A vial that is listed as 2mL is defined as the entire fill volume, with no headspace when the cap is secured. In practice though, a sample solution cannot contain this much volume because of displacement caused by the syringe needle during injection causing the autosampler to inaccurately withdraw the solution.

For this reason, a 1.5mL of “useable volume” can be suggested when possible.

The images below shows the same “2mL vial” filled with different amounts of solution to demonstrate common nominal volume used in the industry, where nominal volume is defined as “stated or expressed volumes but not necessarily corresponding exactly to the real value”.

As shown above the Volume of a 12x32mm screw vial when completely filled, it will contain approximately 2mL. This volume for Autosampler filling is called a total fill volume. When other volume designations are used, this is called a nominal volume.

If Vials are overfilled, when the Autosampler Needle is inserted, it may not have the Headspace Volume that is necessary to remove and displace liquid. This may cause a pressure differential function *(i.e.* vapor lock, partial vapor lock, or instantaneous pressurization during penetration) condition or alignment issue. By the needle not having air to displace the Solution, the Autosampler Needle may not be allowed to draw the correct amount of Sample. This can lead to failed %RSD values in peak amount.

Note: *It is also prudent to check the method’s needle aspiration speed to ensure that it is not too high. Viscous samples require a lower draw speed or else a partial fill may occur, which may also lead to inaccurate measurements.*

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