Marine Paint Guide

Updated: 16/12/14

1. Definitions and abbreviations

TOLERANCES

The numerical information quoted on marine product datasheets has been derived from laboratory test data obtained under controlled conditions for the products described. Whilst every effort has been made to ensure accuracy, this information will be subject to minor variations obtained in normal manufacturing tolerances, and any fluctuations in ambient conditions during the application and curing periods.

GLOSS LEVEL

Typical gloss values have been determined in accordance with ISO 2813:1994/ Corr 1:1997 using a 60° gloss head or, for North America, ASTM-D-523. The categories used in the data sheet are:

Finish (sheen)	Gloss (60°) head
Matt	0-15
Eggshell	16-30
Semi-gloss	31-60
Gloss	61-85
High gloss	>85

In practice, the level of sheen and surface finish will be dependent upon a number of factors, including application and the condition of the surface to be overcoated.

DRY FILM THICKNESS (DFT)

The measured thickness of the final dried film applied to the substrate.

WET FILM THICKNESS (WFT)

The initial thickness of the wet coating applied to the substrate.

VOLUME SOLIDS

The volume solids figure given on the product data sheet is the percentage of the wet film, which remains as the dry film, and is obtained from a given wet film thickness under specified application method and conditions. These figures have been determined under laboratory conditions using a modification of the test method described in ISO 3233:1998/Corr 1:1999 – Determination of Volume Solids by Measurement of Dry Film Density. The modification is technically equivalent involving the use of slightly smaller glass slides. For North America, volume solids are measured by ASTM-D-2697 (1986) which determines the volume solids of a coating using the recommended dry film thickness of the coating quoted on the product data sheet, and a specified drying schedule at ambient temperature, i.e. 7 days at 25°C + 1°C.

DRYING TIME

The drying times quoted in the product data sheet have been determined in the laboratory using a typical dry film thickness, the ambient temperature quoted in the relevant product data sheet, and the appropriate test method, i.e.

Touch Dry (ISO 1517 - 1973) - The surface drying state of a coating when Ballotini (small glass spheres) can be lightly brushed away without damaging the surface of the coating.

Hard Dry (ISO 9117-1990) - The condition of the film in which it is dry throughout its thickness, as opposed to that condition in which the surface of the film is dry but the bulk of the coating is still mobile.

This through drying state is determined by the use of a "mechanical thumb" device "in situ" at the temperature quoted.

In North America the Touch Dry, Hard Dry and Re-coat times are determined in accordance with ASTM-D-1680 (1995) using sections 7.5, 7.7 and 7.8 respectively.

The drying times achieved in practice may show some slight fluctuation, particularly in climatic conditions where the substrate temperature differs significantly from the ambient air temperature and because of variations in practical dry film thickness.

OVERCOATING INTERVAL

The product data sheet gives both a "minimum" and a "maximum" overcoating interval and the figures quoted at the various temperatures are intended as guidelines, consistent with good painting practices. Certain terms require elaboration as follows:

Minimum

The "minimum overcoating time" quoted is an indication of the time required for the coating to attain the necessary state of dryness and hardness to allow the application of a further coat of paint without the development of any film irregularities such as lifting or loss of adhesion of the first coat (ASTM-D-1640). It assumes:

(i) the coating has been applied at the normal recommended thickness.

(ii) environmental conditions both during and after application were as recommended for

that particular coating, especially in respect of temperature, relative humidity and ventilation.

(iii) the paint used for overcoating is suitable for that purpose.

(iv) an understanding of the “method of application”. For example, if a coating can be applied by both brush and spray it is expected that overcoating may be carried out more rapidly if sprayed and it is the “lowest” figure that is quoted.

If the above conditions are not met, the quoted minimum overcoating times are liable to variation and will invariably have to be extended.

Maximum

The “maximum overcoating time” indicates the allowable time period within which overcoating should take place in order to ensure acceptable intercoat adhesion is achieved.

Extended

Where an “extended” overcoating time is stated, the anticipated level of intercoat adhesion can only be achieved if:

(i) the coating has been applied in accordance with good painting practices and at the specified film thickness.

(ii) the aged coating has the “intended” surface characteristics required for long term overcoatability. For example, an over- applied epoxy MIO may not have its usual “textured” surface and will no longer be overcoatable after ageing unless it is abraded.

(iii) the coating to be overcoated must be intact, tightly adherent, clean, dry and free from all contaminants. For example, the leached layer on an antifouling coating is usually porous and friable and must be removed to provide the necessary surface for overcoating.

(iv) coatings having a glossy surface which could have a detrimental effect on the adhesion of subsequent coats should be treated by light surface abrasion, sweep blasting, or other suitable processes which will not cut through or detract from the performance of the underlying coating.

(v) in some situations, and with specific products, it may be necessary to high pressure fresh water wash prior to overcoating.

It should be recognised that the level of intercoat adhesion obtained is also dependent upon the chemistry of the "topcoat". By their nature, primers or undercoats will have inherently better adhesion than finish coats.

The measurement of ultimate "adhesion strength" can often be a difficult process, and interpretation of results can be subjective. Excellent adhesion does not necessarily mean good performance, nor does relatively poor adhesion necessarily mean poor performance.

Although the adhesion of coatings applied to aged / cured coatings may be deemed satisfactory for the specified end use, actual numerical values obtained for adhesion may be less than with coatings applied within "minimum / short" overcoating intervals.

FLASH POINT

The minimum temperature at which a product, when confined in a Setaflash closed cup, must be heated for the vapours emitted to ignite momentarily in the presence of a

flame (ISO 3679:1983). In North America Flash Point is determined in accordance with ASTM-D-3278 (1996).

VOLATILE ORGANIC COMPOUND (VOC)

VOC content is the weight of volatile organic compounds which participate in atmospheric photochemical reactions for litre of paint. Legislative requirements differ from country to country, and from region to region, and are constantly being reviewed. Values quoted for VOC on the product data sheet are calculated from the product formulation or have been determined practically in the laboratory using one of the following published test methods:-

UK-PG6/23(92), Appendix 3

This test method was published in February 1992, by the UK Department of the Environment as part of the Secretary of State's Guidance Note (PG6/23(92)), issued as a guide to local authorities on the appropriate techniques to control air pollution, in order to achieve the objectives laid down in the Environmental Protection Act 1990. The method described in Appendix 3 includes guidance on the method of meeting VOC of coatings, as applied to demonstrate compliance with Clause 19 of the Guidance Note.

USA - EPA Federal Reference Method 24

The Environmental Protection Agency (EPA), published procedures for demonstration of compliance with VOC limits under Federal Reference Method 24 "The Determination of Volatile Matter Content, Density, Volume Solids and Weight Solids of Surface Coatings". This method was originally published in the Federal Register in October 1980, and coded 40 CFR, Part 60, Appendix A, and amended in 1992 to incorporate instructions for dealing with multi-component systems, and a procedure for the quantitative determination of VOC exempt solvent.

It is recommended that users check with local agencies for details of current VOC regulations, to ensure compliance with any local legislative requirements when proposing the use of any coating.

EU Council Directive 1999/13/EC

The purpose of this directive is to prevent or reduce the direct and indirect effects of the emission of volatile organic compounds into the environment, mainly into air, and the potential risks to human health. In essence the directive sets emission limits for coatings users (installations), these differ by application and for old/new installations. For the purpose of the Directive a Volatile Organic Compound (VOC) is defined as:

“Any organic compound having at 293.15 K a vapour pressure of 0.01 kPa or more, or having a corresponding volatility under the particular conditions of use.”

WORKING POT LIFE

The maximum time during which the product supplied as separate components should be used after they have been mixed together at the specified temperature.

The values quoted have been obtained from a combination of laboratory tests, and application trials, and refer to the time periods under which satisfactory coating performance will be achieved.

Application of any product after the working pot life has been exceeded will lead to inferior product performance, and must **NOT** be attempted, even if the material in question appears liquid in the can.

SHIPPING WEIGHT

The shipping weights quoted are typical values and refer to the total weight of the product supplied plus the weight of the can and are for guidance only. They will vary according to the specific colour. These weights are quoted for individual components and do not take into account any additional packaging weight attributable to cartons, etc. Factory supplied material will show differences to the figures quoted on the product Technical Data Sheet.

SHELF LIFE

The shelf life quoted on the product datasheets is generally a conservative value, and it is probable that the coating can be applied without any deterioration in performance after this period has elapsed. Exceeding the shelf life of a product does not necessarily render it unusable. However, if the specified shelf life has been exceeded, it is recommended that the condition of the material is checked before any large scale application is undertaken using materials beyond the quoted shelf life. If this occurs, contact International for advice on how to progress.