Understanding How the System Works

How the measurement system works

Dry film measurement is performed by first boring a shallow crater in through the coating(s) surface and into the substrate. By boring a shallow crater through the paint films to the substrate, exposing the different layers of paint, the crater is then viewed through the video microscope system. By magnifying this crater through the video microscope system and viewing it on the high-resolution monitor, the different film layers are visible. The image on screen is magnified up to approximately 320 linear magnification. The actual measurement is done with the digital micrometer using a cross hair line generator to line up the beginning and termination points for the measurement. The reading is then divided by ten.

Technical Details;

To achieve a very high degree of accuracy the angle of the borer bit used shaves a very shallow crater. You need only to penetrate through the film coating(s) exposing the substrate to obtain a measurement. The film layer width exposed by the borer bit's shallow angle is 10 times greater than the actual film thickness.

To establish the angle required to visually increase the paint film thickness by a factor of ten is a simple calculation using a table of trigonometric function.

From these tables we have established an angle of 5° 42' 38"

Example
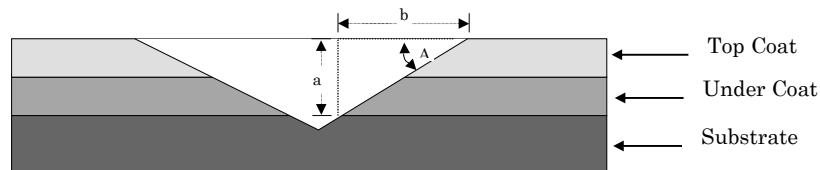
To find angle A using the formulas for the solutions of right-angled triangles, tan A=a/b.

Assume side a=1, side b=10 ∴ tan A =1/10 = tan A=.10, this translates to 5° 42' 38"

∴ angle A=5° 42' 38"

Measurement example showing benefits of ten X factoring.

Sample film thickness is .0008" (8/10,000 commonly referred to as eight tenths) thick: - the width of the film layer exposed by the borer bit is 10 times greater than the actual paint thickness, i.e., .0008 x 10 =.008 (8/1,000), this width is readily measured by the digital micrometer head reading to a resolution of .00005" (50 millionths of an inch), and when projected on to the monitor screen this is further enlarged. On screen this image is approximately 2" wide, so it is an easy matter to line up the cross hair on the enlarged image. Any error or lack of consistency on the part of the operator in lining up the cross hair to the edge of the film is minimized. This error is only 1/10 of the actual film thickness, repeatability of better than +/- .00005 (50 millionths of an inch) is readily obtained.