

# Explanatory notes to PDS

## Scope

These Explanatory notes define the terms used in Hempel's Product Data Sheets (PDS) as well as the methods used to obtain the stated data.

The notes explain the content of each field, provide background information and state any definitions, standards and measurement methods that may be of relevance during planning and application of Hempel's products.

## Product characteristics

### **Description**

A short description of the product including the generic coating type, basic chemistry, principal properties, and advantages.

### **Recommended use**

The usage for which the product is designed or particularly well suited. The product may be specified for other uses in tailor-made paint systems as outlined in the specification.

### **Service temperature**

The maximum (and minimum) temperature (dry and/or wet) that will have no immediate detrimental effect on the paint.

A service temperature constantly near the maximum value may result in a shorter service life of the specified paint system compared to the same paint system operating at ambient conditions. If the service temperature often fluctuates, accelerated ageing (a decrease in the paint system's anticipated service life) is to be expected.

Most paints will change appearance (colour and/or gloss) when exposed to high temperatures, . In addition, many paints will become soft at high temperatures and show higher sensitivity to mechanical or chemical actions.

Exposure to warm liquids, including water, is normally only recommended for dedicated paint systems. At high temperatures, wet service will have a more pronounced influence on service life than dry service.

If the liquid has a higher temperature than the coated steel, a 'cold wall' effect will increase the risk of blistering and put further limitations on the paint system's temperature resistance. Most paint systems only tolerate moderate negative temperature gradients under wet/immersed service conditions.

### **Certificates/approvals**

A list of key certificates and approvals. Additional certificates and approvals may be available from Hempel on request.

### **Features**

A summary of the most important product features.

## Product safety

### **Flash point**

The lowest temperature at which a liquid gives off sufficient vapour to form a mixture with the air near its surface which, if ignited, will make a small flash, but not catch fire. It is important to note that adding thinner to a paint may change the flash point of the diluted material.

The flash point is calculated or measured using the Setaflash method (closed cup) according to ISO 3680. For multi-component products, the flash point of the mixed product is shown. The flash point of the individual components is stated in the Safety Data Sheet for the specific quality and shade.

### Volatiles Organic Compounds (VOC) content

VOC refers to chemical compounds that, because of their high vapour pressure, easily evaporate and change from liquid phase to gas phase. For paints, there is no global definition of which chemical compounds constitute VOCs, hence different VOC legislations are applicable around the globe.

At Hempel, the VOC content of a paint formulation is usually determined by calculation rather than measurement. All of Hempel's products are manufactured using a controlled formulation. To calculate the VOC content of the final product, the paint formulation is broken down to substance level.

Since VOC status differs for some substances under different legislations, the VOC content shown in the PDS is calculated according to one or more of the following legislations: EU, US, Korea, China, Hong Kong or Canada. If you require the VOC content under a specific legislation that is not shown in the PDS, please request the value from Hempel.

In some cases, the PDS will show a measured VOC value instead of calculated value. In those cases, the measurement method will be stated. More detailed information on VOCs for specific components is given in the Safety Data Sheets.

The calculated or measured weight of VOC is stated in grams per litre (and, in some cases, lb per US gallon). For multi-component products, the VOC is stated for the mixed product and, for certain paints, also for the diluted material according to EU Directive 2004/42/CE or other legislation.

### Handling

General safety precautions that should be taken when handling or working with the product. For detailed safety information, please see the product's safety label and Safety Data Sheet.

A product declared 'for professional use only' must only be applied by professional applicators.

## Product data

### Product code

All Hempel products are identified by a unique 5-character code. A multi-component product will have a product code, as well as a code for each component (see below).

### Product components

The unique 5-character code for each component in a multi-component product. This field is not shown in a PDS for a one-component product.

### Standard shade/code

The shade written as a 5-character code. Hempel's paint shades each have a unique code. An overview of shades are given in the table below:

Colour groups	Hempel code
White	10000
Whitish, grey	10010-19980
Black	19990
Yellow, cream, buff	20010-29990
Blue, violet	30010-39990
Green	40010-49990
Red, orange, pink	50010-59990
Brown	60010-69990

Hempel's standard shade codes do not necessarily equal official standards e.g. RAL shades. Frequently used shades are displayed on Hempel's colour cards. Hempel's "Colour Converter" app for mobile devices may also be useful.

The fifth character in the code may be used to identify specific formulas for the same shade when a different type of pigment is used (for example, to conform to specific standards or local legislation).

Please note that shade variations may occur in products in which colour is of less importance, such as primers, many intermediates and antifouling coatings. Uniform appearance of a topcoat is best obtained by applying paint with the same batch numbers.

Certain data may vary from one shade to another. Occasionally, this is of relevance for VOC content, volume solids, and specific gravity. Specific values are available from Hempel on request. Please note that some test results and approvals may only be valid for certain shades.

Most topcoats and some primers are available in customised shades through Hempel's Multitint system. Tinted shades may deviate from main shades in VOC content, volume solids, and specific gravity.

### Gloss

The specular gloss of the paint film after drying under optimal conditions in the laboratory (non-metallic paints only). The measurement is performed according to ISO 2813 with the reflectometer set at 60° geometry. The output figures are converted to text as follows: high gloss (>90), glossy (60-90), semi-gloss (30-60), semi-flat (15-30), flat (<15), silk (5-10) and matt (<5).

The actual gloss will depend on conditions during application, drying and curing. For the gloss of aluminium shades, please consult Hempel's Technical Guideline "Aluminium pigmented topcoats" available on <https://www.hempel.com/service-and-support/technical-guidelines>.

### Volume solids

The volume solids ( % VS) value, expressing the ratio: dry film thickness / wet film thickness.

The stated value is determined under laboratory conditions according to ISO 3233-1 after a drying period of 7 days at 23°C [73°F] and 50% relative humidity.

% VS values are reported with an uncertainty range. This uncertainty takes into account the paint type, normal manufacturing tolerances, experimental uncertainty, etc. Please note that volume solids may vary with shade.

For solvent free products the *theoretical* value 100% VS is shown. In practical life a lower value may be experienced due to shrinkage of the film due to curing reaction. It should also be noted that for certain products containing volatile reactants (e.g. vinylesters and polyesters) the practical % VS may be significantly lower depending on application conditions.

### Specific gravity

The weight of the liquid paint per unit volume at 25°C [77°F], expressed in kilograms per litre (and, in some cases, lb per US gallon). For multi-component products, the specific gravity is stated for the mixed product. The specific gravity of each component can be found in the Safety Data Sheet.

At Hempel, the specific gravity is calculated according to ASTM D 5965-02, Test method C. The actual specific gravity may vary with shade and by a few percent compared to the theoretical value shown in the PDS.

### Reference dry film thickness

The dry film thickness (DFT) used when determining performance parameters, such as drying time and overcoating intervals as well as to calculate the theoretical spreading rate.

DFTs are measured using methods described in the ISO 19840-2012 standard.

The DFT of shop primers is determined using a special procedure, which is available from Hempel on request. For more detail on film thickness, see the *Film thickness* section below.

## Surface preparation

A short description of the minimum surface preparation required (cleanliness and roughness). Detailed surface preparation procedures and techniques are described in Hempel's technical guidelines, available on <https://www.hempel.com/service-and-support/technical-guidelines>.

**Cleanliness:** The degree of cleaning as defined by ISO 8501: *Preparation of steel substrates before application of paints and related products*. This requires a visual assessment of surface cleanliness unless otherwise indicated.

For other substrates than steel, please refer to Hempel's Technical Guidelines and/or the specification. For previously painted surfaces, basic cleaning method and degree of preparatory cleaning is most often described, otherwise refer to the guidelines and/or specification.

**Roughness:** The roughened substrate is characterised by both surface roughness and roughness profile as defined by ISO 8503-2.

When a roughness profile is given in Hempel's PDS, it is normally a sharp profile. The profile specified refers to the ISO Comparator.

## Application

### Mixing ratio

The mixing ratio of the parts for multi-component products. Multi-component products are supplied as separate components (typically the base product, curing agent and/or other additives) in the correct mixing ratio. The mixing ratio must be strictly adhered to (even when mixing smaller amounts) and the individual components must be thoroughly stirred before they are combined.

For more details see Hempel's Technical Guideline "Mixing and thinning" available on <https://www.hempel.com/service-and-support/technical-guidelines>.

### Thinner

The recommended thinner for the product if thinning is needed for the application.

After stirring (and mixing for multi-component products), Hempel's paints are ready to be applied at the film thickness stated in the PDS or in the specification. If the paint is too thick (e.g. in cold weather or for special purposes, such as application in a lower film thickness), the thinner(s) indicated in the PDS may be added to give the required viscosity.

Use only the recommended thinner. Using the wrong thinner may negatively affect the coating system's properties.

For more details see Hempel's Technical Guideline "Mixing and thinning" available on <https://www.hempel.com/service-and-support/technical-guidelines>.

### Cleaner

In most circumstances, the thinner recommended for thinning the product can also be used for cleaning the application tools. However, for some products, special cleaning agents are recommended. This will be stated in the PDS.

Please note that tools used for silicone products or waterborne paints may be particularly difficult to clean. It is important to follow the cleaning instructions in the PDS or in the Hempel Technical Guidelines available on <https://www.hempel.com/service-and-support/technical-guidelines>.

### Pot life

The time from mixing the individual components in a multi-component product to the point when the mixed paint is no longer useable.

Pot life is shown at up to three temperatures within the optimal paint temperature range for the specific product. If the paint's temperature is outside this range, the following rule of thumb may be used.

For solvent-borne paints:

- Pot life is halved for every 10°C [18°F] increase in temperature
- Pot life is doubled for every 10°C [18°F] decrease in temperature.

For waterborne paints:

- Pot life *increases* with increasing temperature.

For Hempadur products, the pot life is usually shorter for airless spray application than for brush application. This is because the anti-sagging properties of the product are gradually lost over time. Thus, high DFTs specified for airless spray application are only obtainable within a shorter pot life.

Please note that pot life cannot be extended by thinning.

### Application method

The recommended methods for applying the product in order of priority. If thinning is required, the normal maximum thinning is indicated for each method. In some cases, higher thinning rates may be needed, consult the specification.

For airless spray, a typical nozzle orifice and nozzle pressure – or a range of nozzle parameters – are shown. Be aware that airless spray data are for guidance only and may require adjusting depending on equipment, working conditions and other requirements.

In general, more coats are required to achieve the specified DFT when the coating is applied by brush or roller instead of spraying.

### Film thickness

Depending on the product, the dry/wet film thickness (DFT/WFT) and the corresponding theoretical spreading rate are either listed as a range or shown as a single recommended value for the *standard* shade listed in the PDS.

The wet film thickness value is calculated as follows:

$$\text{WFT (microns (or mils))} = \frac{\text{DFT (microns (or mils))} \times 100\%}{\text{Volume solids (\%)}}$$

and subsequently rounded to the next WFT step on a typical wet film gauge (comb gauge).

The low and high values show the specification range for the product, but other thicknesses may be specified in specific situations. Please be aware that using other thicknesses will alter the spreading rate, drying/curing time and the overcoating intervals indicated in the PDS. For some products, the PDS will state the highest acceptable DFT above which the performance of the paint or the paint system might be impaired and defects such as sagging, cracking, wrinkling, etc may occur.

Any film thickness specified in a Hempel specification supersedes the values shown in the PDS.

#### **Theoretical spreading rate**

The theoretical spreading rate (TSR) of the paint at a given dry film thickness on a completely smooth surface, calculated as follows:

$$\text{Theoretical spreading rate} \left( \frac{\text{m}^2}{\text{L}} \right) = \frac{\text{Volume solids (\%)} \times 10}{\text{Dry film thickness (microns)}}$$

In most cases TSR is also stated in the US unit 'sq ft/US gal'.

Please note that an increase in film thickness decreases the corresponding spreading rate and vice versa.

Actual consumption (practical spreading rate) may be higher than the theoretical value. However, the practical spreading rate is not given in the PDS, because the variation from case to case is large and depends on many factors. Consumption is mainly affected by: the roughness of the substrate, presence of welding seams, film thickness variances during application, complexity and size/shape of the surface (which may increase paint overlapping) and physical losses from cans, pumps, hoses, etc.

The theoretical spreading rate cannot be given for paint materials used for saturation of an absorbing substrate, such as wood, concrete, etc.

#### **Application conditions**

The recommended climatic conditions for good application. If climatic or other limitations beyond what is dictated by normal good painting practice apply, these will be indicated here. As a general rule, paint should never be applied under adverse weather conditions.

Even if the weather seems fit for painting, condensation will occur if the temperature of the substrate is at or below the dew point (the temperature at which the atmospheric humidity condenses as dew or ice). To reduce the risk of condensation due to weather change, it is recommended that the surface temperature is at least 3°C [5°F] above the dew point during both painting and drying. Beware of ice on the surface when painting at temperatures below freezing.

Preferably, keep the paint temperature above 15°C [60°F], otherwise the paint may require excessive thinning, which will increase the risk of sagging. Viscosity of the paint will increase if the temperature decreases.

In confined spaces, it may be necessary to remove solvent vapours or water vapours by ensuring there is adequate fresh air or mechanical ventilation during application and drying, both to assist evaporation and for safety and health.

## Drying and overcoating

#### **Product compatibility**

Recommendations for preceding and subsequent paints that are compatible with the product. No limitation is implied. Other compatible products may be specified depending on the purpose. In this context, shop primers are regarded as an integral part of surface preparation. The specification supersedes any recommendation given in this section.

#### **Drying time**

Drying/curing time, measured according to standard methods or, in some cases, according to local Hempel procedures.

During measurement, standard conditions relevant for the product in question are applied, including temperature range, relative humidity, film thickness, etc. Changing those parameters will affect drying and curing time. Therefore, the drying/curing times indicated in the PDS may be different under operational conditions.

The drying/curing time is the time needed to reach the stages defined below:

*Touch dry:* The film is sufficiently solidified, by solvent evaporation, chemical reaction or both, so that it no longer flows or sticks to a finger when lightly touched. It is measured according to ISO 9117-4: *Paints and varnishes - Drying tests - Part 4: Test using a mechanical recorder.*

**Surface dry:** The state of a coat of paint or varnish when ballotini (small transparent glass spheres) can be applied and lightly brushed away without damaging the surface of the coating. It is measured according to ISO 9117-3 or ISO 9117-4: *Paints and varnishes - Drying tests - Part 3: Surface-drying test using ballotini or Part 4: Test using a mechanical recorder.*

**Hard dry:** When the drying or curing reaction (or both) has proceeded sufficiently so that the film is not displaced, nor is any noticeable mark left, when the panel is pinched between the thumb and forefinger (with the thumb on the coating film) with a relatively strong force. It is measured according to ISO 9117-4: *Paints and varnishes - Drying tests - Part 4: Test using a mechanical recorder.*

**Dry to handle:** When there is no loosening, detachment, wrinkling or other evidence of distortion of the film after the following test: The tester places a thumb on the film while holding his/her arm in a vertical line from the wrist to the shoulder. He/she then pushes down onto the film, exerting maximum pressure while turning his/her thumb through a 90° angle along the plane of the film. Dry-to-handle is measured according to ASTM D1640: *Standard test methods for drying, curing, or film formation of organic coatings at room temperature.*

**Through dry:** The coating film is dry throughout its thickness; or it has solidified so completely that a large twisting force can be applied without distorting the film. It is measured according to ISO 9117-1 or ISO 9117-4: *Paints and varnishes - Drying tests - Part 1: Determination of through-dry state and through-dry or Part 4: Test using a mechanical recorder.*

**Dry to walk on:** The paint surface is sufficiently hardened to be walked on by a person without being damaged. It is measured using an internal Hempel test method.

**Fully cured:** The paint film has achieved its final properties and is suitable for the intended service, as described on the product data sheet.

### **Overcoating**

**Overcoating with itself.** A film is considered dry for overcoating with itself when a second coat can be applied without the development of any film irregularities, such as lifting or loss of adhesion of the first coat. It is measured by an internal Hempel test method based on a number of ISO and ASTM standard methods.

The overcoating intervals stated in the drying table are intended as a guideline only, as a number of conditions affect overcoating intervals, including temperature, ventilation, film thickness, number of coats, atmospheric conditions before overcoating, etc. Unless otherwise stated, spray application is assumed – other application procedures, such as brush application, may require longer intervals.

The overcoating times shown are for the future corrosive environment that is most relevant for the paint/paint system (i.e. atmospheric conditions of mild, medium or severe as defined at the end of this document.) Where relevant, overcoating intervals are given for immersion service in water.

#### **Minimum and maximum intervals**

The period of time after the application of a coating layer when another coating layer can be successfully applied without experiencing defects in the coating system during its service life.

Unless otherwise stated in the specification, minimum and maximum intervals should always be adhered to if the paint system is to provide maximum protection. The specification always supersedes any guideline overcoat intervals given in the PDS.

The minimum interval is prolonged by a factor of approximately 2.25 if the film thickness is on average 50% higher than specified and a factor of approximately 4 for an average film thickness 100% higher.

The effects of overcoating before the stated minimum time could be wrinkling, bleeding through of the base coat, and solvent entrapment and retention, which may cause loss of adhesion or other defects during the coating system's service life.

The effect of exceeding the recommended overcoating interval is typically reduced adhesion between the two coats. This may result in detachment or peeling, which could be further worsened by exposure to humidity, abrasion, temperature fluctuations and/or further overcoating.

For some paint types, the overcoating interval may not be critical for adhesion. In this case, the maximum overcoating interval is denoted as 'none'. Regardless, a primer coat should not be left unprotected for a very long time in an aggressive environment.

When the overcoating interval is denoted as 'extended', it may be possible to extend the time before overcoating, depending on the condition and cleanliness of the paint's surface as well as other conditions, such as exposure to sunlight. Evaluation of the specific situation must be based on local experience. For advice, contact Hempel.

### **Drying conditions**

The drying times stated in the table require the continuous removal of solvent vapours from above the paint film. When painting indoors, it is essential to have sufficient ventilation during application, drying and curing (please also see notes in the *Application conditions* section above).

### Overcoating details

Any special recommendations related to overcoating.

Before overcoating, the surface must always be thoroughly cleaned of any oil, grease, salt, dust or other contaminant. Exposure to sunlight has a marked effect on the maximum overcoating interval for some products and should also be taken into consideration.

If the maximum overcoating interval is exceeded, it may be necessary to roughen the surface to ensure adhesion to the next coat. After exposure in a polluted environment, thorough cleaning by high-pressure freshwater hosing or another appropriate method is always recommended before overcoating.

Note: For epoxy and polyurethane paints, moisture and carbon dioxide may result in a greasy surface, preventing adhesion to the subsequent coat. In particular, this tends to occur at low temperatures and high humidity.

### Other remarks

Any other relevant data or information.

## Storage

### Shelf life

The time from the date of production to the point at which the quality of the paint can no longer be assured, assuming the paint has been stored correctly, in original unopened containers. The can will include a 'best before' label for guidance. Thereafter, the product quality must be re-inspected. For advice, please consult Hempel.

### Storage conditions

In general, paints and paint components should not be stored at temperatures above 40°C [104°F]. For some products, the storage temperature must be lower (this will be clearly stated on the label). Waterborne paints must not be exposed to frost.

Long-term storage and storage at high temperatures may require careful remixing of the paint prior to application due to (slight) sediment in the can. If the product has been stored at temperatures above 40°C [104°F] or the storage conditions in general are unknown, consult Hempel for advice on suitability.

## Additional documents

A list of relevant technical documents (Hempel Technical Guidelines. The Guidelines documents are available on <https://www.hempel.com/service-and-support/technical-guidelines> or on the relevant local Hempel website.

## General note

The reader should be aware that data, directions and recommendations given in the PDS are based on test results or experience obtained under controlled laboratory or specifically defined conditions. Their accuracy, completeness or appropriateness under actual operational conditions may be different.

All decimals of Hempel's source data are used when calculating derived parameters such as theoretical spreading rate, wet film thickness, conversion between SI and US units, etc.

On the other hand, figures shown in the PDS are rounded-off to the number of significant digits most appropriate for the parameter in question. This entails that if directly converting figures shown in the PDS to derived parameters, rounding errors will appear.

## ADDITIONAL NOTES AND DEFINITIONS OF EXPRESSIONS USED

### Surface cleaning\*

Low pressure water cleaning (LP WC): up to 340 bar/5000 psi

High pressure water cleaning (HP WC): 340-680 bar/5000-10.000 psi

High pressure water jetting (HP WJ): 680-1700 bar/10.000-25.000 psi

Ultrahigh pressure water jetting (UHP WJ): above 1700 bar/25.000 psi

\*As defined in "Joint Surface Preparation Standard NACE No. 5/SSPC-SP 12, 1995".

**Surface tolerant:**

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**Damp surfaces:**

water is not readily detectable, but the temperature of the surface is below the dew point.

**Moist surfaces:**

pools of water and droplets have been removed, but there is a noticeable film of water.

**Wet surface:**

droplets or pools of water are present.

**Blast primer**

is a paint used for short term protection of a newly blast cleaned steel surface of an assembled structure in order to ease the working procedures. In this context blast primers are often regarded an integral part of the surface preparation.

**Holding primer**

was originally used as a term for a paint used to prolong (hold) the protective lifetime of a shopprimer until the specified paint system can be applied, but is now used synonymously as a blast primer.

**Mist coat / flash coat**

is a thin coat (10-25 µm) achieved by applying a thinned paint by swift spray passes / with heavy atomization. In common usage, the terms are used synonymously. Flash coats / mist coats are extensively used to saturate the porosities in zinc silicates and thermally sprayed metals prior to application of a full paint film. But also sealer coats and tie coats are often applied as mist coats / flash coats.

**Tiecoat**

is a layer of paint which improves the adhesion between coatings of different generic types, e.g. to "bridge" between conventional and advanced coatings, or between epoxy and physically drying paints.

**Sealer coat**

is a layer of paint which is used to seal off (fill the pores of) porous surfaces such as concrete, zinc silicates and empty, insoluble matrix of certain antifoulings. In this connection it prevents disturbance of the balance between binder and active pigments of the new antifouling. Furthermore, certain paints may be used as sealer coats to minimise popping of the following coat(s) when painting a porous substrate.

**Spillages and splashes**

When a product is mentioned to be resistant to **spillages and splashes** of certain chemicals, this is understood to be limited in both area, duration and frequency. The spilt chemical must be removed as soon as possible and not later than 1-2 days. Cosmetic change may appear.

**Solvent free?**

Hempel consider a product solvent free when

- The VOC is maximum 30 g/l
- There appears no typical solvents on the safety datasheet

**Classification of environments: MILD, MEDIUM and SEVERE.**

Different corrosion environments will have different effect on substrates and coatings. Therefore information about the environment (service conditions) in which a coating system need to perform – is crucial for the selection and specification of any anti-corrosive coating system.

An environment is typically defined according to corrosion rates of uncoated metals like steel and zinc - which are mainly influenced by time of wetness of surfaces, as well as possible exposure to salts and chemicals.

All of this is explained in ISO 12944-2, which also separates different environments into a system of corrosivity categories.

The corrosivity category is an important design parameter and tool in relation to the selection of a proper coating system for a given object and service.

Hempel uses the corrosion category system of ISO 12944 in our recommended specifications.

**ENVIRONMENTAL EFFECT ON COATING SYSTEMS:**

The environment also has an effect on the coating system, where one of the obvious effects is the sunlight (UV) degradation of for example epoxy coatings.

Exposure to water and high humidity stresses the adhesion of coatings. Continuous or longer term water exposure can lead to delamination/peeling of a coating system that under dry service would have good adhesion and provide satisfactory performance.

Accordingly, this time of wetness is a very important parameter not only for corrosion rates for metals, but also for the intercoat adhesion of coatings.

In addition to the time of wetness, mechanical, chemical and thermal stress also affects adhesion.

**HEMPEL's CLASSIFICATION SYSTEM:**

In order to provide proper guidance on the use of Hempel products – specifically in relation to overcoating intervals, we have established our own classification system. The system addresses time of wetness and other stresses that affect adhesion.

The Hempel classification system consists of three categories for service in atmospheric conditions: MILD, MEDIUM and SEVERE.

These categories are one of the important factors for determining recoating and over coating intervals for coating systems.

A coating system with excellent adhesion in generally dry service may experience inadequate adhesion in other, more aggressive, environments.

This applies mainly for chemically curing paints like alkyds, epoxy and polyurethane where optimum adhesion typically is obtained when the surfaces are dry but not yet fully cured, and where adhesion of subsequent coats will be reduced when overcoating takes place at a later stage.

*Although the adhesion is reduced at long recoating intervals, experience over many years shows that it may be sufficient for many purposes and service conditions.*

The majority of Hempel's Product Datasheets and Application instructions apply this classification system when informing on maximum recoating intervals.

Definition of the different environmental classes and examples are given on next page.

Severity of exposure	Description	Examples
<b>MILD</b>	<p>The coating surface is dry and only occasionally wet, i.e. short periods of time e.g. in relation to cleaning or light showers.</p> <p>The temperature is ambient and without frequent changes. Surfaces are well ventilated. Exposure to mechanical wear is low.</p>	<p>Interior in buildings, heated and ventilated cellars, engine rooms etc.</p> <p>Exterior when sheltered.</p> <p>ISO 12944-2: Typically C1 &amp; C2.</p> <p>Marine: Interior, engine rooms and accommodation.</p>
<b>MEDIUM</b>	<p>The coating surface is normally dry, but will often become wet due to showers, condensation.</p> <p>Water can run off the surfaces and there is in general good ventilation, allowing surfaces to dry up shortly after being wet.</p> <p>The temperature follows the normal changes in the outdoor environment. No frequent fluctuating temperatures due to special service conditions.</p> <p>Exposure to mechanical wear is low.</p>	<p>Interior as for "mild" but with more frequent moderate condensation, e.g. in kitchens, bathrooms, cellars, storage rooms etc.</p> <p>Exterior - normal service conditions in all atmospheric corrosion categories defined by ISO 12944-2, when the requirements listed under "description" are met.</p> <p>ISO 12944-2: Typically C3 &amp; C4.</p> <p>Marine: Superstructure, Light traffic decks, cargo holds excluding dry bulk holds.</p>
<b>SEVERE</b>	<p>The coating surface is frequently wet, due to splashes, showers and/or condensation.</p> <p>Water may not be able to run off the surfaces or due to the design prolonged periods of condensation are anticipated.</p> <p>Spillage of solvents and other aggressive chemicals may occur.</p> <p>Frequent fluctuating temperatures due to special service conditions may occur.</p> <p>Exposure to mechanical wear is medium to high.</p>	<p>Interior: Buildings in which processes or activities give rise to continuous high humidity or heavy condensation or are a source of aggressive fumes, dust or waste products.</p> <p>Exterior: Splash zones (including topsides on ships), decks, underside of bridges etc.</p> <p>ISO 12944-2: Typically C4, C5-M &amp; C5-I.</p> <p>Marine: Topsides, heavy traffic/working decks, cargo holds (bulk).</p>

This document is intended for professional use and provides generic advice in respect of the subject matter only. It is not intended to be used as a comprehensive guide. The buyer/applicator should always read the relevant Product Data Sheet ("PDS") and Safety Data Sheet ("SDS") relating to the Products ordered which are available for download on [www.hempel.com](http://www.hempel.com). If in doubt, please contact your local Hempel representative for further advice. To the extent relevant, the disclaimer set out in the relevant PDS(s) applies to this document.