

### THE RELATION OF DRY FILM THICKNESS TO PAINT DURABILITY

A paint film by any standards is very thin, so thin that it is measured in thicknesses of 1/1000 of an inch or "mils". Paint labels or data sheets often specify the number of dry mils needed to achieve warranted results or optimum product performance.

The following is used to calculate the number of dry mils which can be obtained from a wet coat of paint: One gallon of paint spread at 1 mil wet thickness will cover 1,604 square feet. 1,604 divided by the paint's recommended spread rate will give the number of wet mils the paint will yield at the recommended spread rate. When the wet mil thickness is multiplied by the percentage of product volume solids, it reveals the dry mil film thickness of the paint.

The volume solids of a paint indicate how much dry paint will remain on the surface after the volatiles have evaporated. The volatiles include the liquid portion of paint: the solvent, additives, etc. These liquid ingredients are necessary for the paint to glide on smoothly and flow and level to a smooth uniform film. Aside from assisting application properties, stability and film formation, volatiles do nothing to add to the durability of the paint. Once evaporated, what remains (the solids) is what forms the dry film. If two paints of identical quality ingredients are applied at equal rates, yet one has higher volume solids, the one with the higher solids will be more durable because it will leave a thicker protective coating.

Paint not only protects the surface from attack by weather, but can also support dimensional stability of a substrate when properly applied. Multiple coats of paint, such as one primer coat and finish coats, properly applied with adequate dry time between coats, are always better than one thick coat. This is true for several reasons. First, over-building paint at too great a thickness may result in "mudcracking". Mudcracking takes its name from the appearance of a dried mudhole where water has evaporated, leaving stress cracks on the surface. Mudcracking is unsightly in itself, and it may also lead to adhesion loss. Mudcracks are also a great place for dirt to collect and mildew to get a foothold. Mudcracks weaken a film's integrity.

Another reason multiple coats are advantageous is because laminates of paint films are tougher than a single heavier film. They would be more forgiving in the expansion and contraction which normally takes place. This would transpose into greater grain crack resistance and better adhesion. It is recommended that primer and topcoats be from the same manufacturer, since they are designed to be used together as a system.

A three-coat paint system applied to an unpainted substrate is optimum. The primer serves as the "anchor" and should be selected carefully with no expense spared. This anchor will, after all, be the base for all future coatings ever applied to the surface. Finish coats are formulated using more prime pigment than primers, so they naturally cover or "hide" better. The prime pigment, high quality titanium dioxide, is a chief protector of the surface from penetration by ultraviolet sunlight. When two coats of a typical paint are applied, a dry film thickness of 3-4 mils is typically obtained.

Paint films erode very rapidly in the South Florida sun. Ultraviolet light is very intense in South Florida, and it acts to break down paint into a fine powdery substance called "chalk". As paint chalks and weathers away, part of the paint film is lost. Over time, paint can completely chalk away exposing the primer, or if left neglected too long, the substrate can become exposed to the detrimental effects of weathering. Wood can split, warp or rot, and mildew can grow on the unprotected surface. Masonry surfaces, such as block or stucco, can absorb water, sometimes leading to interior damage. Pressure washing and sealing with a penetrating chalk sealer are then required before recoating, increasing costs in time and materials.

Testing dry paint thicknesses on substrates other than smooth ferrous metals is difficult and unreliable, especially when testing irregular surfaces. It is better to check the paint thickness during application, while it is still wet, and calculate the dry film thickness using the method given above.

Flex Bon requires minimum mil film thicknesses and proper primer and finish combinations for any job where warranty is requested. Wet film gages are available through your Flex Bon Factory Representative.