DAMIANI
industrial paints

EXPLANATORY NOTES

2K Primers and DTM

2K PRIMERS and DTM

GENERAL PARAMETERS

Product description

The type and family to which the product belongs are indicated according to the use within a coating system (primer, anti-corrosive paint, intermediate coats, topcoats and enamels, etc.), in compliance with the types of binder contained (resin or polymer) and depending on the drying system.

Chemical drying

The film hardening happens by chemical reaction between the two components (resin and hardener) that were mixed before application. This last type of chemical cross-linking system is very sensitive to changes in temperature and humidity; therefore, these types of products are much more affected by improper application conditions than those that dry by solvent evaporation and oxidation.
All the epoxy-vinyl, 2K epoxy, polyurethane and acryl-polyurethane products, whether they are primers, anti-corrosive paints, DTM or enamels, belong to this group.

Features

A brief description of the product to highlight the main performance features.

Fields of use

It refers to the specific, recommended use of the product within a coating system (if provided) and the sector in which it can be used.
An optimal result can be obtained by carefully following the advices contained in the technical data sheet which, however, being descriptive, cannot include all the combinations and possible methods of use that it is always better to analyse from time to time depending on the case.

Theoretical average spreading rate

It is the surface (in square meters) that can be coated with 1 kg or 1 litre of product, without any loss in the application phase.
In spray applications, the real spreading rate (practical degree of opacity) depends on the Transfer Coefficient, i.e., the amount of paint that falls on the support compared to the sprayed quantity and is influenced by some factors such as:
- ambient temperature (that can fluidify the painting product causing greater or lesser overspray)
- type and features of the sprayed painting product and its viscosity
- type of used thinner
- type of support to be coated (shape and dimensions)
- distance of the gun from the surface (alteration of the wetting power, overspray formation)
- atomization and air supply pressure
- type and features of the dosing system
- aspiration air/ventilation
- surface and edge conditions
- application methods
- weather conditions
- skill of the workforce

Theoretical average consumption

Expressed in grams, it indicates the quantity of painting product theoretically necessary (i.e., without dispersions) to paint a square meter of surface at the indicated dry film thickness.

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SUPPLY TECHNICAL DATA

They describe the features of the liquid product in the can.

Composition

It indicates the chemical nature of the contained main binder and/or its modification.

Color

It refers to the available colors ready in stock and to the possibility of making them with the tinting service, or on request according to the minimum batches indicated in the price list.

Viscosity

It is the fluidity of the product as it is (as supplied) at the temperature of 20°C. In the case of a 2K product, the data refers only to the pigmented part. The numerical value written on the technical data sheet is expressed in Centipoises (Cps) or Millipascals (MPa) and it is calculated considering the resistance encountered by the impeller of the Brookfield viscometer in its rotational motion. This resistance is proportional to the viscosity of the product under examination.
Viscosity is influenced by the temperature: increasing the temperature, the viscosity value decreases.

Specific weight

It is also called “density” and represents the weight of the unit of volume (i.e., the weight of 1 litre of product). The two values written on the Technical Data Sheet (expressed in kg/l) refer to the lightest and heaviest color of the product and may therefore be subject to slight variations depending on the realized shade. The white products always have a higher specific weight if compared with all other shades.

Gloss

It indicates the degree of gloss of the dried film, i.e., its ability to reflect the light and is expressed in degrees or points:
- Matt: 0-15 gloss
- Semi-matt: 15-30 gloss
- Satin-finished: 30-60 gloss
- Semi-glossy: 60-75 gloss
- Glossy: 75-100 gloss

Dry content by weight

It indicates the weight of the solid part that remains after the evaporation of the solvent. It is indicated as a percentage, i.e., the quantity of product that remains with reference to 1 kg of product.

Dry content by volume

It indicates the volume of the solid part remaining after the evaporation of the solvent.
It is indicated as a percentage, i.e., the quantity of product that remains with reference to 1 litre of product.

Voc

The two values indicate the quantity of solvents (VOC = Volatile Organic Compounds) contained in the product, they are expressed in “grams per litre” of product or in “percentage by weight”, i.e. on 1 kg of product.

PREPARATION OF THE SUPPORT

This section shows the surface pre-treatment processes to be made before starting to apply the coating system. The application on supports other than those indicated is not recommended, unless being approved by the technical service.

The cleaning/pre-treatment process is very important to achieve optimal results and performance in the coating system.

Pre-treatment can be done in various ways and according to different criteria, which must lead to a unique result. The surfaces to be painted must be perfectly clean and dry, free from organic and/or inorganic contaminants such as grease, rust, calamine, oxides, soluble salts, dust and must have a neutral pH. Below you can find the methods to be used for the metal surfaces preparation.

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PREPARATION OF THE SUPPORT

Degreasing

Carried out with solvents (or solvent vapors) or with water-soluble detergents, manually or in automatic systems (tunnels or industrial washing machines). The purpose is the dissolution and removal of grease and fat.

Manual and mechanical cleaning

Removal of rust scales and old paints, using tools (grinding wheels, discs and abrasive papers, wire brushes, scrapers, etc.) moved manually or mechanically. Since these processes do not remove the greasy substances, it is advisable to proceed with the degreasing of the surface, as previously described, both before and after the use of the above specified tools.

Mechanical preparation grades

St2 - Removal by tapping, scraping, sanding and metal brushing of loose mill scales, rust and foreign substances. At the end of the treatment, the surface takes on an almost metallic appearance.
St3 - Steel surface treatment realized like the previous one, but more accurately.
At the end, it shows a distinctly metallic appearance.

Preparation grades by sandblasting, shot blasting or shot peening

Sa1 - Light sandblasting corresponding to a good brushing. All easily detachable parts, rust, or other foreign particles must be removed.

Sa2 - Accurate sandblasting corresponding to commercial sandblasting. Mill scales, rust and foreign particles must be almost completely removed. After this process the surface looks greyish.

Sa2 ½ - Very accurate sandblasting corresponding almost to a white metal blast cleaning. Like the previous one, this operation must leave the surface perfectly clean and, in case of any small impurities still present, they must appear as light color variations on the substrate. After this process the surface is almost white.

Sa3 - White metal blast cleaning. It must lead to obtaining a perfectly clean metal surface.

Wet abrasive blasting (hydro-sandblasting)
Wet abrasive blasting (hydro-sandblasting): cleaning method that combines the strength of a high-pressure water jet mixed with sand. This process is widely used for the maintenance of large surfaces (generally on reinforced concrete, stone materials in general, plasters, etc.). The only issue is represented by having to dry the treated surface perfectly before starting to apply the coating system.

ENVIRONMENTAL CONDITIONS

Application temperature

It shows the temperature limits within which the substrate and the ambient air in which the application takes place must be.
Generally, it is indicated as follows:
Substrate: between +5°C and +35°C and in any case always 3°C above the Dew Point
Environment: min + 5°C and max +35°C
Relative humidity: 60%

Dew point

The term Dew Point indicates the temperature at which condensation occurs (at certain percentages of RH and temperature), which can deposit on metal surfaces (and on the film) in the form of condensation or even ice. It's always suggested that any paint must be applied only at temperatures at least 3°C higher than the Dew Point. In this regard, there are tables that help determine these values.

Relative humidity

Relative Humidity has a strong influence on waterborne and solvent-based products (especially for air-drying ones), as a high level of humidity also considerably slows down the evaporation rate of the water contained in the applied film and, consequently, the film drying.

Epoxy products

For epoxy products, the minimum indicated temperature (both of the support and of the environment) is 12-15°C, as below these temperatures the polymerization slows down until it stops completely. If the temperature is lower, over time there may be a loss of adhesion of the coating product film on the support and also a loss of its mechanical and chemical features.

Shelf-life

The product stability and shelf-life can be influenced by the conditions of temperature and humidity.
The time indicated in the technical data sheet refers to the product in its original and sealed packaging, stocked at a temperature not lower than 5°C and higher than 35°C.

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APPLICATION METHODS

This section lists the equipment indicated/suggested for a correct application of the product, as well as the environmental conditions to be respected during the painting steps.
In the sector of industrial painting, these are the most used methods:

- Spray
- Roller and brush
- Immersion

Spray application, the most used, takes place using an airbrush (gravity-feed spray gun) or continuous spay guns fed by:

- Under pressure pot
- Pumps (of the air assisted, airless, diaphragm, piston, volumetric double suction type) to which auxiliary systems can be coupled to improve and optimize their performance, such as:

- Generators and electrostatic systems
- HVLP guns
- Pre-heaters

Optimal results can be obtained from both an aesthetic and an economic point of view depending on the correct choice of one of the above-mentioned application systems. It must be considered that as the application system changes, the loss of material varies and consequently the cost per square meter increases.
Application with a brush involves relatively small waste, while spray application involves a bigger loss of product; in addition, there is also a further waste of paint and solvent when cleaning the equipment.

Surface and edges conditions

In the case of a very porous surface, the first coat of paint will be practically absorbed by the substrate without creating any protective film nor the required thickness. Before creating a desired thickness over a rough and uneven surface, it is first necessary to fill the porosity with a first coat of a suitable primer.

Application factors and variables

The application method greatly affects the material consumption. Furthermore, atmospheric conditions also considerably change the spreading rate.
E.g.: spray application with a spray gun or airless on substrates exposed to sun and wind conditions can create considerable difficulties due to the poor wettability of the product on a hot substrate and also a considerable dispersion due to the wind.

Depending on the application method and atmospheric conditions, the following reduction factors can be used:
- Application by brush or roller 0,9
- Indoor spray application 0,8
- Outdoor spray application with wind conditions 0.7

Therefore, in order to calculate the degree of opacity (effective spreading rate), the theoretical degree (theoretical spreading rate) must be multiplied by the factors, depending on the various application conditions that may occur.

Depending on the condition of the surface to be treated, the following reduction factors can be used:
- Laminated steel: 0.96
- Light sandblasted steel: 0.85
- Deep sandblasted steel: 0.78
- Concrete: 0.5 - 0.7

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APPLICATION RECOMMENDATIONS

Mixing ratio (A+B)

It is the amount of hardener required to reach a proper polymerization. It is expressed: By weight: 100 of pigmented part A + X weight of part B(hardener)
By volume: 100 of pigmented part A + X volume of part B(hardener)

The mixing ratio between the pigmented part (A) and the hardener (B) is not the same when calculated by weight or by volume. Therefore, if the mixing ratio is calculated by weight, it is recommended to use scales. If weighing tools are not available, you must refer to the catalysis by volume (using graduated jugs) taking care to scrupulously respect the indicated ratio by volume.
Values of C.O.V. and S.O.V. of the A + B mixture: they show the quantities of solvents present in the mixture (A + B), that is to say after catalysis.

Dilution

Reference is made to the type of specific diluent required and its percentage of use. The incorrect use of thinner is often the cause of various problems, both during application and with the dried paint film.
E.g. The use of nitro thinners for the application of polyurethane coating systems could create bittiness phenomena on the dried film surface; moreover, the presence of partially reactive solvents inside the nitro thinner could cause undesired reactions with the isocyanate component, thus reducing the aesthetic and mechanical features of the coating system.
Furthermore, the choice of unsuitable thinners (regenerated) can create problems of colour change and sedimentation of the diluted product. For industrial water-based paints, it is recommended to strictly follow the product dilution quantity indicated, specifically for each product, in its technical data sheet.

Application viscosity

It's a numerical value expressed in seconds which indicates the time it takes for a certain volume of diluted product to flow out of the Ford Cup 4 at the standard temperature of 23 ± 0.5°C (in compliance with UNI EN ISO 2431).
The suggested viscosity refers to an average application at 20°C.
It can therefore differ according to temperature and used application method.

Pot life

The pot life of the A+B mixture, indicates the maximum time within which the 2K product must be used. After this period, the coating product, even if apparently still usable, loses its features compromising the final result. The value refers to 20°C as it is considerably influenced by the temperature. Unless otherwise specified, it can generally be assumed that the indicated time is halved if the temperature rises by10°C (reaching 30°C) and doubled if the temperature drops by 10°C (thus reaching 10°C).

Wet film thickness

It indicates the wet film thickness to be applied.

Dry film thickness

It indicates the dry film thickness obtained from the wet film thickness applied, once dried.

N° coats

It indicates the number of coats to be applied.

Flash-off

It indicates the time that must elapse between one coat and the other of the same product at the indicated temperature conditions.

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DRYING

It is the drying time of a coating product applied at a given film thickness. The data reported on the technical data sheet are calculated at standard conditions of 20°C and Relative Humidity of 60%; in practice they can therefore be subjected to variations depending on the climatic conditions and the applied thickness. In 2K and oxidative products, the term “total polymerization” refers to the time necessary for the chemical reaction between component A and component B (hardener or oxygen) to take place completely. Before reaching the total polymerization, 2K products dry in any case, but their features of chemical and mechanical resistance can be reached only after polymerization is complete. The drying process up to the phase indicated as “touch-free drying”, mainly depends, in order of importance and effective influence, on:

1. The environment degree of ventilation (higher for waterborne products)
2. The room temperature
3. The applied thickness per coat

The drying time also depends on the applied thicknesses, both total and per single coat.
In general, the application of a thickness twice to the suggested one, takes 4 times the time normally required for drying, with the exact same ventilation.

Cross-linking and polymerization

After drying, in general, the cross-linking/polymerization is not complete, but it’s achieved gradually over the following days and in the following weeks. The painted product has in any case reached a degree of hardening sufficient to be handled, sanded, stacked, repainted, packed, shipped and exposed outdoors, but many of its features can still undergo variations, such as chemical resistance and hardness (which tend to increase) and elasticity (which instead tends to decrease). Therefore, even the accelerated resistance tests (salt spray, humidity chamber, etc.) must be carried out (unless otherwise indicated) after a period of at least 3 weeks, during which the painted support must be maintained at a stable temperature range and relative humidity, as described in the UNI EN ISO 12944-6 Regulation at point 5.4 (as defined in ISO 554).

Overcoating interval

It refers to the minimum and maximum period to recoat a product with itself or with other suggested coating systems. In the case of 2K products, after sanding and checking the compatibility of the coating system, it is possible to overcoat even beyond the maximum overcoating interval.

Factors and variables

All the values related to the drying/polymerization times depend on the thicknesses applied and the environmental conditions during the painting and drying processes, up to total polymerization.
The ones reported above, unless otherwise indicated, refer to standard environmental conditions (20°C) and to recommended thicknesses.

Drying temperature

It indicates the temperature at which the product must be kept to dry properly at room temperature (generally 20°C) or, in case of thermosetting products, it indicates the time and temperature conditions at which they must kept in order to speed up the drying time.

Dust-free drying

Drying step in which the dust is no longer captured by the coating film.

Dry to touch

Drying time of the film beyond which the film is dry to the touch on the surface.
By slightly pressing the finger on the surface, stickiness is no longer present the and fingerprint doesn’t appear anymore.

Dry-through

Period beyond which the film is dried to its deepest coat.

Sandable

The applied film can be sanded.

Movable

The painted product can be moved and assembled.

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DRYING

Stackable

The painted products can be stacked one on top of the other without causing damages and without sticking together.

Full cure

Period beyond which the film is fully formed, ensuring the maximum performance.

Resistance to temperature

It indicates the maximum temperature at which the dried film can be subjected without being largely transformed in its performance. It's important to remind that most paints, when exposed to high temperatures, tend to change how they appear, both in terms of colour and gloss. If the temperature remains unchanged (operating temperature) at levels close to maximum temperature, there will be in any case a decrease in resistance (artificial weathering/accelerating aging).
The presence of humidity in a hot environment, such as changes in temperature, leads to a further loss of the paint features.
The film features are subjected to a higher degradation when strong thermal excursion occurs.
The indicated temperatures refer to a ventilated environment. If not specifically indicated, the products are not suitable. For immersion in hot liquids