



SPREADING RATE / COVERAGE

General Information

Theoretical Spreading Rate / Coverage

The Theoretical spreading rate or coverage of a coating is a function of the volume solids. The volume solids is the percentage of the coating consisting of binder and pigments which remain on the substrate, forming the final paint film after the volatile components or solvents evaporate.

In the U.S. measurements, one U.S. gallon of paint with 100% solids by volume will cover 1,604 square feet of surface area at a dry film thickness of 1 mil. The theoretical coverage of any coating can be calculated from the following formula, *knowing the solids by volume (SBV) and the desired dry film thickness (DFT)*:

$$\frac{1604}{\text{DFT (mils)}} \quad \times \quad \text{SBV} \quad = \quad \text{Theoretical Coverage}$$

Example:

65% solids by volume coating applied at 5.0 mils dry film thickness

$$\frac{1604}{5} \quad \times \quad (0.65) \quad = \quad 208.52 \text{ square feet per gallon}$$

In metric measurement, one liter of paint with 100% solids by volume will cover 1,000 square meters of surface area at a dry film thickness of 1 micron. To calculate the theoretical coverage of a coating in metric units, utilize the following formula:

$$\frac{1000}{\text{DFT (microns)}} \quad \times \quad \text{SBV} \quad = \quad \text{Theoretical Coverage}$$

Example:

65% solids by volume coating applied at 125 microns dry film thickness

$$\frac{1000}{125} \quad \times \quad (0.65) \quad = \quad 5.2 \text{ square meters per liter}$$

Practical Spreading Rate / Coverage

The theoretical formulas above assume that all the coatings (except solvents) are uniformly applied to the substrate with no over spray or application loss. The theoretical coverage is used in calculating cost comparisons between coatings systems and suppliers and establishes a factual starting point from which the practical spreading rate/coverage can be estimated. The practical coverage makes allowances for application losses and is a more reliable indicator of what will be experienced in the field. Application losses are affected by many factors, including wind, application technique, application equipment, and type/profile of the substrate to be coated. Loss factors vary depending on the specific situation.

The practical coverage/spreading rate of a coating are calculated as follows:

$$\text{Theoretical coverage} \quad \times \quad (1-\text{loss factor}) \quad = \quad \text{Practical Coverage}$$

Example:

Theoretical coverage of 200 square feet per gallon at recommended dry film thickness
Loss factor of 30%

$$200 \text{ sq. ft./gal} \quad \times \quad (1-0.30) \quad = \quad 140 \text{ square feet / gallon}$$

Paint Consumption

In order to estimate the total number of gallons necessary for a specific job, it is necessary to know the total area to be painted. Theoretical and/or practical paint consumption estimates can then be calculated using the following formulas:

$$\frac{\text{Total Area (ft}^2 \text{ or m}^2\text{)}}{\text{Theoretical Coverage (ft./gal}^2 \text{ or m/l}^2\text{)}} \quad = \text{Theoretical Consumption (Gal or L)}$$

Or

$$\frac{\text{Total Area (ft}^2 \text{ or m}^2\text{)}}{\text{Practical Coverage (ft./gal}^2 \text{ or m/l}^2\text{)}} \quad = \text{Practical Consumption (Gal or L)}$$