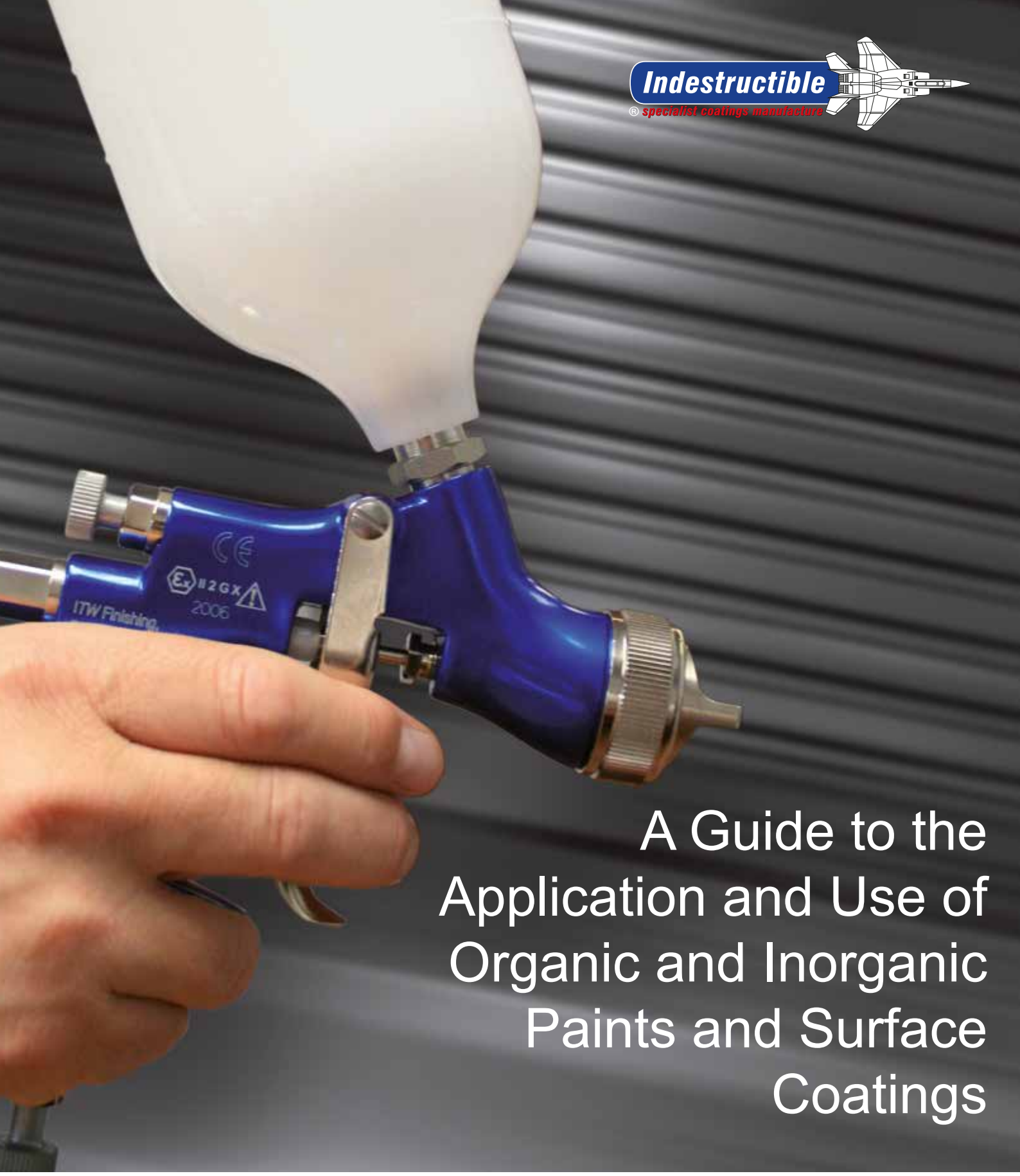

A Guide to the Application and Use of Organic and Inorganic Paints and Surface Coatings

Our recommended methods of appying both our organic and inorganic surface coatings. This guide will help to use our products in a safe and efficient manner.

Issue 2

Organic Finishes

In the majority of cases these are solvent based and can be applied by a wide variety of methods. Water based or reducible systems are also available, though a little more care is required with these products, especially with regard to paint shop conditions (temperature and humidity) and the use of galvanised or stainless equipment.

You will need to check whether the product is supplied ‘ready for use’ or will require thinning to application viscosity. For two pack paints, you will need to check the the correct mixing ratio with a catalyst. Please consult the relevant data sheet for the product in question before starting work.

We always recommend that you check the relevant safety data sheet(s) before using any product to ensure any personal protection items required are correctly used.

Inorganic Coatings

Being based on non-carbon chemistry, the majority of inorganic coatings are slurries or dispersions carried in water. In view of this, care must be exercised when storing. Maintain a store temperature above 5°C minimum and below 25°C. As with water based organic coatings, paint shop temperature and humidity need more control.

Most inorganic coatings need to be thoroughly mixed prior to use. We recommend rollers or tumbling for a minimum 16 hours before use to ensure the coating is thoroughly dispersed. Always check whether any additions; catalysts, diluents etc are required before using and ensure these are thoroughly mixed in.

Most of our inorganic coatings can be applied through standard spray equipment. Keep in mind that the solvent is water so all equipment must be water resistant; including spray booths, ovens, extraction units etc. Normally, galvanised or stainless steel are used.

Prior to starting application, please consult the relevant safety data sheets and utilise the required personal protection equipment.

Product Preparation

Most paints will suffer from some layering or settlement in storage. It is essential that they are thoroughly mixed to a consistent condition prior to use. This can usually be achieved by stirring; using a wide blade pallet knife or stirrer, either by hand or with a low rev mechanical stirrer. Narrow blade stirrers, like screwdrivers, should not be used as these will not sufficiently mix a viscous product.

Paint shakers and rollers can be utilised. Rollers are especially useful with inorganic and slurry coatings, where the settlement can be harder than with organic finishes. It is recomended that shakers are NOT used with water based or inorganic and slurry coatings; as airation would likely occur.

Surface Preparation

All paints should be applied to clean, dirt and grease-free surfaces to ensure correct levelling, film forming and adhesion. Most coatings specifications detail the preparation to be employed, but as a minimum degreasing and cleaning are essential.

Brushing Application

Most paints formulated for brush application over large areas are supplied ready for use from the can. The brush size used should be suitable for the area to be covered i.e. it is not recommended to use a ½” or 1” brush to cover large surfaces). Ensure the brush is clean, dry and the hairs are flexible, to ensure good flow and avoid a heavily brush marked finish.

Load the brush fully but do not overload; you do not want excess paint running off the brush. Apply in smooth even strokes, in one direction, parallel to the longest side of the area to be coated. Lay off across the width then along the length with light brush strokes to even out the coating and prevent runs and sags. Do not over-apply as this will result in runs and sags.

Some paints designed for spray application can also be applied on small areas by brush, for example for touch-up. In these instances, use a narrow brush or even a pencil brush and apply thin coats to achieve the required result.

Please remember that paints designed for spray use and fast evaporating solvents will leave brush marks in the coating.

Clean brushes and equipment as soon as the application is finished with the relevant cleaning solvent, ensuring all paint is removed from the core of the bristles, not just the outer surfaces. Dry carefully before putting away.

Spray Application

This is the most widely used method of paint application and encompasses a number of alternate types of equipment and methods.

Conventional Air Spray

This is the traditional and still widely used type of spray gun, typical examples being the DeVilbiss JGA and Binks 230 guns. Paint / coating supply can be from a gravity cup mounted on the top of the spray gun, a suction cup under the spray gun, or from a remote pressure pot.

These guns are high pressure and use high volumes of air to move the coating through the gun body and atomise the coating into fine droplets at the nozzle.

Typically, an air pressure of 40-50psi (2.9-3.6 bar) is used with this type of gun to successfully atomise most coatings. Lacquers and metallic finishes typically work best at the lower pressure, whilst heavy bodied finishes and primers require the higher pressure. Very smooth, even coatings are easy to achieve with these guns.

However, the major drawback is the pressure of the air used, which causes a high velocity stream of atomised paint droplets. This results in overspray and / or an effect called ‘bounce back’ where a proportion of the paint droplets literally bounce back off the item being coated and either fall or are extracted to waste. This is even more apparent when coating complex items. The resulting utilisation of the coating can be as low as 40% with 60% going to waste.

HVLP / Compliant Spray

An improvement over conventional spray guns, where much lower air pressures are required to atomise the coating. Supply of the coating is the same as the conventional spray, by gravity, suction or from a pressure pot.

The most noticeable difference is the much lower air pressure used to atomise the coating, typically 10psi (0.7 bar).
Much reduced overspray and bounce back are achieved and coating utilisation can be seen to increase to 60-70%. This is especially valid when coating inside components, where the reduced air velocity of the coating droplets allows a much higher percentage deposition. HVLP guns give excellent results with low solids coatings but are not really suitable with latest VOC systems
Latest generation Low VOC coatings are best applied with modern technology spray guns, where specifically engineered atomisation systems ensure the breakup of the coating into fine atomised particles. These guns usually operate at an air pressure of 29-35 psi (2-2 1/2 Bar) and provide much increased product utilisation of up to 75%.

Airless Spray

A method where atomisation of the coating is achieved without the influence of air. The coating to be applied is pumped at high pressure through a narrow orifice, which effectively ‘atomises’ the coating into droplets. Because of the pressures used (up to 2500psi / 175 bar) a high delivery rate of paint is achieved. Airless guns are also ideal for applying heavy bodied primers and fillers as these high pressures can again handle thick or highly filled products.

Because no air is used in the atomisation process, overspray and bounce back are easier to control.

This method is typically used to rapidly apply the coating to large surface areas, and / or to apply thick film thicknesses in reduced passes. However, the applied coating will not exhibit the surface smoothness achieved with conventional or HVLP guns.

Air Assisted Airless Spray

A combination of conventional and airless spray technology. The coating is again mainly atomised by pumping through a narrow nozzle at high pressure (but much reduced from standard airless) but controlling the fan pattern and assisting the atomisation by using low pressure air at the air cap.

This gives a fine, smooth application of lower viscosity products whilst allowing high application rates on large areas and controlling overspray and bounce back.

Typically used for the application of lacquers on large or complex shapes, or where it is necessary to coat internal surfaces of an object (inside tubes; cupboards etc) where the minimal bounce back is essential.

Electrostatic Spray Guns

By using electrostatic forces to charge the paint particles as they are atomised, and by making the object to be coated an earth, the charged paint particles are attracted to the article and deposit evenly all around the surface.

This process is especially useful for coating cylindrical items or for ensuring a deposition of coating on edges and inside cut-outs.

The fact that most of the sprayed coating is attracted to the earthed workpiece results in much higher utilisation of the sprayed coating, and on some automatic plants utilisation figures greater than 95% have been seen.

A fact to be borne in mind is that the coating needs a resistance to charging (sometimes called resistivity) to enable the paint particles to accept a charge. If the coating is too conductive (like most water based and inorganic systems and some fast drying solvent based organic paints) the charge will 'track back' through the feed container to earth and no electrostatic effect will be achieved. This can be overcome by insulating the feed container and paint lines and preventing tracking back, but we strongly recommend that you consult the equipment supplier in conjunction with ourselves to ensure the correct equipment is specified.

It is fair to say however that most modern electrostatic spray equipment can cope with most coatings formulations.

Dipping / Flow Coating

Used to coat a wide variety of shapes and items, the benefits of dip application mean full coating of complex shapes which include areas that would be hidden to spray guns.

There are 2 basic processes for the dip application of surface coatings:

1. Slow Extraction Dip
2. Standard Dipping

Slow extraction dip involves immersing the items to be coated in a tank containing the surface coating held at a high viscosity. The substrate is then removed from the tank in a slow even controlled rate (typically 4-6 inches per minute). This allows an even, high build deposition of coating over the surface, and minimal tears or build up on the extract point. The process has been widely used to lacquer such items as brush handles and bullets.

Standard dipping uses coatings at a much lower viscosity and involves simply plunging the item to be coated in the dip tank, and removing immediately. The coated item needs a while to allow drain off of excess material, before moving to the drying zone.

Flow coating gives a similar coating result to dipping. However in this instance the coating is quite literally hosed over the item to be painted through large nozzles, and collected in a drain off zone for filtering and recirculating. The main advantage of flow coating is the ability to coat large complex shapes (usually too large for dip tanks) with the need for much less paint to be held in the holding tank.

With all dip and flow coating methods, it must be remembered that sometimes a quite considerable volume of coating will be held in a tank, usually at a reduced viscosity. It is imperative that this paint is correctly monitored to maintain correct solid / viscosity parameters. Daily checks are recommended, and it is suggested frequent samples are returned to our quality control lab for more accurate checking.

Roller / Curtain Coating

Automated application methods for coating two dimensional articles on a flat bed conveyor system.Typically used to coat flat metal sheeting and wood panels in the furniture and door industries.

With roller coating, thin films are applied by passing the sheet under a rubber roller, which has a wet film of the paint / lacquer on the surface. The thickness of the film is controlled by a dosing roller which touches the applicator roller; a 'sausage' of the coating being held in the nip of these two rollers. Very even, accurate film thickness are applied.

Control of the process is quite critical, as the viscosity and integrity of the sausage in the roller nips needs regular monitoring.

With curtain coating, the item to be finished is simply conveyorised through a falling curing of paint, and the coating is evenly applied to the top surface.

Equipment Care

Whatever the method of application, clean and well maintained equipment is a critical factor in successful painting. Before starting any work, check that the equipment is clean and functioning correctly.

After application, allow time to thoroughly clean the equipment with the recommended clean up solvent, which is always noted on our product label on the can. Do not skimp on cleaning, as this will cause problems the next time the equipment is used.

Drying / Curing

The recommended drying / curing times for all our products are noted both in the technical data sheet and on the product can label. Please make sure these recommendations are followed to ensure the coating has been cured correctly and correct technical performance can be achieved.

With air drying products, please remember that the lower the ambient temperature, the longer the coating will take to dry. It is suggested that, wherever possible, air drying coatings should not be applied at ambient temperatures lower than 5°C.

Please note that several new technology low VOC two pack products, will not cure at ambient temperatures below 10°C. If in doubt about drying times in the prevailing ambient conditions, please consult our technical department.

With heat curing products, it is essential to take note of the recommended flash off times before exposing the coated item to heat. This is to allow the solvent in the coating to totally evaporate. If the coating is cured before all the solvents have evaporated, it is probable that solvent boil will occur.

On heavy mass items, it is essential to ensure that the item has reached full metal temperature, before commencing curing time. The use of an infra-red or laser heat measuring gun will assist.

When using radiation curing methods, the following guidelines should be followed:

Infra Red: Like heat curing systems, ensure all the solvents have evaporated before exposing the coated part to the infra red.

Ultra Violet: Make sure the coating used will cure under the wavelength UV light being used. If using high solvent containing products allow 1-2 minutes flash off before exposing the coating to the UV light.

UV products only cure on exposure to the correct wavelength light, so make sure no coated areas are shielded from the light source.

Remember that UV light sources use very high energies, and give out intense light, so must be regarded as dangerous: Do NOT look at the UV light source, and avoid exposing your skin. Follow the shielding recommendations supplied with the equipment.

Temperature

°C	Number	°F
-17.8	0	32.0
-12.2	10	50.0
-6.7	20	68.0
-1.1	30	86.0
4.4	40	104.0
10.0	50	122.0
37.8	100	212.0
65.5	150	302.0
93.3	200	392.0
121.0	250	482.0
149.9	300	572.0
176.7	350	662.0
204.4	400	752.0
232.2	450	842.0
260.0	500	932.0
315.5	600	1112.0
371.1	700	1292.0
426.7	800	1472.0
482.2	900	1652.0
537.8	1000	1832.0

Capacity

Litres	U.S. Gallons
1	0.264
2	0.528
3	0.793
4	1.057
5	1.321
6	1.585
7	1.894
8	2.113
9	2.378
10	2.642

U.S. Gallons	Litres
1	3.785
2	7.571
3	11.356
4	15.141
5	18.927
6	22.712
7	26.497
8	30.282
9	34.068
10	37.853

Coverage

Sq. m/l.	Sq. yds/U.S. Gallon
1.5	7
2.0	9
2.5	11
3.0	13
3.5	16
4.0	18
4.5	20
5.0	22
6.0	27
7.0	31
8.0	36
9.0	40
10.0	45
11.0	50
12.0	54
13.0	59
14.0	63
15.0	68
16.0	72

Note: The gallon figures are rounded off to the nearest square yard.
1 sq. m/l = 4.527 sq. yds / U.S. gallon
1 sq yd / U.S. gallon = 0.221 sq. m/l.

Viscosity (seconds)

Ford 4	BS.B 4	Afnor 4	ISO.4	ISO.5
10	15	11	21	10
11	16	13	24	12
12	18	14	27	14
15	20	17	33	16
17	23	19	40	18
19	24	21	44	20
21	27	23	50	22
24	30	27	57	25
28	35	31	68	30
33	42	36	82	35
38	48	42	95	40
46	58	50	118	50
68	88	77	182	75
89	116	102	238	100

We hope this simple guide will help. More detailed enquiries on specific products should be addressed to our technical teams available at the address below or on +44 (0)121 702 2485.

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