimp loads of vials daily?*

Help your customer to…

✓ Save time
✓ Get a better seal
✓ Increase productivity
✓ Consistency of crimping performance

[YouTube Video](https://www.youtube.com/watch?v=9VNQXr0FbXc)
The right vial is only a few clicks away

Use our online selection tool to quickly find the right products for complete confidence in your sample containment.

- Answer a few simple questions to identify your best options
- Search by technique, product number, vial type, or instrument manufacturer
- Make a perfect pick from more than 600 vials, caps, and septa

Go to [www.agilent.com/chem/selectvials](http://www.agilent.com/chem/selectvials)

Learn more
[www.agilent.com/chem/vialsresources](http://www.agilent.com/chem/vialsresources)

Find a local Agilent customer center in your country
[www.agilent.com/chem/contactus](http://www.agilent.com/chem/contactus)

USA and Canada
1-800-227-9770
agilent_inquiries@agilent.com

Europe
info_agilent@agilent.com

Asia Pacific
inquiry_lsca@agilent.com

India
india-lsca_marketing@agilent.com
You should now be able to….

✓ Better describe vials*, caps*, septa* and inserts*
✓ What makes a “better” vial
✓ How vials* work together to provide confidence in sample containment
✓ Available ranges for each
✓ Making better choices based on application
✓ How vials can impact lab productivity
✓ Why aren’t vials considered a more important part of the flow path
✓ Why Agilent should be your one stop shop for sample containment

*For the purposes of being succinct I may refer to “vials” when discussing all products underlined above
THANK YOU FOR YOUR LISTENING

DO YOU HAVE ANY QUESTIONS?
Appendix
Resources available

2 White Papers for more details on Septa and Vials

Take a closer look at the Agilent Vials Portfolio

IN-DEPTH WHITE PAPERS
See how analysts are using Agilent vials to minimize retention time shifting, peak tailing, poor resolution, and asymmetric peaks

An Agilent Septum is Not Just a Septum

An Agilent Vial is Not Just a Vial
Vials brochure

Downloadable

Link: https://www.agilent.com/cs/library/brochures/5990-9022EN_LR.pdf

Contains: 450+ products

Chemical compatibility charts

Our latest advances with technical explanations
Curing (or Conditioning)
The art of limiting siloxane bleed while improving ease of use

Previously we discussed how the raw material is converted into the glob, rolled out and stamped into septa. I mentioned “curing”; let’s go into more detail on this very important step…

Curing is an important step improving the septa performance:

• **Chemical:** Curing longer produces lower bleed but has a negative impact on the physical or mechanical structure of the material.

• **Mechanical:** Curing (or conditioning) makes the septa harder making it more difficult for the autosampler needle to penetrate.

• **Chemical/Mechanical:** Getting the balance right between the need for lower bleed and material malleability is the “art”.

*Agilent’s range of septa provides exceptional overall performance (chemical and mechanical)*