Base Load Power Hub (BLPH)

INSTRUMENT AIR PACKAGE A-63000
PAINTING PROCEDURE

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Rev.	Date	Description	Prepared	Reviewed	Approved

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Lifting sketch

None

1 INTRODUCTION

1.1 PROJECT OVERVIEW

Crosswind, a Shell and Eneco joint venture, was awarded the tender to develop the offshore Hollandse Kust Noord (HKN) wind farm, located 18.5km off the coast of Netherlands near the town of Egmond aan Zee. The consortium plans to have HKN operational in 2023 with an installed capacity of 759MW generating at least 3.3TWh per year. This is sufficient renewable power to supply more than 1 million Dutch households with green electricity.

Offshore wind farms produce intermittent electricity and balancing these dips and peaks and integrating this electricity into the national energy system requires new technologies. For this reason, the offshore wind farm will include several new technologies that could be implemented at full-scale in the future. The new technologies being explored include a floating solar park, a short-duration battery storage as well as long-term storage via green hydrogen produced by water electrolysis and subsequently consumed in a fuel cell. The combination of these individual measures, herein referred to as the Base Load Power Hub (BLPH) will ensure a continuous power supply regardless of the wind situation.

1.1.1 Project Location

The Hollandse Kust Noord (HKN) wind farm is located 18.5km off the coast of the Netherlands near the town of Egmond aan Zee.

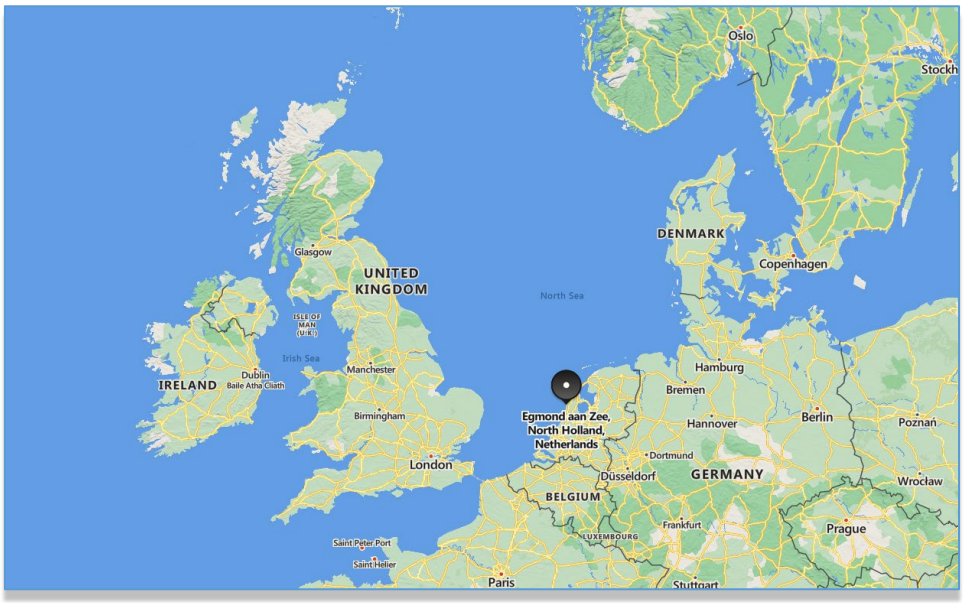


Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map

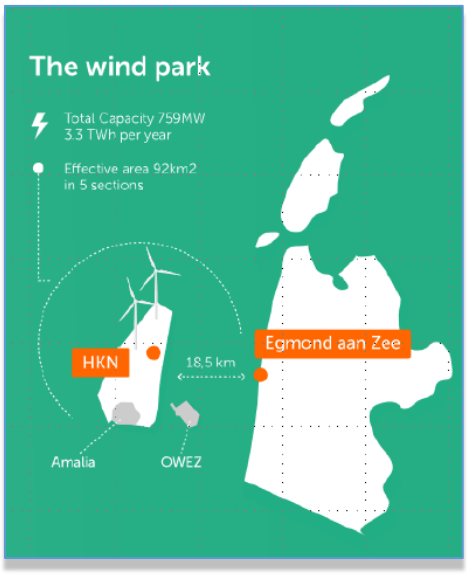


Figure 2 - Wind Park Details

The wind farm will consist of No. 69 x 11.5MW wind turbine generators each to be installed on a dedicated monopile structure. A 70th monopile located on coordinates E 590719.1, N 5841602.3 is reserved for installing the platform accommodating the BLPH. The monopile structure was designed and installed by Van Oord Offshore Wind (VooW) and therefore not part of the BLPH scope.

1.1.2 Project Concept

All components included in the BLPH will be integrated onshore on a topsides and installed in an offshore location within the boundaries of the HKN wind farm. At its simplest, the BLPH will store energy during periods of high electricity generation from renewable sources (a wind turbine generator and the floating solar PV farm) and release it during periods of low generation. In practice. It is expected that the energy stored will supplement generation from renewable sources to ensure that at least 1.0MW of power is exported to the electrical grid regardless of wind/solar availability.

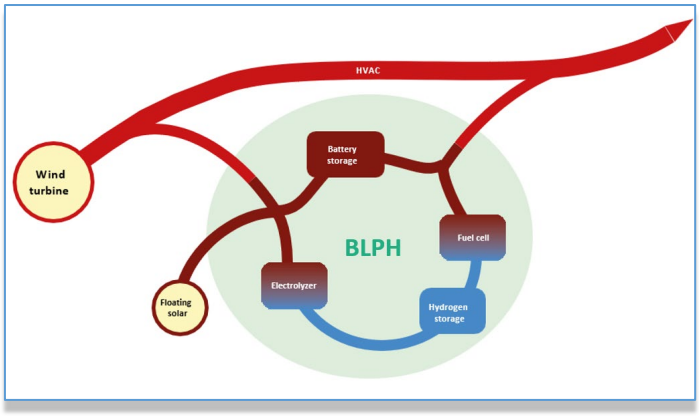


Figure 3 – BLPH Concept

Electricity in the BLPH will be stored in the form of electrons in a battery energy storage system (BESS) as well as converted into green hydrogen via water electrolysis. When the power output from the connecting wind turbine drops to below 1 MWe, the BLPH will return its stored energy to supplement the remaining power output. This will be by discharging the BESS, while stored hydrogen will be converted back into electricity using a fuel cell to extend the discharge duration.

The purpose of the BLPH s to function as a testbed for the integration of energy storage technologies with renewable generation. It is expected that equipment installed on the BLPH will operate as Normally Unmanned Installation for at least two (2) years with no or minimal maintenance and it will have its own independent control room with the ability to communicate with Crosswind's control room.

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2 DOCUMENT SCOPE

This document identifies any electrical equipment to be fed with its main characteristics.

2.1 REFERENCES

Doc. No.	Description
1724000428-PR-PID-00019	PACKAGE P&ID
1724000428-MAC-DA-00005	CERTIFIED PACKAGE GENERAL ARRANGEMENT AND DIMENSIONAL OUTLINE DRAWINGS (INCLUDING : NAMEPLATE, BASEFRAME, FOUNDATION LOADS, NOZZLES LOADS, NOZZLES LIST, BATTERY LIMITS, CoG)

Table 1 - Reference Documents

2.2 DEFINITIONS AND ABBREVIATIONS

COMPANY or Client (CPY):	Crosswind
CONTRACTOR (CTR):	ROSETTI MARINO S.p.A.
PROJECT:	HOLLANDSE KUST NOORD WIND PARK Project

Table 2 - Definitions and Abbreviations

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3 PAINTING SPECIFICATION

3.1 SCOPE

This coating procedures describes the surface preparation and paint application for the Instrument Air Package and shall be read in conjunction with the instruction of the Paint Manufacturer of the used products.

3.2 REFERENCE DOCUMENTS

- 123A90-DDL-MAT-SP-60006_00 Coating and Painting spec
- ISO 8501 (Parts 1;3) Latest Edition: Preparation of steel substrates before application of paints and related products - Visual assessment of surface cleanliness
- ISO 8502 (Parts 3; 6; 9) Latest Edition: Preparation of steel substrates before application of paints and related products - Visual assessment of surface cleanliness
- ISO 8503 (Parts 1; 2) Latest Edition: Preparation of steel substrates before application of paints and related products - Surface roughness characteristics of blast-cleaned steel substrates
- SSPC SP1 Latest Edition: Surface Preparation Standard
- ISO 19840 Latest Edition: Paints and varnishes - Corrosion protection of steel structures by protective paint systems - Measurement of, and acceptance criteria for, the thickness of dry films on rough surfaces
- ASTM D4285 Latest Edition: Standard Test Method for Indicating Oil or Water in Compressed Air
- ASTM D4940 Latest Edition: Standard Test Method for Conductimetric Analysis of Water Soluble Ionic Contamination of Blast Cleaning Abrasives

3.3 PRELIMINARY CONTROLS

Preliminary controls shall be in accordance with SSPC-SP1 Latest Edition.

Paints shall not be applied on any surfaces containing grease, oil, loose rust, mill scale, corrosion products or any other deleterious material. No paint shall be applied to wet, moist or sweating surfaces, or uncleaned previously applied paint.

Under no circumstances shall coating application work be carried out when the relative humidity is above 85%, when ambient temperature is below 10°C or above 40°C, or when the substrate temperature is less than 3°C above the dew point temperature.

All edges, corners, bolt holes and cut ends shall be stripe coated by brush, prior to the application of the second coat. The stripe coat shall either be an additional coat of primer or an additional coat of intermediate coat of different color. The intention of the stripe coat is to ensure that the minimum required dry film thickness is achieved at edges.

All painting equipment must be maintained in good working condition and daily cleaned in accordance with the paint supplier's instructions.

As per ASTM D4285, compressed air used at any time during the painting process shall be completely free of oil and water. Adequate separators and traps shall be provided, installed in the coolest part of the system.

Paint supplier's instructions and recommendations must be followed in detail, without exceptions.

Before starting painting operations, all surfaces which do not require painting shall be checked to verify that they are adequately masked and protected.

Testing shall be performed as detailed in section no.3.9.

3.4 SURFACE PREPARATION

Oil and grease contaminated surfaces, included bolt holes, shall be solvent cleaned per SSPC-SP1 prior any abrasive blasting.

Prior to abrasive blasting, all equipment which can be damaged by blasting, dust, grid or shot, shall be protected by wrapping, taping or other adequate means, to prevent damage.

Surfaces shall be blast cleaned using oil free air, reaching a surface finishing grade equal to SSPC-16 grade for S.S., and ISO 8501-1 Sa3 for C.S.. After blast cleaning, surfaces shall be blown clean of all blasting material and dust with dry air, or by means of an industrial vacuum cleaner.

All weld spatters, sharp edges and surface irregularities shall be contoured and surface irregularities ground smooth as required by reference standard ISO 8501-3 Grade P3.

The use of Carbon steel and copper/nickel alloy abrasives on hot dip galvanized steel and austenitic steel surface is forbidden.

In case of high RH%, above 70%, coatings shall be applied within 4 hours from surface preparation.

Coatings shall not be applied when:

- the ambient temperature is less than 10°C
- the relative humidity is more than 85%
- the surface temperature is less than 3°C above the dew point
- the metal surface temperature is higher than that recommended by manufacturer for application
- surface preparation has not been completed or oil, grease and dust are present on the substrate to be painted
- poor weather conditions for painting exist or are expected within two hours of application such as blowing sand, fog, rain or snow
- total soluble salts are higher than 20 mg/m2 as per ISO 8502-6 & 8502-9.
- available light is less than 500 lux.

Abrasive media shall have a conductivity less than 150µS/cm at 20°C and shall be tested in accordance with ASTM D 4940. Abrasive shall be grit type.

In general, testing shall be performed as detailed in section 3.9.

3.5 PAINT APPLICATION

All paint furnished shall be in unopened, clearly identifiable containers. No paint shall be used whose shelf life has expired. Containers shall remain unopened until required for use.

Coating application shall be carried out after completion of blast cleaning and before any rusting occurs. The blast-cleaned surface shall be vacuum cleaned or blown free of dust and other loose contaminants.

All application data shall be in accordance with the PTDS of the Paint Manufacturer. The type of thinner used shall comply with the Manufacturer's recommendation. Contrasting colors shall be used for each coat of paint. Airless or conventional spray pumps shall be used. Stripe-coating with brush of edges, welds, corners and all irregular surfaces shall be performed to obtain the specified film thickness and to avoid holidays.

The blast-cleaned test panels shall be painted contemporaneously with the same paint system as per the items.

In the period between coating and curing, the freshly applied coating shall not come into contact with handling equipment or any other items that may impact coating quality and shall be held in a covered facility protected from dust, wind and rain. Over-coating time shall be recommended by the Paint Manufacturer in the PTDS.

3.6 PRIMER COAT

Apply to the surface one coat of primer coat.

After primer coat drying, all surfaces shall be visually inspected to verify the absence of areas with mismatched color or paint drops, blisters, bubbles, craters, sags, runs, unnecessary over-spray or brush marks, damages, scoring, and DFT shall be checked.

The use of roller shall be avoided on blast cleaned surfaces or rough welds; roller can be either used for successive layers or stripe coats

Any area evidencing such poor quality shall be cleaned by means of wire brush or emery paper. The surrounding paint, which is still intact, shall be roughened for a distance of 50 mm beyond the damaged area, prior to spot painting, which consists of all the coats previously applied, it is executed by brush and it shall overlap the damaged area at least 50 mm.

Application method and product data are indicated on relevant painting report

3.7 INTERMEDIATE COAT

All surfaces shall be cleaned before intermediate coat application: traces of dirt, grease, oil or other foreign particle must be removed using clean rags and washer detergent, or thinner.

Apply to the surface one coat of intermediate coat

After intermediate coat drying, all surfaces shall be visually inspected to verify the absence of areas with mismatched color or paint drops, blisters, bubbles, craters, sags, runs, unnecessary over-spray or brush marks, damages, scoring, and DFT shall be checked.

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Any area evidencing such poor quality shall be cleaned by means of wire brush or emery paper. The surrounding paint, which is still intact, shall be roughened for a distance of 50 mm beyond the damaged area, prior to spot painting, which consists of all the coats previously applied, it is executed by brush and it shall overlap the damaged area at least 50 mm. Application method and product data are indicated on relevant painting report.

3.8 FINAL COAT

All surfaces shall be cleaned before final coat application: traces of dirt, grease, oil or other foreign particle must be removed using clean rags and washer detergent, or thinner.

Apply to the surface one coat of final coat.

After final coat drying, all surfaces shall be visually inspected to verify the absence of areas with mismatched color or paint drops, blisters, bubbles, craters, sags, runs, unnecessary over-spray or brush marks, damages, scoring, and DFT shall be checked.

Any area evidencing such poor quality shall be cleaned by means of wire brush or emery paper. The surrounding paint, which is still intact, shall be roughened for a distance of 50 mm beyond the damaged area, prior to spot painting, which consists of all the coats previously applied, it is executed by brush and it shall overlap the damaged area at least 50 mm. Application method and product data are indicated on relevant painting report.

Repairs:

Major defects (paint products, application, non conformity of test results): the paint shall be removed completely by abrasive blast-cleaning and the entire system shall be re-applied.

Minor defects (localized appearance, mechanical damage, scratches, etc.): subject to agreement of the supplier of the product, the system shall be removed by localized blast-cleaning, the edges of around coating shall be feathered back about 50mm, and the repair system shall be applied.

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3.9 TESTING

Inspectors shall be individually certified by an approved organization (NACE or FROSIO)

The following tests are carried out, to guarantee the correct and complete painting process

TEST TYPE	METHOD	FREQUENCY	ACCEPTANCE CRITERIA	CORRECTIVE ACTION
Blotter Test	White adsorbent paper ASTM D 4285	Once a day.	A piece of clean white absorbent paper shall be positioned at the air-outlet. After about 1 min. of air discharge there shall be no trace of water and oil on the paper.	Any accumulated moisture and oil in the traps, separators and filters shall be emptied.
Abrasive material	ASTM D4940	Every shift	Conductivity ≤ 150 µS/cm	Materials discarded and clean abrasive shall be used
Temperature Relative Humidity Dew point	Thermo hygrometer ISO 8502-4	Before and during blasting and painting operations.	Air and steel temperature min. 10°C – max. 40°C 85% max. 3°C or more above Dew Point Temperature.	Unless these parameters are met the operations shall not proceed.
Visual Examination	Visual ISO 8501-3	All surfaces.	Fillets, corners, welds are dressed to achieve preparation grade P3 of ISO 8501-3. Sharp edges and weld spatters are dressed to achieve P3 of ISO 8501-3. Flame and plasma cut surfaces are ground smooth. Welding is continuous. Raised slivers, burrs, scabs, weld spatter, laminations or hackles of steel are removed.	Out of conformity items shall be kept aside. Vendor shall be notified.
Pre-cleaning of surfaces	Steam jet cleaner SSPC-SP 1	All surfaces.	Surface contaminants such as oil and grease shall be solvent cleaned as per SSPC-SP 1. Soluble salt deposits, soil and any exogenous compounds shall be removed by steam cleaning and brushing in combination with detergent.	If oil, grease and any exogenous compound is still visible on the surface the operations shall be repeated until conformity is achieved.
Surface Preparation Cleanliness	Blasting booth ISO 8501-1	All surfaces.	The required visual standard of blast cleaning shall correspond to ISO 8501-1 SA 3 for C.S. and SSPC-SP16 for S.S.	Recleaning and retesting until acceptable.
Water Soluble Salts	Bresle-kit ISO 8502-6 ISO 8502-9	Once per 100 m2. Min. 1 for each item	The salt concentration (chlorides) tested on the blast-cleaned surfaces shall not exceed 20 mg/m2.	Washing with potable water and retesting until acceptable.

Blasted Surface Roughness	ISO comparator ISO 8503-1	Spot check Min. 5 readings per 10 m2.	The surface profile shall be between 50 to 85µm, with rough peaks to 100µm (Rz).	Re-blasting.
Surface Dust Cleanliness	Transparent adhesive tape ISO 8502-3	100% of surfaces	After surface preparation any grit, dust, etc. shall be removed. The residual particle quantity and particle size shall be class 2, rating 2.	Recleaning and retesting until acceptable.
Wet Film Thickness	Comb type ISO 2808 Method 1A	Spot checks.	As indicated in PTDS.	Additional coat
Visual Inspection	Visual	During all phases of coating application.	The coating shall be smooth, of uniform color, free of runs, sags, visible holidays, blisters, orange peel, scratches, dust inclusions, solvent retention or any other irregularities.	Repair and retesting.
Dry Film Thickness	Electromagnetic thickness gauge ISO 19840	See table 1 ISO 19840.	Equal to or above 80% NDFT (Nominal Dry Film Thickness). Number of readings between 80% of DFT and NDFT shall not exceed 20% of total readings and max value as indicated in the PTDS. DFT values higher than those indicate in the PTDS shall be allowed only for those areas subjected to stripe-coating.	Repair, additional coats or recoating as appropriate.
Adhesion Test	ISO 4624	Spot checks	Performed on the coated test panels when the coating system is fully cured. Minimum acceptable adhesion value: 5 MPa	Painting to be rejected

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3.10 TOTAL DRY FILM THICKNESS CHECK

Total dry film thickness shall be measured using a daily calibrated magnetic induction instrument. No individual thickness shall be less than 80% of the specified minimum thickness and not more than 20% of thickness measurements taken at random shall be less than the specified minimum thickness.

Required total dry film thickness for the different painting cycles are indicated in paragraph 11

Coated surface shall be free of damage, runs, and sags, pinholes, voids, bubbles, mud cracking and solvent retention.

In any case maximum DFT of Coating Manufacturer shall not be exceeded.

3.11 CERTIFICATION

Painting report, according to applicator standard, with the following information:

- Name of the applicator and responsible personnel
- Dates when the work was carried out
- Equipment and techniques used
- Type of instruments used
- Weather and ambient conditions
- Painting periods
- Tools and methods used to prepare surface
- Information on system being applied
- Paint application techniques.
- Certificates (NACE or FROSIO) of operators and inspectors

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3.12 PAINTING SYSTEMS

3.12.1 Painting system 6A, for external surface of uninsulated stainless steel:

SURFACE PREPARATION	PRIMER	INTERMEDIATE	TOP COAT
Sweep blasting with non-metallic and chloride free grit to obtain anchor profile of approximately 25 µm to 45 µm.	Epoxy primer HEMPEL Hempadur 15570 d.f.t. 50 µm	Epoxy HEMPEL Hempadur 45880 d.f.t. 100 µm	Polyurethane HEMPEL Hempathane HS 55610 d.f.t. 75 µm
NOMINAL TOTAL DRY FILM THICKNESS (NDFT): 225 µm			
FINISHING COLORS • PIPING: White (RAL 9002) • MANUAL & ACTUATED VALVES: White (RAL 9002)			

3.12.2 Painting system 1, for external surface of uninsulated carbon steel

SURFACE PREPARATION	PRIMER	INTERMEDIATE	TOP COAT
Cleanliness: ISO 8501-1 Sa 2½ Roughness: ISO 8503 Profile 50 to 85 µm	Zinc rich primer HEMPEL AVANTGUARD 750 d.f.t. 60 µm	Epoxy HEMPEL Hempadur 45880 d.f.t. 190 µm	Polyurethane HEMPEL Hempathane 55610 d.f.t. 50 µm
NOMINAL TOTAL DRY FILM THICKNESS (NDFT): 300 µm			
FINISHING COLORS • SKID STRUCTURE: White (RAL 9002) • PIPING SUPPORTS: White (RAL 9002) • INSTRUMENT AIR RECEIVER: White (RAL 9002) • MANUAL VALVES: White (RAL 9002)			

3.12.3 Not painted equipments

- Stainless steel tubing and fittings
- Carbon Steel galvanised grating
- Stainless steel PLC

Hempadur Avantguard 750 TL100

Product characteristics

Description
Hempadur Avantguard 750 TL100 is an activated zinc-rich epoxy primer in compliance with the requirements of Level 2, type II in SSPC Paint-20, 2019 and ISO 12944 Part 5, 2018. The product is in full compliance with ASTM D520 type II and EU Directive 2004/42/EC, the Paints Directive on the limitation of volatile organic compounds: subcategory j.

Recommended use
Hempadur Avantguard 750 TL100 is recommended as a primer for steel constructions and bridges.

Service temperature:
- Maximum, dry exposure only: 160°C [320°F].

Certificates / Approvals
- Approved by the German Federal Highway Research Institute (BAST), TL/TP-KOR-Stahlbauten. Blatt 100, Material No.100.1.1.

Features
- Reduces the effect of corrosion and provides excellent galvanic protection.
- Fast drying primer with short minimum overcoating intervals.
- Excellent mechanical strength, also in cyclic temperatures, with improved tolerance to high film thickness through high flexibility and self-healing effect.
- Superior tolerance to high relative humidity during application.
- Cures down to -10°C [14°F].

Product safety

Flash point 25°C [78°F]

VOC content mixed product

Legislation	Value
EU	333 g/L [2.78 lb/US gal]
US (coatings)	333 g/L [2.78 lb/US gal]
US (regulatory)	333 g/L [2.78 lb/US gal]
China	333 g/L [2.78 lb/US gal]

VOC values may vary with shade, please consult the Safety Data Sheet, section 9. According to specific legislation, see details in the Explanatory Notes available at Hempel website, hempel.com or at your local Hempel website. [a]EU Directive 2004/42/CE.

Handling
Handle with care. Before and during use, observe safety labels on packaging and paint containers and follow all local and national safety regulations. Always consult Hempel's Safety Data Sheet for this product along with the Product Data Sheet.

For professional use only.

Product data

Product code
17361

Product components
Base 17365
Curing agent 97043

Standard shade / code
Reddish Grey 19830

Gloss
Flat

Volume solids
65 ± 2%

Specific gravity
2.3 kg/L [19 lb/US gal]

Hempadur Avantguard 750 TL100

Reference dry film thickness
80 micron [3.2 mils]

Surface preparation

Cleanliness
- Remove oil, grease and other contaminants by suitable detergent cleaning.
- Remove salts, detergents and other contaminants by high pressure fresh water cleaning.

New build:
- Abrasive blasting to min. Sa 2½ (ISO 8501-1) / SP 10 (SSPC).
- Remove dust, blast media and loose materials.

Roughness
- Surface profile Medium (G) (ISO 8503-2).

Consult Hempel's separate Surface Preparation Guidelines for more details.

Application

Mixing ratio
Base 17365 : Curing agent 97043
(8.5 : 1.5 by volume)

Stir well before use. It is recommended to use fixed volumes/can size for multi-component products.

Thinner
Above 20°C [68°F] Hempel's Thinner 08450

Cleaner
Hempel's Tool Cleaner 99610

Pot life

Product temperature	0°C [32°F]	0°C [32°F]	20°C [68°F]
Pot life	5 hours	5 hours	4 hours

Application method

Tool	Thinning max vol.	Application parameters
Airless spray	5%	Nozzle pressure: 220 bar [3200 psi] Nozzle orifice: 0.017-0.021"
Air spray	10%	Not Applicable.
Brush/Roller	5%	Not Applicable.

If brush or roller application is used, more coats will be necessary to achieve the specified dry film thickness. Spray data are indicative and subject to adjustment. Pressure is for a material temperature of 20°C [68°F].

Film thickness

Specification range	Low	High	Recommended
Dry film thickness	40 micron [1.6 mils]	100 micron [4.0 mils]	80 micron [3.2 mils]
Wet film thickness	61 micron [2.5 mils]	153 micron [6.1 mils]	123 micron [4.9 mils]
Theoretical spreading rate	16 m²/L [652 sq ft/US gal]	6.5 m²/L [265 sq ft/US gal]	8.2 m²/L [334 sq ft/US gal]

Overthickness must be closely controlled and never locally exceed 150 micron [6.0 mils] DFT. On irregular surfaces it is recommended to employ special care in avoiding over application.

Application conditions
- Temperature of product must be above 15°C [59°F] during application.
- To avoid condensation, apply on a clean and dry surface with a temperature that is at least 3°C [5°F] above the dew point.
- Surface temperature must be above -10°C [14°F] during application and curing.
- Surface temperature must be below 40°C [104°F] during application and curing.
- Minimum surface temperature: 5°C/41°F in case of ZTV ING regulated project.
- Beware of ice on the surface at low temperatures.

Relative Humidity:
- Relative humidity must be below 95% during application.
- Relative humidity must be below 95% during curing.

Hempadur Avantguard 750 TL100

Drying and overcoating

Product compatibility

- Previous coat: According to Hempel's Specification.
- Subsequent coat: According to Hempel's Specification.

Drying time

Surface temperature		5°C [41°F]	15°C [59°F]	30°C [86°F]
Touch dry	min	30	10	5
Hard dry	hours	3	2	1
Fully cured	days	-	-	7

Determined for dry film thickness 80 micron [3.2 mils] at standard conditions, see Hempel's Explanatory Notes for details.

Drying conditions

- To obtain the drying time stated, it is important to maintain sufficient ventilation during application, drying and curing.

Overcoating details

- If the maximum overcoating interval is exceeded, roughening of the surface is necessary to ensure intercoat adhesion.
- Remove zinc salts or other contamination before overcoating.
- The surface must be dry and clean prior to application.

Storage

Shelf life

Ambient temperature	25°C [77°F]
Base	12 months
Curing agent	36 months

Shelf life from date of production, when stored in original, unopened containers. Thereafter, the product quality must be re-inspected. Storage at elevated temperatures may reduce shelf life. For advice, please consult Hempel.

Storage conditions

- Product must be stored according to local legislation, at 40°C [104°F] without direct sunlight and protected from rain and snow.

Carbon Footprint

Dry film thickness	1 µm	1 mil
GWP (Global Warming Potential)	18.8 g CO_2e/m^2	0.098 lb CO_2e/ft^2

The carbon footprint is for 1 square meter / square foot of surface area with a dry film thickness of 1 micron / mil.

The scope includes raw materials, in-bound transport to the Hempel factory, Hempel manufacturing processes, and any Volatile Organic Compounds emitted during and after the application of the product.

It is calculated based on the standard shade defined in this PDS. Values may vary with shade.

Hempadur Avantguard 750 TL100

Additional documents

Additional information is available at the Hempel website https://www.hempel.com/service-and-support/technical-guidelines or at your local Hempel website:

- Explanatory Notes for Product Data Sheet.
- Application methods.
- Substrates.
- Surface Preparation.
- Application Instruction for this product.
- Repair & maintenance.
- Inspection & quality control.

This Product Data Sheet ("**PDS**") relates to the supplied product ("**Product**") and is subject to updating from time-to-time. Accordingly, the buyer/applicator should have regard to the PDS supplied together with the relevant batch of the Product (and not an earlier version). In addition to the PDS, the buyer/applicator may receive some or all of the following specifications, statements and/or guidelines as listed below or as are available from the Hempel website under 'Products' at www.hempel.com (the "**Additional documents**"):

No.	Document description	Location/comments
1.	Technical Statement	One-off specific advice provided on request for specific projects
2.	Specification	Only issued for specific projects
3.	PDS	This document
4.	Explanatory Notes to the PDS	Available at www.hempel.com and contain relevant information about the Product testing parameters
5.	Application Instruction	Where available, at www.hempel.com
6.	Generic technical guidelines (e.g. on application and surface preparation)	Where available, at www.hempel.com

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Hempel shall not be liable for defects where the application of the Product has not been made fully in accordance with the recommendations and requirements set out in the relevant PDS and the Additional Documents. The information and terms of this disclaimer apply to this PDS, the Additional documents and any other documents supplied by Hempel in respect of the Product. In addition, the Product is supplied and all technical assistance is given subject to Hempel's General Conditions of Sale, Delivery and Service, unless otherwise expressly agreed in writing.

Hempadur 15570

Product characteristics

Description
Hempadur 15570 is a two component, polyamide-adduct cured epoxy paint, which cures to a strong and highly corrosion resistant coating, at temperatures down to -10°C/14°F. The Micaceous Iron Oxide pigmented reddish grey 12430 shade is also well suited for application under humid conditions, on damp steel surfaces, and may be applied on moist surfaces. The greyish yellow 21780 and the grey 11320 shades contains zinc phosphate.
Complies with EU Directive 2004/42/EC, The Paints Directive on the limitation of volatile organic compounds: subcategory j.

Recommended use
As a maintenance and repair primer, intermediate, and/or finishing coat in Hempadur systems in severely corrosive environment. As a finishing coat where a cosmetic appearance is of less importance.
As a low temperature curing epoxy primer, intermediate, and/or finishing coat in paint systems according to specification. Well suited as a (blast) primer in epoxy systems.
Mist coat on Galvosil.

Service temperature:
- Maximum, dry exposure only: 140°C [284°F].

Certificates / Approvals
- EC-type examined as a low flame spread material when used as part of a predefined paint system. Please refer to “Declaration of Conformity” on hempel.com for further details.
- Reaction to fire tested (as part of a coating system with approved primer and topcoat) according to EN13501-1 B-s1, d0.

Product safety

Flash point 25°C [77°F]

VOC content mixed product

Legislation	Value
EU	412 g/L [3.44 lb/US gal]
US (coatings)	412 g/L [3.44 lb/US gal]
US (regulatory)	412 g/L [3.44 lb/US gal]
China	388 g/L [3.24 lb/US gal]

According to specific legislation, see details in the Explanatory Notes available at Hempel website, hempel.com or at your local Hempel website. VOC values may vary with shade, please consult the Safety Data Sheet, section 9. [a]EU Directive 2004/42/CE.

Handling
Handle with care. Before and during use, observe safety labels on packaging and paint containers and follow all local and national safety regulations. Always consult Hempel’s Safety Data Sheet for this product along with the Product Data Sheet.

For professional use only.

Product data

Product code
15570

Product components
Base 15579
Curing Agent 95570

Standard shade* / code
Brownish red 50630

Gloss
Flat

Volume solids
54 ± 2%

Specific gravity
1.3 kg/L [11 lb/US gal]

* Other shades are available, please contact your local Hempel representative.

Hempadur 15570

Reference dry film thickness
100 micron [4.0 mils]

Micaceous iron oxide (MIO) shade / code
Metallic grey 12430

Gloss
Flat

Volume solids
54 ± 2%

Specific gravity
1.4 kg/L [12 lb/US gal]

Reference dry film thickness
100 micron [4.0 mils]

Surface preparation

Cleanliness
- Remove oil, grease and other contaminants by suitable detergent cleaning.
- Remove salts, detergents and other contaminants by high pressure fresh water cleaning.
- All damage of shopprimer and contamination from storage and fabrication should be thoroughly mechanically/chemically cleaned prior to final painting.

New build:
- Abrasive blasting to min. Sa 2½ (ISO 8501-1) / SP 10 (SSPC).
- Stainless steel, aluminium and other non ferric metals and alloys: use non-metallic blast media (corundum, garnet, etc.). Sweep blasting to a uniform dense sharp profile, without blank spots.
- Remove dust, blast media and loose materials.

Maintenance and Repair
- Abrasive blasting to min. Sa 2 (ISO 8501-1) / SP 6 (SSPC).
- Water jetting to min. Wa 2 (ISO 8501-4).
- Flash rust degree of maximum FR M (ISO 8501-4).
- Minor areas can be cleaned by power tool to St 3 provided the surface is roughened and not polished.
- Stainless steel, aluminium and other non ferric metals and alloys: use non-metallic blast media (corundum, garnet, etc.). Sweep blasting to a uniform dense sharp profile, without blank spots.
- Remove dust, blast media and loose materials.

Roughness
- Surface profile Medium (G) (ISO 8503-2).

Consult Hempel's separate Surface Preparation Guidelines for more details.

Application

Mixing ratio
Base 15579 : Curing Agent 95570
(3 : 1 by volume)

Stir well before use.

Hempadur 15570

Thinner
Hempel's Thinner 08450

Cleaner
Hempel's Tool Cleaner 99610

Pot life

Product temperature	20°C [68°F]
Pot life	2 hours

Application method

Tool	Thinning max vol.	Application parameters
Airless spray	5%	Nozzle pressure: 175 bar [2500 psi] Nozzle orifice: 0.019-0.021"
Air spray	15%	Not Applicable.
Brush	5%	Not Applicable.

If brush or roller application is used, more coats will be necessary to achieve the specified dry film thickness. Spray data are indicative and subject to adjustment. Pressure is for a material temperature of 20°C [68°F].

Film thickness

Specification range	Low	High	Recommended
Dry film thickness	50 micron [2.0 mils]	125 micron [5.0 mils]	100 micron [4.0 mils]
Wet film thickness	93 micron [3.7 mils]	231 micron [9.3 mils]	185 micron [7.4 mils]
Theoretical spreading rate	11 m²/L [448 sq ft/US gal]	4.3 m²/L [175 sq ft/US gal]	5.4 m²/L [220 sq ft/US gal]

For best performance, avoid excessive film thickness. Product may be specified in another film thickness than indicated depending on purpose and area of use. This will alter spreading rate, drying and curing time and overcoating interval.

Application conditions
- To avoid condensation, apply on a clean and dry surface with a temperature that is at least 3°C [5°F] above the dew point.
- Surface temperature must be above -10°C [14°F] during application and curing.
- Beware of ice on the surface at low temperatures.
- Temperature of product must be above 15°C [59°F] during application.

Relative Humidity:
- Relative humidity must be below 85% during application.
- Relative humidity must be below 85% during curing.

Application remarks
- Metallised surfaces should be overcoated before exposure to open air conditions.
- Flash-coat technique is recommended when overcoating porous substrates.

Drying and overcoating

Product compatibility
- Previous coat: None or according to Hempel's specification.
- Subsequent coat: According to Hempel's Specification. Recommended products are: Hempadur, Hempathane, Hempatex

Drying time

Surface temperature		20°C [68°F]
Touch dry	min	60
Hard dry	hours	5
Fully cured	days	7

Determined for dry film thickness 100 micron [4.0 mils] at standard conditions, see Hempel's Explanatory Notes for details.

Hempadur 15570

Overcoating

Hempel's specification supersedes any guidelines indicated in the overcoating table

Quality name		0°C [32°F]	10°C [50°F]	20°C [68°F]	30°C [86°F]
Atmospheric medium					
Hempadur 15570	Min	18 h	8 h	4 h	3 h
	Max	Ext	Ext	Ext	Ext
Hempathane HS 55610	Min	18 h	8 h	4 h	3 h
	Max	Ext	Ext	Ext	Ext
Hempatex Enamel 56360	Min	9 h	4 h	2 h	90 min
	Max	36 h	16 h	8 h	6 h
Immersion					
Hempadur 15570	Min	36 h	16 h	8 h	6 h
	Max	Ext	Ext	Ext	Ext

Overcoating times are indicative for products of the same generic chemistry. Consult Hempel's specification for more information.

Drying conditions

- To obtain the drying time stated, it is important to maintain sufficient ventilation during application, drying and curing.

Overcoating details

- If the maximum overcoating interval is exceeded, roughening of the surface is necessary to ensure intercoat adhesion.
- The surface must be clean before overcoating.

Other remarks

- Epoxy coats have an inherent tendency of chalking in outdoor exposure. This does not affect the performance of the coating.
- Hempel's Specification supersedes any recommendations given in the Product Data Sheets.

Storage

Shelf life

Ambient temperature	25°C [77°F]
Base	36 months
Curing Agent	36 months

Shelf life from date of production, when stored in original, unopened containers. Thereafter, the product quality must be re-inspected. Storage at elevated temperatures may reduce shelf life. For advice, please consult Hempel.

Storage conditions

- Product must be stored according to local legislation, at maximum 40°C [104°F], without direct sunlight and protected from rain and snow.

Carbon Footprint

Dry film thickness	1 µm	1 mil
GWP (Global Warming Potential)	9.1 g CO_2e/m^2	0.047 lb CO_2e/ft^2

The carbon footprint is for 1 square meter / square foot of surface area with a dry film thickness of 1 micron / mil.

The scope includes raw materials, in-bound transport to the Hempel factory, Hempel manufacturing processes, and any Volatile Organic Compounds emitted during and after the application of the product.

It is calculated based on the standard shade defined in this PDS. Values may vary with shade.

Hempadur 15570

Additional documents

Additional information is available at the Hempel website
https://www.hempel.com/service-and-support/technical-guidelines
or at your local Hempel website:

- Explanatory Notes for Product Data Sheet.
- Application methods.
- General Application Guidelines

This Product Data Sheet ("**PDS**") relates to the supplied product ("**Product**") and is subject to updating from time-to-time. Accordingly, the buyer/applicator should have regard to the PDS supplied together with the relevant batch of the Product (and not an earlier version). In addition to the PDS, the buyer/applicator may receive some or all of the following specifications, statements and/or guidelines as listed below or as are available from the Hempel website under 'Products' at www.hempel.com (the "**Additional documents**"):

No.	Document description	Location/comments
1.	Technical Statement	One-off specific advice provided on request for specific projects
2.	Specification	Only issued for specific projects
3.	PDS	This document
4.	Explanatory Notes to the PDS	Available at www.hempel.com and contain relevant information about the Product testing parameters
5.	Application Instruction	Where available, at www.hempel.com
6.	Generic technical guidelines (e.g. on application and surface preparation)	Where available, at www.hempel.com

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Hempadur Mastic 45880

Product characteristics

Description
Hempadur Mastic 45880 is a polyamide curing, high solids modified epoxy paint. It forms a hard and tough coating, has good wetting properties and cures at low temperature.
Complies with EU Directive 2004/42/EC, The Paints Directive on the limitation of volatile organic compounds: subcategory j.

Recommended use
Hempadur Mastic 45880 is recommended as a self-primed, surface tolerant paint for steel and concrete or as an intermediate or a topcoat in systems where low VOC and high film build are required. The product can be used when extended recoating properties for polyurethane topcoats are required. It may also be used directly on zinc silicate or spray metallised surfaces. The product can be used for minor repairs in immersed areas.

Service temperature:
- Maximum, dry exposure only: 120°C [248°F].

Certificates / Approvals
- EC-type examined as a low flame spread material when used as part of a predefined paint system. Please refer to “Declaration of Conformity” on hempel.com for further details.
- Meets requirements to ISO 12944 when used as part of a predefined paint system. Part 6 C4 High.
- Reaction to fire tested (as part of a coating system with approved primer and topcoat) according to EN13501-1 B-s1, d0.
- Complies with US FDA and EU food regulations for contact with dry foodstuff. Consult Hempel for details.
- Complies with the requirements in EN1504-2 Products and systems for the protection and repair of concrete structures.

Features
- Versatile, can be used for both steel and concrete.
- High surface tolerance.
- Low temperature curing.

Product safety

Flash point 25°C [77°F]

VOC content mixed product

Legislation	Value	5% thinning, by volume	Limit value, phase II (2010)[a]
EU	217 g/L [1.81 lb/US gal]	248 g/L [2.07 lb/US gal]	500 g/L [4.17 lb/US gal]
US (coatings)	217 g/L [1.81 lb/US gal]	-	-
US (regulatory)	217 g/L [1.81 lb/US gal]		
China	217 g/L [1.81 lb/US gal]		

According to specific legislation, see details in the Explanatory Notes available at Hempel website, hempel.com or at your local Hempel website. VOC values may vary with shade, please consult the Safety Data Sheet, section 9. [a]EU Directive 2004/42/CE.

Handling
Handle with care. Before and during use, observe safety labels on packaging and paint containers and follow all local and national safety regulations. Always consult Hempel’s Safety Data Sheet for this product along with the Product Data Sheet.

For professional use only.

Product data

Product code
45880

Product components
Base 45889
Curing Agent 95880

Standard shade* / code
Light grey 12170 **

* Other shades are available, including shades containing MIO. Please contact your local Hempel representative.
** Slight discolouration may occur. This does not affect the performance of the coating.

Hempadur Mastic 45880

Wide range of colours is available via Hempel's tinting system.

Gloss
Semi-gloss

Volume solids
80 ± 2%

Specific gravity
1.5 kg/L [12 lb/US gal]

Reference dry film thickness
125 micron [5.0 mils]

Aluminium shade / code
Aluminium grey 19002

Gloss
Please consult Hempel's Guideline on aluminium pigmented coatings.

Volume solids
72 ± 2%

Specific gravity
1.3 kg/L [11 lb/US gal]

Reference dry film thickness
125 micron [5.0 mils]

Surface preparation

Cleanliness
- Remove oil, grease and other contaminants by suitable detergent cleaning.
- Remove salts, detergents and other contaminants by high pressure fresh water cleaning.

New build:
- Abrasive blasting to min. Sa 2½ (ISO 8501-1) / SP 10 (SSPC).
- Concrete: According to Hempel's Specification.
- Remove dust, blast media and loose materials.

Maintenance and Repair
- Spot abrasive blasting to min. PSa 2 (ISO 8501-2) / SP 6 (SSPC).
- Water jetting to min. Wa 2 (ISO 8501-4).
- Flash rust degree of maximum FR M (ISO 8501-4).
- Remove dust, blast media and loose materials.
- Minor areas can be cleaned by power tool to St 2 provided the surface is roughened and not polished.

Roughness
- Surface profile Medium (G) (ISO 8503-2).

Consult Hempel's separate Surface Preparation Guidelines for more details.

Application

Mixing ratio
Base 45889 : Curing Agent 95880
(3 : 1 by volume)

Stir well before use.

Thinner
Hempel's Thinner 08450

Cleaner
Hempel's Tool Cleaner 99610

Hempadur Mastic 45880

Pot life

Product temperature	15°C [59°F]	20°C [68°F]	30°C [86°F]
Induction time	15 min	10 min	0 min
Pot life (spray)	90 min	60 min	30 min
Pot life (brush)	3 hours	2 hours	1 hour

Application method

Tool	Thinning max vol.	Application parameters
Airless spray	5%	Nozzle pressure: 250 bar [3600 psi] Nozzle orifice: 0.017-0.023"
Brush/Roller	5%	Not Applicable.

If brush or roller application is used, more coats will be necessary to achieve the specified dry film thickness. Spray data are indicative and subject to adjustment. Pressure is for a material temperature of 20°C [68°F].

Film thickness

Specification range	Low	High	Recommended
Dry film thickness	100 micron [4.0 mils]	200 micron [8.0 mils]	125 micron [5.0 mils]
Wet film thickness	125 micron [5.0 mils]	250 micron [10 mils]	150 micron [6.0 mils]
Theoretical spreading rate	8 m²/L [326 sq ft/US gal]	4 m²/L [163 sq ft/US gal]	6.4 m²/L [261 sq ft/US gal]

Product may be specified in another film thickness than indicated depending on purpose and area of use. This will alter spreading rate, drying and curing time and overcoating interval. For best performance, avoid excessive film thickness.

Application conditions

- Temperature of product must be above 15°C [59°F] during application.
- To avoid condensation, apply on a clean and dry surface with a temperature that is at least 3°C [5°F] above the dew point.
- Surface temperature must be above -5°C [23°F] during application and curing.

Relative Humidity:

- Relative humidity must be below 85% during curing.

Drying and overcoating

Product compatibility

- Previous coat: None or according to Hempel's specification.
- Subsequent coat: None or according to Hempel's specification.

Drying time

Surface temperature		-5°C [23°F]	0°C [32°F]	20°C [68°F]	40°C [104°F]
Surface dry	hours	36	20	2½	1
Hard dry	hours	48	25	3½	1½
Fully cured	days	75	30	7	3

Determined for dry film thickness 125 micron [5.0 mils] at standard conditions, see Hempel's Explanatory Notes for details.

Overcoating

Hempel's specification supersedes any guidelines indicated in the overcoating table

Quality name		0°C [32°F]	20°C [68°F]	30°C [86°F]	40°C [104°F]
Atmospheric medium					
Hempadur Mastic 45880	Min Max	54 h Ext	6 h Ext	4½ h Ext	3½ h Ext
Hempathane HS 55610	Min Max	54 h Ext	6 h Ext	4½ h Ext	3½ h Ext
Atmospheric severe					
Hempadur Mastic 45880	Min Max	4 d Ext	10 h Ext	7½ h Ext	5½ h Ext
Hempathane HS 55610	Min Max	4 d 27 d	10 h 72 h	7½ h 54 h	5½ h 40 h

Overcoating times are indicative for products of the same generic chemistry. Consult Hempel's specification for more information.

Hempadur Mastic 45880

Drying conditions
- To obtain the drying time stated, it is important to maintain sufficient ventilation during application, drying and curing.

Overcoating details
- If the maximum overcoating interval is exceeded, roughening of the surface is necessary to ensure intercoat adhesion.
- The surface must be dry and clean prior to application.

Other remarks
- Epoxy coats have an inherent tendency of chalking in outdoor exposure. This does not affect the performance of the coating.
- Hempel's Specification supersedes any recommendations given in the Product Data Sheets.

Storage

Shelf life

Ambient temperature	25°C [77°F]
Base	36 months
Curing Agent	36 months

Shelf life from date of production, when stored in original, unopened containers. Thereafter, the product quality must be re-inspected. Storage at elevated temperatures may reduce shelf life. For advice, please consult Hempel.

Storage conditions
- Product must be stored according to local legislation, at maximum 40°C [104°F], without direct sunlight and protected from rain and snow.

Carbon Footprint

Dry film thickness	1 µm	1 mil
GWP (Global Warming Potential)	6.2 g CO_2e/m^2	0.032 lb CO_2e/ft^2

The carbon footprint is for 1 square meter / square foot of surface area with a dry film thickness of 1 micron / mil.

The scope includes raw materials, in-bound transport to the Hempel factory, Hempel manufacturing processes, and any Volatile Organic Compounds emitted during and after the application of the product.

It is calculated based on the standard shade defined in this PDS. Values may vary with shade.

Hempadur Mastic 45880

Additional documents

Additional information is available at the Hempel website https://www.hempel.com/service-and-support/technical-guidelines or at your local Hempel website:

- Explanatory Notes for Product Data Sheet.
- Application methods.
- Substrates.
- Surface Preparation.
- Application Instruction for this product.
- Repair & maintenance.

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No.	Document description	Location/comments
1.	Technical Statement	One-off specific advice provided on request for specific projects
2.	Specification	Only issued for specific projects
3.	PDS	This document
4.	Explanatory Notes to the PDS	Available at www.hempel.com and contain relevant information about the Product testing parameters
5.	Application Instruction	Where available, at www.hempel.com
6.	Generic technical guidelines (e.g. on application and surface preparation)	Where available, at www.hempel.com

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Hempathane HS 55610

Product characteristics

Description
Hempathane HS 55610 is a glossy polyurethane topcoat, cured with aliphatic isocyanate. The product has very good gloss and colour retention and contains zinc phosphate.
Complies with EU Directive 2004/42/EC, The Paints Directive on the limitation of volatile organic compounds: subcategory j.

Recommended use
Hempathane HS 55610 is recommended as VOC compliant, high-build finishing coat for protection of structural steel in severely corrosive environment. The product may be specified as a one coat "direct to metal" system in environments classified as C2 and C3. It may also be applied directly on galvanised steel.

Service temperature:
- Maximum, dry exposure only: 120°C [248°F].

Certificates / Approvals
- EC-type examined as a low flame spread material when used as part of a predefined paint system. Please refer to “Declaration of Conformity” on hempel.com for further details.
- The following shades are formulated with special electrical conductive pigments that makes it possible to design paint systems that meet the requirements in ISO 80079-36:2016 Explosive atmospheres (ATEX): 95000
- Meets requirements to NORSOK M-501 when used as part of a predefined paint system. Edition 6, System 1. Edition 7, System 1A, 1B.

Features
- For severely corrosive atmospheric environment.
- Direct-to-metal in C2 and C3 environments.
- Glossy with very good gloss and colour retention.
- High volume solids and VOC-compliant.
- The minimum temperature for curing is -10°C [14°F].

Product safety

Flash point 31°C [88°F]

VOC content mixed product

Legislation	Value	5% thinning, by volume	Limit value, phase II (2010)[a]
EU	343 g/L [2.86 lb/US gal]	366 g/L [3.05 lb/US gal]	500 g/L [4.17 lb/US gal]
US (coatings)	320 g/L [2.67 lb/US gal]	-	-
US (regulatory)	343 g/L [2.86 lb/US gal]		
China	343 g/L [2.86 lb/US gal]		
Hong Kong	320 g/L [2.67 lb/US gal]		

According to specific legislation, see details in the Explanatory Notes available at Hempel website, hempel.com or at your local Hempel website. VOC values may vary with shade, please consult the Safety Data Sheet, section 9. [a]EU Directive 2004/42/CE. According to EPA Method 24.

Handling
Handle with care. Before and during use, observe safety labels on packaging and paint containers and follow all local and national safety regulations. Always consult Hempel’s Safety Data Sheet for this product along with the Product Data Sheet.

For professional use only.

Product data

Product code
55610

Product components
Base 55619
Curing Agent 97050

Hempathane HS 55610

Standard shade / code
White 10000 *

Wide range of colours is available via Hempel's tinting system.

Gloss
Glossy

Volume solids
67 ± 2%

Specific gravity
1.4 kg/L [12 lb/US gal]

Reference dry film thickness
80 micron [3.2 mils]

Aluminium shade / code
Aluminium grey 19002

Gloss
Please consult Hempel's Guideline on aluminium pigmented coatings.

Volume solids
58 ± 2%

Specific gravity
1.1 kg/L [10 lb/US gal]

Reference dry film thickness
80 micron [3.2 mils]

Surface preparation

Cleanliness
- Remove oil, grease and other contaminants by suitable detergent cleaning.
- Remove salts, detergents and other contaminants by high pressure fresh water cleaning.

New build:
- Abrasive blasting to min. Sa 2½ (ISO 8501-1) / SP 10 (SSPC).
- Remove dust, blast media and loose materials.

Maintenance and Repair
- Abrasive blasting to min. Sa 2 (ISO 8501-1) / SP 6 (SSPC).
- Minor areas may be hand or power tool cleaned instead of abrasive blasting.
- Water jetting to Wa 2½ (ISO 8501-4).
- Flash rust degree of maximum FR M (ISO 8501-4).
- Remove dust, blast media and loose materials.

Roughness
- Surface profile Medium (S) (ISO 8503-2).

Consult Hempel's separate Surface Preparation Guidelines for more details.

Application

Mixing ratio
Base 55619 : Curing Agent 97050
(7 : 1 by volume)

Stir well before use.

Thinner
Hempel's Thinner 08080

Cleaner
Hempel's Thinner 08080

* Colour stability may be affected by exposure to harsh chemical and/or high temperatures.

Hempathane HS 55610

Pot life

Product temperature	10°C [50°F]	20°C [68°F]	30°C [86°F]
Pot life	3½ hours	2 hours	1 hour

Application method

Tool	Thinning max vol.	Application parameters
Airless spray	5%	Nozzle pressure: 175 bar [2500 psi] Nozzle orifice: 0.017-0.021"

If brush or roller application is used, more coats will be necessary to achieve the specified dry film thickness. Never thin more than allowed according to local environmental legislation. Spray data are indicative and subject to adjustment. Pressure is for a material temperature of 20°C [68°F].

Film thickness

Specification range	Low	High	Recommended
Dry film thickness	50 micron [2.0 mils]	125 micron [5.0 mils]	80 micron [3.2 mils]
Wet film thickness	75 micron [3.0 mils]	187 micron [7.5 mils]	120 micron [4.8 mils]
Theoretical spreading rate	13 m²/L [530 sq ft/US gal]	5.3 m²/L [216 sq ft/US gal]	8.3 m²/L [338 sq ft/US gal]

For best performance, avoid excessive film thickness.

Application conditions

- To avoid condensation, apply on a clean and dry surface with a temperature that is at least 3°C [5°F] above the dew point.
- Surface temperature must be above -10°C [14°F] during application and curing.
- Beware of ice on the surface at low temperatures.
- The film formation may be adversely affected by light rain, high humidity and/or condensation during application and the following interval after application: “8 hours, 20°C/68°F”.
- Optimal spraying properties are obtained at paint temperatures of 15-30°C [59-86°F]. Beyond these temperatures additional thinning may be necessary.

Relative Humidity:

- Relative humidity must be below 85% during curing.
- Relative humidity must be below 85% during application.

Drying and overcoating

Product compatibility

- Previous coat: According to Hempel’s Specification. Recommended products are: Hempaprime Multi 500, Hempadur
- Subsequent coat: None.

Drying time

Surface temperature		10°C [50°F]	20°C [68°F]	30°C [86°F]
Touch dry	min	120	90	60
Surface dry	hours	11	3½	2
Hard dry	hours	12	5	3
Fully cured	days	-	7	-

Determined for dry film thickness 80 micron [3.2 mils] at standard conditions, see Hempel’s Explanatory Notes for details.

Overcoating

Hempel’s specification supersedes any guidelines indicated in the overcoating table

Quality name		-10°C [14°F]	10°C [50°F]	20°C [68°F]	30°C [86°F]
Atmospheric medium					
Hempathane HS 55610	Min	30 h	9 h	6 h	3 h
	Max	Ext*	Ext	Ext	Ext

Overcoating times are indicative for products of the same generic chemistry. Consult Hempel’s specification for more information.

Drying conditions

- To obtain the drying time stated, it is important to maintain sufficient ventilation during application, drying and curing.
- Condensation on the freshly applied coating should be avoided.

Overcoating details

- The surface must be dry and clean prior to application.

Other remarks

- Hempel’s Specification supersedes any recommendations given in the Product Data Sheets.

Hempathane HS 55610

Storage

Shelf life

Ambient temperature	25°C [77°F]
Base	36 months
Curing Agent	24 months

Shelf life from date of production, when stored in original, unopened containers. Thereafter, the product quality must be re-inspected. Storage at elevated temperatures may reduce shelf life. For advice, please consult Hempel.

Storage conditions

- Product must be stored according to local legislation, at maximum 40°C [104°F], without direct sunlight and protected from rain and snow.
- The curing agent is sensitive to moisture. Store in a dry place and keep the can tightly closed until use.

Carbon Footprint

Dry film thickness	1 µm	1 mil
GWP (Global Warming Potential)	8.7 g CO_2e/m^2	0.045 lb CO_2e/ft^2

The carbon footprint is for 1 square meter / square foot of surface area with a dry film thickness of 1 micron / mil.

The scope includes raw materials, in-bound transport to the Hempel factory, Hempel manufacturing processes, and any Volatile Organic Compounds emitted during and after the application of the product.

It is calculated based on the standard shade defined in this PDS. Values may vary with shade.

Additional documents

Additional information is available at the Hempel website https://www.hempel.com/service-and-support/technical-guidelines or at your local Hempel website:

- Explanatory Notes for Product Data Sheet.
- Application methods.
- Surface Preparation.
- Application Instruction for this product.
- Aluminium pigmented topcoats.

This Product Data Sheet ("**PDS**") relates to the supplied product ("**Product**") and is subject to updating from time-to-time. Accordingly, the buyer/applicator should have regard to the PDS supplied together with the relevant batch of the Product (and not an earlier version). In addition to the PDS, the buyer/applicator may receive some or all of the following specifications, statements and/or guidelines as listed below or as are available from the Hempel website under 'Products' at www.hempel.com (the "**Additional documents**"):

No.	Document description	Location/comments
1.	Technical Statement	One-off specific advice provided on request for specific projects
2.	Specification	Only issued for specific projects
3.	PDS	This document
4.	Explanatory Notes to the PDS	Available at www.hempel.com and contain relevant information about the Product testing parameters
5.	Application Instruction	Where available, at www.hempel.com
6.	Generic technical guidelines (e.g. on application and surface preparation)	Where available, at www.hempel.com

In the event of a conflict of information between the PDS and the Additional documents, the order of priority of information shall be in the order as set out above. In such event you should also contact your representative at Hempel for clarification. Furthermore, the buyer/applicator must have full regard to the relevant Safety Data Sheet provided with each Product and which can also be downloaded from www.hempel.com.

Hempel shall not be liable for defects where the application of the Product has not been made fully in accordance with the recommendations and requirements set out in the relevant PDS and the Additional Documents. The information and terms of this disclaimer apply to this PDS, the Additional documents and any other documents supplied by Hempel in respect of the Product. In addition, the Product is supplied and all technical assistance is given subject to Hempel's General Conditions of Sale, Delivery and Service, unless otherwise expressly agreed in writing.