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Cost Considerations

It is often difficult to select from a number of apparently equally suitable paint systems the one which is most economical and therefore the one which should be chosen for the job in question.

There is only one certain way of making a decision and this is dependent on the Volume Solids of each paint. Volume Solids is expressed as a percentage and means the Volume of solid material contained in the paint and that which forms the dried film of the paint after application. The remainder of the paint evaporates, this being the solvent or thinner necessary for the process of application.

For example, the paint may contain 50% Volume Solids. This means that 50% of the volume is deposited during application and the remaining 50% evaporates. This also means that to apply a dry film thickness of 25 μm, a wet film thickness of 50 μm must be applied. It is possible to have paints of 100% solids, usually called Solventless and with these there is no volatile content and a dry film thickness will be the same as wet film thickness applied. It is essential that the Volume Solids of each paint is known, together with the cost per litre. These figures permit the easy calculation of the number of square metres covered by a litre of paint at the specified film thickness and the cost per square metre. The Volume Solids of each product dealt with in this Manual is shown on the reverse side of the Technical Notes.

NOTE 1
1μm = 1 micrometres = 10^{-6} metres.
The use of the term micron, symbol μ, should be avoided.

NOTE 2
D.F.T. – Dry Film Thickness.
One litre applied at a wet film thickness of 25 μm will theoretically cover an area of 40 square metres.

$$\text{Coverage in square metres per litre} = \frac{\text{\% Volume Solids x 10}}{\text{D.F.T. in micrometres required}}$$

$$\text{The paint cost of this application} = \frac{\text{Cost per litre of paint}}{\text{Square metres per litre}}$$

The important factors in the cost considerations of a paint are its coverage and its cost to give a dry film thickness of 25 μm. From these two it is possible to determine the cost in terms of cents per square metre per litre of paint at a particular dry film thickness.

Thus:

$$\text{Coverage at 25 } \mu\text{m D.F.T. per litre} = \frac{\text{\% Volume Solids x 10}}{25}$$

$$\text{and cents per square metre per litre at 25 } \mu\text{m} = \frac{\text{cents per litre}}{\text{sq. metres per litre at 25 } \mu\text{m}}$$

When it is not clear at first glance which paint will prove the most economical, the foregoing simple calculation provides the answers.

EXAMPLE

1. Paint A costs $5.60 per litre, volume solids 33%.

   Coverage per litre for each 25 μm = $\frac{33 \times 10}{25}$ = 13.2 sq. metres

   Cents per square metre for each 25 μm = $\frac{560}{13.2}$ = 42.4 cents

2. Paint B costs $7.69 per litre, volume solids 53%.

   Coverage per litre for each 25 μm = $\frac{53 \times 10}{25}$ = 21.2 sq. metres

   Cents per sq. metre for each 25 μm = $\frac{769}{21.2}$ = 36.2 cents

Whilst the cost per litre of paint B is greater, it is in fact actually cheaper, because of its higher Volume Solids. It is therefore of the utmost importance that Volume Solids be the only basis for acceptance or rejection of a paint or paint system. Note that "solids by weight" is a figure that is meaningless and should not be used as a basis of evaluation under any circumstances.

Total paint cost for a particular job is given by:

Number of litres required = $\frac{\text{Total sq. metres to be painted x Dry Film Thickness required}}{\text{Coverage at 25 } \mu\text{m D.F.T. per litre}}$

Total Cost = No. of litres x cost per litre

In actual practice, theoretical coverage is rarely obtained and an allowance for paint loss must be considered. These factors include the type of surface being painted, type of application, weather conditions, spillage and other wastage, and so on.

Theoretical coverage figures calculated from volume solids should be amended with due allowance for loss and costs calculated from an assessed practical coverage.

Practical Coverage = Theoretical Coverage x Surface Roughness Factor x Application Condition Factor

SURFACE ROUGHNESS FACTOR COATS	PRIMER COAT	BODY & FINISH
New smooth steel, picked steel	0.95	0.98
Blast Cleaned Steel	0.90	0.95
Power Tool Cleaned	0.85	0.90
Blasted – Lightly pitted steel	0.85	0.90
Blasted – Heavily pitted steel	0.80	0.85
Rough Concrete or Masonry	0.60	0.75

APPLICATION CONDITION FACTOR	ALL COATS
Brush or Roller	0.90
Spray – interior	0.80
Spray – exterior *	0.70

* Subject to wind – if spraying in wind, this factor will be lower than 0.70.

For example, consider a priming paint of volume solids 54.5% having a theoretical coverage of 10.9 sq. metres per litre, giving 50 μm film thickness being applied by spray (no wind) to a heavily pitted blast cleaned steel tank.

Practical Coverage = 10.9 x 0.80 x 0.70
= 6.1 sq. metres per litre

The above figures are satisfactory for use on profiles up to 75 μm for higher profiles add 25 μm extra for each 25 μm higher than 75 μm to the dry film thickness to be applied.