Additional Information

Paint Application

INFORMATION

IMPORTANT NOTE

Whilst we endeavour to ensure that all advice we give about the product is correct, the information given in this data sheet is not intended to be exhaustive and any person using the product for any purpose other than that specifically recommended in this sheet without first obtaining written confirmation from us as to the suitability of the product for the intended purpose does so entirely at his own risk. As conditions of use, method of application and suitability of the substrate prior to painting are beyond our control, no guarantee is implied by the recommendations contained herein. We therefore do not accept any liability whatsoever or howsoever arising from the performance of this product or for any loss or damage arising out of the use of this product. The information contained in this sheet is liable to modification from time to time in the light of experience and ongoing product development programmes. It is the user's responsibility to ensure that this sheet is current prior to using the product

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INTRODUCTION

The objective in applying a coating is to provide a film which will give protection and/or decoration to the surface being painted. The success of any paint application will be governed by a number of parameters, including:

- Surface preparation
- Film thickness
- Methods of application
- Conditions during application

These are discussed below.

SURFACE PREPARATION

The importance of surface preparation to the success of a coating system cannot be over emphasised. For details on surface preparation please refer to the Speccoats™ document Surface Preparation: Metallic Surfaces.

FILM THICKNESS

An adequate film thickness is essential for the success of any coating system. Under-application will generally result in premature failure. However, the old adage of "the more paint, the better" can be equally dangerous. The gross over-application of modern high technology coatings can lead either to solvent entrapment and subsequent loss of adhesion, or to splitting of primer coats. With the majority of coatings, the limits of acceptable dry film thickness allow for reasonable practical variation, but the specified film thickness should always be the target during application.

The actual dry film thickness recommended for a particular surface will depend on the type of coating system being used and the nature of the surface. Recommended dry film thicknesses for individual products are given on the product technical data sheets.

Dry Film Thickness Measurement

If a coating is applied to a steel substrate, previously blast cleaned with abrasive grit or shot, the measurement of its dry film thickness is more complicated than that of a coating applied to a smooth steel substrate. The measurement results are influenced by the profile of the abrasive blasted surfaces which changes from point to point, the construction of the measuring equipment, (e.g. size of the probe) and dry film thicknesses to be measured. Some variations exist in methods of DFT measurement; DFT gauges can be calibrated on smooth or blasted steel panels and a correction factor for surface profile may or may not be considered. ISO 2808:2007, ISO 19840:2004 and SSPC-PA2 are accepted standards for measuring DFT.

The DFT is typically measured using a non-destructive magnetic gauge, which will give a value measured from the surface of the coating to the magnetic plane within the surface profile. The magnetic plane is the theoretical point within the surface profile that the DFT gauge sees as being the average position of the substrate.

When thin films are being applied care should be taken to consider the surface profile whereby some of the coating is being used to fill in the profile. For blast primers and coatings of less than 25 microns, measurement over the blasted surfaces is not meaningful.

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METHODS OF APPLICATION

The method of application is largely dependent on the type of coating selected. The most widely used methods of applying protective coatings are brush, roller, conventional (air) spray, conventional (pressure pot) spray and airless spray. The advantages and disadvantages of these methods are briefly discussed below. Other, less widely used methods include trowel, putty knife.

Brush Application

Brush application should always be undertaken using an appropriately sized, good quality synthetic or natural fibre brush compatible with the product being applied. This application technique is relatively slow and is generally used for coating small areas with decorative paints and for surface tolerant primers, where good penetration of rusty steel substrates is required. It is particularly suitable for the application of stripe coats and for coating complex areas where the use of spray methods would lead to considerable losses due to overspray and associated dry spray problems.

Note that most high build coatings are designed for application by airless spray; high film build will generally not be achieved by brush application. In general, twice as many coats will have to be applied by brush to achieve a similar build when compared to airless spray.

Brush application requires considerable care when applying non-convertible coatings over one another, e.g. chlorinated rubber over chlorinated rubber, or vinyl on top of vinyl. In these cased, the solvents in the wet coat readily redissolve the previously dry bottom coat. Even a mild degree of the brushing out normally given to topcoats will cause pick-up of the previous coat and result in a very poor finish. Even, light strokes should be used in these circumstances, covering a particular area with one or two brush strokes, and on no account working the bristles into the previous coat.

Roller Application

Roller application is faster than brush on large, even surfaces and can be used for the application of most decorative paints. However, control of film thickness is not easily achieved. As with brush, high film build will generally not be attained. Care must be taken to choose the correct roller pile length, depending on the type of paint and degree of roughness of the surface.

Typically, phenolic core rollers should be used fitted with a smooth to medium pile roller cover and the roller cover should be pre-washed to remove any loose fibres prior to use.

Air Spray (Conventional)

This is a widely accepted, rapid method of coating application in which paint is atomised by a low pressure air stream. Conventional air spray equipment is relatively simple and inexpensive, but it is essential to use the correct combination of air volume, air pressure and fluid flow to give good atomisation and a paint film free from defects.

If conventional spray application is not controlled correctly, large losses of paint can result from overspray and rebound from the surface, in addition to problems such as poor flow, sagging and pinholing. The major disadvantage of conventional air spray is that high build coatings can generally not be applied by this method, as most paints have to be thinned to a suitable viscosity for satisfactory atomisation, and so lose their high build properties.

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METHODS OF APPLICATION Continued…

Air Spray (Pressure Pot)

Pressure feed tanks or pressure pots are commonly used in association with low pressure air stream (conventional) spray guns, to provide a means of delivering paint at a regulated pressure from a tank, through a fluid hose to a spray gun.

The equipment works as follows: A length of air hose from the compressed air supply is connected to an air pressure regulator on the tank lid. Some air bleeds through the regulator at an adjusted pressure into the tank but most of the air passes the regulator and reaches the spray gun through a second length of air hose to atomise the paint as it is sprayed. The air which has entered the tank forces paint from it to the gun through a length of fluid hose. Paint in the tank can be prevented from settling by means of an agitator driven by hand or by a compressed air motor.

Air spray (pressure pot) is recommended in cases where large quantities of paint are to be applied, and their use instead of a suction or gravity feed cup attached to the gun significantly reduces waste time in constant refilling. This also enables the gun to be turned to any angle to coat objects effectively without spilling paint. Pressure feed tanks of up to 20 litres capacity can be used and allow ease of movement around the workplace.

Airless Spray

Here atomisation is achieved by hydraulic pressure forcing the paint through specially designed nozzles or tips. No air is mixed with the paint. The required hydraulic pressure is usually generated by an air powered pump having a high ratio of fluid pressure to air input pressure. Pumps with ratios between 20:1 and 100:1 are available, with perhaps the most common being around 45:1:

The chief advantages of airless spray are:

- High build coatings can be applied without thinning
- Very rapid application is possible, giving an economic advantage
- Compared to conventional spray, overspray and bounce-back are reduced, leading to reduced losses of material and lower fume hazards.

The tips through which the paint is forced to achieve atomisation are precisely constructed from tungsten carbide. The atomised fan is produced by a slot ground onto the face of the orifice. Various orifice sizes together with different slots angles are available. The choice of tip is governed by the fluid pressure required to give atomisation coupled with the orifice size needed to give the correct fluid delivery rate. The fluid delivery rate controls the film thickness applied.

Different slot angles produce spray fans of different widths. The selection of a particular fan width depends on the shape and size of the structure to be painted. Choice of fan width is also related to orifice size - for the same orifice size, the wider the spray fan the less paint will be applied per unit area.

Airless spray equipment normally operates at fluid line pressures up to 345 bar. (5,000 p.s.i), and should always be used in accordance with the manufacturer's operating instructions and safety precautions.

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METHODS OF APPLICATION Continued…

Generally tips with an orifice size 0.23-0.33mm (9-13 thou) are suitable for coatings to be applied at approximately 50 microns (2 mils) wet film thickness. Tip sizes from 0.33-0.48mm (13-19 thou) are suitable for wet films of 100-200 microns (4-8 mils) and 0.48-0.79mm (19-31 thou) for 200 microns (8 mils) and above. Heavy duty mastics which are applied at very high film thicknesses may need tips with orifices as large as 1.02-1.52mm (40-60 thou).

There are several designs of tip available, the choice of which depends upon the finish required, the ease of application and ease of clearing blockages from the tips. With some products, the decorative effect achieved with airless spray is not as good as can be achieved by conventional spray. However, airless spray application is now widely accepted as a convenient method of applying high performance protective coatings.

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CONDITIONS DURING APPLICATION

When applying protective coatings, the most important factors to consider are the condition of the substrate, the surface temperature, and the atmospheric conditions at the time of painting.

Paint application should only be carried out when good atmospheric conditions and clement weather prevail.

Painting should not be undertaken:

- When the air temperature falls below the lower drying or curing limit of the coating
- During fog or mist conditions or when rain or snow is imminent
- When the surface to be painted is wet with condensation or when condensation can occur during the initial drying period of the paint.

During the night steel temperatures fall. They rise again during the day but there is always a lag in movement of steel temperature compared to the atmospheric condition, so condensation on the steel surface is possible. Condensation will occur if the steel temperature is below the dew point of the atmosphere.

Borderline Conditions

Bad weather is a familiar problem to those using protective coatings. Relative humidity itself rarely creates a problem. Most paints will tolerate high humidities, but humidity should not be permitted to lead to condensation on the surface being painted. In order to determine whether or not a surface is wet, the steel temperature should be measured using a surface temperature thermometer and the dew point calculated after measurement of humidity with a hygrometer. Paint application should not take place when steel temperature is less than 3˚C above the dew point.

Paint should not be applied when surfaces are affected by rain or ice. Some two pack paints (certain traditional two component epoxy coatings for example) should not be applied at low temperatures as curing may be retarded.

Extreme Conditions

Generally, extreme conditions refer to ambient temperatures below 4˚C or above 40˚C.

Below 4˚C the curing of coatings such as traditional two component epoxies slows down dramatically and for some paints curing stops altogether. Water borne paints must not be stored or applied at temperatures below 4˚C as application and performance properties will be adversely affected. Other protective coatings are not so severely affected. Chlorinated rubbers and vinyls are quite suitable for use at temperatures below 0˚C provided that the surface is clean and free from ice or frost. Some other coatings may also be applied at such low temperatures although curing will be severely retarded.

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CONDITIONS DURING APPLICATION Continued…

At the other extreme of 40˚C and above, the drying and curing of paints is rather rapid and care should be taken to avoid dry spray. This is caused by the too rapid loss of solvent from paint droplets between the spray nozzle and the surface. It can be avoided by:

- Keeping the spray gun at the minimum suitable distance from the work piece, spraying consistently at 90˚ to the surface being painted.
- Adding thinners, if necessary, up to a maximum of 5% by volume.

In such conditions, techniques must be adapted this way to prevent defects such as voids, pinholes, bubbles and poor coverage due to the over rapid evaporation of solvent. However, provided that good standards of workmanship are maintained, it is normally possible to satisfactorily apply most Speccoats™ Protective Coatings products on to steel substrates up to 65˚C.

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