PRODUCT DATA SHEETS EXPLANATION 0003

GENERAL

For ease of reference figures are usually stated in one unit only.
All values are given for temperature of 20 °C (68 °F) and relative humidity of 85 %, unless stated otherwise.

GLOSS

With a 'Lange' gloss gauge 5° ranges of gloss have been determined, compared with a standard sheet of black polished glass. The gloss values are determined according to ISO 2813=NEN 2813 (= ASTM D-523, DIN 67530).

The expressions used in the data sheets are:

Matt	corresponds with 0-15 % on Lange gloss gauge (angle 60°)
Eggshell	corresponds with 15-30 % on Lange gloss gauge (angle 60°)
Semi-gloss	corresponds with 30-60 % on Lange gloss gauge (angle 60°)
Gloss	corresponds with 60-80 % on Lange gloss gauge (angle 60°)
High-gloss	corresponds with 80-100% on Lange gloss gauge (angle 60°)

SHELF LIFE

The shelf life is the period during which the paint can be safely transported and stored in undamaged and unopened packing and at temperatures between 10-30 °C.

If the specified shelf life has been exceeded, it is recommended to request the supplier to carry out re-inspection of the material for extend of the shelf life.

DRY TO TOUCH

Drying time in the product data sheet is "dry to touch" unless otherwise indicated. Drying times refer to a temperature of 20°C/68°F, 60-70% relative humidity, with adequate ventilation.

"**Dry to touch**": A slight pressure with a finger does not leave a mark and the surface does not feel sticky

DRY TO HANDLE

The paint surface is suffiently hard to be handled with care without coming off/being damaged.

In the case of physically drying paints, drying time is also influenced by the number of coats, the total film thickness of the system and the film thickness per coat. As a rough rule of thumb, twice the film thickness of a given single coat will require approx. 4 times the drying time with the same amount of ventilation.

This goes for both solvent and waterborne paints. It should be stressed that when apply applying more coats, entrapped solvents may result in a softer film than if only one coat is applied. This is especially relevant in the case of physically drying paints. Also temperature has much influence on the drying/curing time. A temperature drop to 10°C/18°F will roughly require twice the drying time for physically drying paints.

FULL CURE

The curing time is given for two-component products at a (steel) temperature of 20°C/68°F and provided adequate ventilation. The curing is accelerated at higher temperatures and retarded at lower temperatures.

For products where the curing time is given at 20°C/68°F only, the following rough rule of thumb can be utilized:

The curing time is roughly halved at an increase in temperature of 10°C/18°F, and doubled at a decrease in temperature of 10°C/18°F.

FLASH POINT

Is determined according to DIN 53213.(=DIN 53213=ASTM D3278, and to Omega method) see also sheet 9090 - Safety in confined spaces and health safety.

DRY FILM THICKNESS / WET FILM THICKNESS

The dry film thickness indicated in our data sheets is the minimum recommended for protection.

The minimum DFT of a **paint system** (also a one coat system) should not be less than specified whilst for **individual coats** the average DFT should not vary by more than 20%.

This explains in part the difference between theoretical and practical spreading rates.

The dry film thickness can be calculated from the applied wet film thickness:

$$DFT = \frac{WFT \times \%\ \text{volume solids}}{100} \qquad WFT = \frac{DFT \times 100}{\%\ \text{volume solids}}$$

SOLIDS CONTENT BY VOLUME

This value is given in the product data sheet. It can be determined by a laboratory test, corresponding to ASTM method D 2697 (= DIN 53219, ISO 3233, NEN 5346) or calculated from the formulation.

The calculated solids content by volume is in general lower than the determined solids content by volume. The latter however meets practice at best, assuming that the table for spreading rate losses is used correctly.

It is impossible to calculate the solids content by volume from other figures.

$$\text{Volume Solids} = \frac{\text{measured dft} \times 100}{\text{Measured wft}}$$

TOLERANCES

Values given for specific gravity, theoretical spreading rate and solids content are averages from standard production batches; these values can vary slightly.

THEORETICAL SPREADING RATE

The theoretical spreading rate m²/l for a given dry film thickness can be calculated from:

$$M^2/l = \frac{\% \text{ Volume Solid} \times 10}{\text{Dry Film Thickness (in } \mu m)}$$

1 mil is rounded off to 25 micron - the exact value is 25.4 micron

PRACTICAL SPREADING RATE (AS GUIDE ONLY)

% Volume Solids		20	25	30	35	40	45	50
DFT	**20 µm**	10,0	12,5	15,0	17,5	20,0	22,5	25,0
DFT	**25 µm**	8,0	10,0	12,0	14,0	16,0	18,0	20,0
DFT	**30 µm**	6,7	8,3	10,0	11,7	13,3	15,0	16,7
DFT	**50 µm**	4,0	5,0	6,0	7,0	8,0	9,0	10,0
DFT	**60 µm**	3,3	4,2	5,0	5,8	6,7	7,5	8,3
DFT	**75 µm**	2,6	3,4	4,0	4,6	5,4	6,0	6,6
DFT	**80 µm**	2,5	3,1	3,8	4,4	5,0	5,6	6,2
DFT	**100 µm**	2,0	2,5	3,0	3,5	4,0	4,5	5,0
DFT	**125 µm**	1,6	2,0	2,4	2,8	3,2	3,6	4,0
DFT	**150 µm**	1,3	1,7	2,0	2,3	2,7	3,0	3,3

The variation in the Consumption Factor is largely attributed to the following:

a) Complexity and size / shape of the surface to be calculated

Complex, odd-shaped and small-sized surfaces are virtually impossible to paint without overspray and will therefore lead to higher consumption than theoretically calculated from the area square in question.

b) Surface roughness of the substrate

Surface roughness of the substrate gives a "dead volume" "surface area ratio" greater than one and will therefore cause a higher consumption than theoretically calculated for a smooth substrate.

c) Physical losses

Factors such as residues in cans, pumps and hoses, discarded paint due to exceeded pot life, wind loss, etc. will all contribute to a higher consumption.

The Practical spreading rate thus varies with method of application, skill of the painter, shape of the object to be painted, texture of the substrate, film thickness applied, and working conditions. The practical spreading rate

depends on a number of factors: Such surface condition and profile, application method, normal, high build or solvent-free paint, skill of labour and weather conditions.

For calculation guideline the table below has been created

ESTIMATED LOSSES IN PERCENTAGES (AS GUIDE ONLY)

		Bare Steel / 1st Coat				Coated Steel / Subsequent Coat			
Type of Surface and Application Method		NEW ISO-Sa2½		OLD C St 3 D ISO Sa2½		NEW Including shopprimer		OLD due for maintenance	
		interior	exterior	interior	exterior	interior	exterior	interior	Exterior
LARGE 1)	airless spray	30	50	40	60	35	45	45	55
	air-spray	30	40	40	50	25	35	35	45
	roller	25	30	30	35	25	25	35	35
SMALL 2)	airless spray	45	55	55	65	45	55	55	65
	air-spray	45	50	55	60	50	60	55	65
	roller-brush	25	25	25	30	20	20	30	30
STEEL FRAME 3)	airless spray	75	75	85	85	75	75	85	85
	brush	25	25	25	25	20	20	30	30

1) LARGE SURFACES: Steel plates, bulkheads, overheads, external hull, floors and roofs
2) SMALL SURFACES: Doors, boards, structural steel and complex structures
3) FRAMEWORK: Ladders, piping, railings, door frames, window frames.

NOZZLE ORIFICE AND SPRAY ANGLE

In the product data sheets only the recommended orifice is stated. The choice of the spray angle depends very much on the practical situation. Each application should be considered individually and the most appropriate spray angle chosen for the job in hand.

MIXING RATIO

Two-component products are delivered in the correct mixing ratio as stated in the product data sheets. When mixing hardener into the paint component of solvent-thinned paints, rinse hardener tin with some thinner to ensure that the correct proportions are kept. Solvent-free and water-thinned two-component paints require special treatment.

POT LIFE

This gives the time interval after mixing during which a 20 liter pack can be sprayed without addition of more than 3 to 5% extra thinner over the normal proportions.

SERVICE TEMPERATURE

Indicates the maximum temperature that will have no immediate detrimental effect on the paint. A service temperature constantly near the maximum will result in a shorter lifetime of the specified paint system compared to the lifetime anticipated when operating at normal temperatures. ("accelerated ageing").

Most paints will change appearance when exposed to high temperatures, either by a direct change of colour or by loosing gloss.

V.O.C.

The calculated weight of volatile organic content in gramme per litre.

Alternatively, VOC can be indicated by a measured value.

For water-borne paints, two VOC figures are indicated:

1. VOC calculated on total wet paint. DFT/WFT x 100

2. VOC calculated omittting the water content in the wet paint (according to ASTM D3960).

INDICATED FILM THICKNESS

Dry Film Thickness (DFT) is indicated in a thickness frequently used in specifications. Checking of dry film thicknesses is, generally, done with gauges calibrated on smooth reference steel panels.

Wet Film Thickness (WFT) is indicated in multiple of 25 micron (1 mil) in order to facilitate the practical measurements with the wet film thickness gauge (comb gauge). These values are rounded off to the multiple of 25 which is regarded most relevant in each case.

RECOAT INTERVAL

The time required or allowed to pass at 20°C/ 68°F or the relevant temperature range for the product in question before the subsequent coat is applied. The intervals are related to the temperature, film thickness, number of coats, type of future (in service) exposure and will be affected correspondingly.

For maximum intervals the temperature in this context is the highest surface temperature during the period. For some products the interval is more critical in regard to intercoat adhesion than others. If the maximum interval is exceeded it may be necessary to roughen the surface to ensure adhesion of the next coat. On the other hand, for some paint types the interval may not be critical in respect of adhesion, but a primer coat should not be left unprotected for too long in an aggressive environment.

If nothing else is mentioned the indicated intervals refer to recoating with the same paint. Other paints of different types may require other (recoating) intervals.

Minimum and any maximum intervals should always be adhered to if the paint system is to provide maximum protection. Furthermore, beware of undesired influence of moisture and carbon dioxide on epoxy and polyurethane paints, which especially occurs at low temperatures and high humidity. This will result in a greasy surface preventing any adhesion of the subsequent coat.

After exposure of any painted surface in polluted environment thorough cleaning by high pressure fresh water hosing or another appropriate measure is always recommended before recoating.

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