

## How are RSA vials different from all other autosampler vials - FAQ

Using a proprietary processes of precision manufacturing, RSA™ (Reduced Surface Activity) autosampler vials are **superior for chromatography to all other vials** on the market since they are not only made to exact tolerances for your autosampler, they are manufactured for your sample chemistry as well.

When ordinary and “certified” commercially available autosampler vials are made, they are constructed from long lengths of borosilicate glass, tubing stock made to exact tolerances and chemical specifications. The tubing is placed into vial converting machines that use high heat to soften and tool the tubing into vials with dimensional characteristics such as necks, threads and bottoms. To achieve the lowest cost, these machines run at very fast speeds with petroleum lubricants (organic contaminants) to soften the glass quickly enough to tool them properly and to achieve production goals. This **excessive heat** drives contaminants and metals to the glass surface and is a very common production side-effect and well known in the glass industry.

During this process of intense and rapid heating some of the glass becomes a gas and will quickly cool and sublimate onto the surface of the vial in the form of sodium borates & silicates either a powder or particles. This material is not covalently bonded to the glass and will greatly vary in amount from vial to vial and lot to lot depending on the amount of heat that was used on each individual vial station. The amount of heat that’s used is determined by the speed of the vial machines and units made per minute. The “**silicate material**” can be pH sensitive, adsorb basic compounds and will “delaminate” or come off the vial under certain conditions. Silicate materials have been somewhat responsible for



giving glass its undeserved negative reputation for some compounds and samples.

To eliminate vertical and horizontal strain created from the high heat and rapid softening of the glass, the vials must be **annealed at 1,200 - 1,400°F**. It's during this step that all organic material that might have been present from handling, air or packaging is completely burned off.

The usable maximum temperature for RSA Autosampler Vials is approximately 300°C (572°F).

Some manufacturers will use a “**cleaning**” process with water, acid or surfactants to remove the silicate from the vial. This only introduces new contaminants to the vial in the form of residue from cleaning materials, air or the actual gas used to dry the vials. Even with all attempts to clean the vials of silicate, it is still almost impossible to remove all of it once its formed. Since organic materials are burned off during the annealing process, cleaning steps have no benefit and can actually make the vials non-compatible for LCMS/MS.

RSA™ or Reduced Surface Activity glass vials are manufactured in the same manner as stated above except a **process of precision heat and control** virtually eliminates the gaseous state that develops and avoids the formation of the silicate layer/powder and all its drawbacks as stated above. Since the silicate is not formed and subsequently the problems associated with it are eliminated. As there is no silicate to remove, there is no cleaning process required for RSA™ vials to achieve the cleanest, least reactive vials on the market.

What results is clean, pure, borosilicate glass, LCMS/MS compatible vial with **ultra-low levels of metals** or organic



materials with perfect fit and form to extremely tight dimensional tolerances. All vials are then tested by LCMS for adsorption of basic compounds, metal content (ICP-MS) and for pH changes over time that would be due to the silicate.

To preserve this manufactured state of the vials, they are immediately packaged in a **Class 100,000 clean room**, under ISO conditions by robotic means. Never touched by human hands RSA vials are shipped pyrogen and contaminant free.

It is also important to note that the **write-on-patches** of the RSA vials are “**ceramic patches** and not an epoxy paint like most competitive products. Under some conditions, the epoxy will outgas while in the containers and contaminate the vials. This will not happen with RSA vials that always have ceramic write on patches that will not smear when you write on them. The patch is permanent and will not come off under any conditions even when being put into liquid Nitrogen storage. They are impervious to any solvents or alcohol.



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