

VOLUME SOLIDS

Volume solids is the portion of a freshly applied (wet) paint film that stays on the surface as a dry paint film after the water/solvent phase evaporates. In other words, it indicates how much of the material you apply to the surface actually becomes the final dry paint film.



Coverage and Film Build

Generally, when other variables are similar, higher volume solids means more dry coating is delivered per gallon when targeting a specific dry film thickness (DFT). It also impacts film build: if two products are applied at the same wet film thickness (WFT), a higher-solids coating will typically yield a thicker dry film because more of the applied film remains on the surface. Since film build affects gallons required, and the time and labor needed to complete a job, volume solids is an important consideration for estimating, planning, and specification.

Using Volume Solids

Volume solids is typically listed on a Product Data Sheet (PDS) as “Solids by Volume” or “% Solids by Volume.” When estimating coverage (spreading rate) or calculating film build, solids by volume is the value to use—not solids by weight. A widely used approach for estimating theoretical coverage at a target dry film thickness (DFT) is:

$$\text{Theoretical Coverage (sq ft/gal)} = \left(\frac{1604 \times \text{Volume Solids (as a decimal)}}{\text{DFT (mils)}} \right)$$

DFT may also be determined from the measured wet film thickness (WFT) using the following formula:

$$\text{DFT (mils)} = \text{WFT (mils)} \times \text{Volume Solids (as a decimal)}$$

By rearranging the DFT formula, you can estimate the wet film thickness required to achieve a specified dry film thickness.

$$\text{WFT (mils)} = \text{DFT (mils)} \div \text{Volume Solids (as a decimal)}$$

Here's the applied example: For a 5,000 sq ft area at a 1.5 mil target DFT, a coating with 30% volume solids (0.30) provides a theoretical coverage of ~321 sq ft/gal, requiring roughly 16 gallons. A coating with 40% volume solids (0.40) provides ~428 sq ft/gal, requiring roughly 12 gallons. At the same target DFT, the higher solids product therefore reduces the total gallons required. **Note:** Actual coverage is affected by surface texture, porosity, and application method, and these estimates do not account for material loss associated with spraying.

Product Comparison Using Volume Solids

When comparing volume solids across products, the value should be considered in the context of the coating's intended use and market position (e.g., new residential construction, residential repaint, commercial, or specialty), because not all "solids" contribute equally to performance. Two coatings can have similar or even higher volume solids yet perform very differently depending on resin quality and the pigment package (the balance of prime pigments that drive hiding versus extender pigments). For example, some new construction flat paints may show relatively high volume solids because a larger part of the solids comes from extenders. While extenders can support application characteristics and cost targets, they may not deliver the same durability, stain resistance, or long-term performance as a higher-quality formulation. For this reason, volume solids is best used as a planning and comparison metric alongside the product's service level, resin system, recommended film build, and the performance properties listed in the product data sheet.

Key Takeaways

Volume solids is an important parameter—but it is not a standalone predictor of performance. Hiding/opacity, durability, ease of application, and overall results depend on the full formulation and on jobsite conditions such as surface porosity and texture, the magnitude of the color change, application method, temperature and humidity, and workmanship. Rough or porous substrates (e.g., unsealed masonry, CMU, or drywall) often reduce real-world coverage compared with theoretical estimates, and major color changes may require a primer and/or additional coats. When film build is critical, a wet film gauge can help verify applied thickness and improve consistency (Figure 1). All calculations are theoretical—always follow the product label and product data sheet for application requirements and expected performance.



Figure 1

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