

## Paint Volume Solids Test Methods

Quote from a large international paint manufacturer: "We have been having ongoing discussions with *large Customer X* regarding the volume solids figure we quote for one particular type of system. They dispute what we quote because they occasionally run out of paint. It seems that the figures you obtained (using Wolf Innovation PVS1®) from the samples we sent are more in line with their findings. Traditionally we have done our determinations for 90 minutes at 125°C but see a reduction of about 3% at 165°C, however this still does not equate to what is happening on the line".

The above quote is what we would expect. **Paint property results depend as much on the test procedure as on the property itself.** Volume solids results determined using different methods and apparatus will not line up; the paints are applied at different thicknesses and cured under different conditions and the amount of solvent driven out of the paint will vary.

Furthermore the tests covered in Standard test methods such as ASTM are characterized by solvent loss from the paint sample prior to the first measurements of mass. This leads to further errors in the final result. It is unreasonable to expect the same results for paint volume solids for the same paint sample using two different test methods. Even the relative ranking of a series of paints based on two measurement methods could be different.

Standard test methods in use for the determination of paint volume solids and related properties are covered by Australian and American standards including ASTM 2369, ASTM 3960, AS 1580.301.2 and AS 1580.301.xx (a revision). The methods are based on taking a known volume of wet paint, applying that to a metal disc or an aluminum surface, drying the paint, then measuring the mass and the density of the dried paint film.

The density of the wet paint must be determined, the volume of the paint sample must be measured, and density and weight of the dried paint film and the final volume of the dried paint are all measured using intricate laboratory techniques. Each of these steps requires exacting precision and each of these steps will introduce small errors. In short the techniques are complex, time consuming, and provide results that are influenced by the procedure itself. The results can be variable and inaccurate.

To compensate for the variability of these test results duplicate or triplicate testing is required and the results are then averaged. The time to test just one sample can be many hours – the best part of a working day. Issues such as paint viscosity, degree of gloss, and thixotropy also limit the range of paints for which the methods can be used.

The Wolf Innovation PVS1® paint volume solids instrument overcomes these limitations using a very simple approach. A small paint film is applied to a substrate, the wet thickness is measured using a high fidelity sensor, the paint is cured and finally the dry film thickness is measured providing all of the measurements needed to determine the final PVS result.

The degree of cure is aligned with what occurs on your paint line so the results relate directly to the paint consumption of practical importance to the running of your line. Very short sample **preparation time limits solvent loss prior to the first wet film thickness measurement. Measurements made by Wolf PVS1 eliminate the human factor and the need for exacting laboratory technique. The upshot is much greater repeatability, ease of use, and accuracy of results. However the biggest benefit of the Wolf PVS1 is the speed of the test.**

Instead of a complex procedure that takes hours a result is completed in 3 minutes. Duplicate tests can be performed quickly if needed; and they are accomplished with a high degree of accuracy and utility in the final result.