Synopsis of RSA-Pro™ Glass

INTERNAL ONLY AND CONFIDENTIAL

July 2016

1. QIS/ARC has developed what they claim is a proprietary, improved way to use Vapor Deposition (VD) to deactivate laboratory glass. The process of VD is well known and been used by scientists like Tom Sabatino of Analytical Procedures for years but QIS claims to have found a way to improve the efficiency and effectiveness of VD by making modifications to the process. VD, using their technique ends with covalent bonding of agents on the surface of the glass and the covalent bonding makes them “impervious” to degradation of the coating according to Allen Ross, I would caution you not to use these terms with customers as nothing is impervious to degradation of the coating. RSA-Pro™ glass can be steam sterilized without reverting to ordinary glass. This only applies to RSA-Pro™ and not RSA because high heat will degrade RSA vials and will populate silanols on the surface.

2. RSA-Pro™ is pretty much a a product of a better way to silanize… however there are some important issues here.
A. For RSA-Pro™, we are starting with low surface activity glass and it is considered pristine glass with no foreign material on the glass (this is critical to the RSA-Pro™ effectiveness).
B. Most ordinary glass products (non RSA) are contaminated with borax powder, glass powder and other foreign materials (such as what comes from China and World Wide Glass) that will “block” the coating process during VD and when these materials come off the surface, they leave behind areas on the glass that are not coated. The deactivating reagents are covalently bonded to these materials and not the glass surface. This is very common which is why most companies that silanize will never promise 100% silanization and there is often still VARIABLE loss of analyte from vial to vial, insert to insert.

3. **NOTE**: we can buy AQ brand (Waters Certified) deactivated or RSA deactivated (with the same reagents) and the coating will be close but from what they tell me, only the mRSA is so effective (due to the starting substrate) and “blows away competition” when effectiveness is compared in the field, and QIS will share data to prove that in August 2016. Essentially, when

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the glass substrate (starting vial) is as pristine as RSA glass, the results are greatly improved especially for consistency from vial to vial.

4. **NOTE**: For all dealers that buy from QIS or ARC, they can purchase DA product using the new QIS deactivation process which includes anyone that is a dealer for them, not just the selected six (Waters, Sigma, Shimadzu, Grace, MTC & Leap). They do not sell "certified or RSA" product to anyone other than the selected six.

5. RSA-Pro™ (like other silanized vials) is hydrophobic in nature but is not charged and is pretty much neutral

6. RSA-Pro™ is what QIS and ARC call LADA or Low Adsorption DeActivated.

Synopsis: RSA-Pro™ is deactivated glass that most likely will perform better than most other silanized products even though it is pretty much the same thing only with a much better coating process and better chances of 100% coating. So if a customer is using silanized vials or inserts, they may not like silanized product because what they have used in the past may have had non coated areas in their vials or inserts and was not as effective as it could be where RSA-Pro™ likely will solve their problem. RSA-Pro™ is better than RSA for compounds like neutrals, proteins, peptides and some compounds. Also, RSA-Pro™ can be steam sterilized and RSA cannot.

Silanizing does not solve the problem for everyone because of the nature of the analytes. However, since RSA solves the problem for bases sticking, RSA-Pro™ can solve the problem of acids, bases, neutrals and hydrophilic compounds adsorption. If a customer's analyte is still sticking to RSA-Pro™, QIS is willing to develop custom coatings for them on an ad hoc basis.

Silanizing is a way to deactivate glass. There are other ways to deactivate glass so do not confuse the two definitions. Like all thumbs are fingers, not all fingers are thumbs.

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