Base Load Power Hub (BLPH)

PAINTING PROCEDURE – HYDROGEN VENT

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Rev.	Date	Description	Prepared	Reviewed	Approved

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Revision / Change Log

Rev.	Description
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02	Accepted for Construction (AFC)

HOLDS LIST

No.	Description
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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.

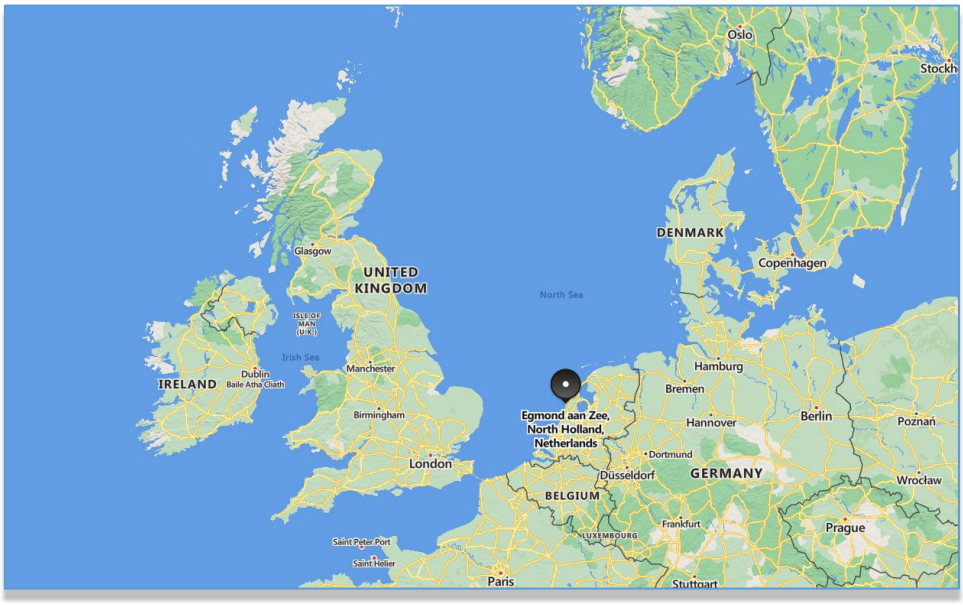


Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map

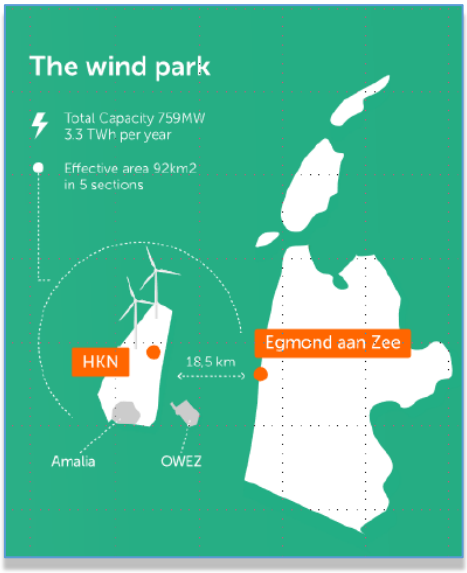


Figure 2 - Wind Park Details

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.

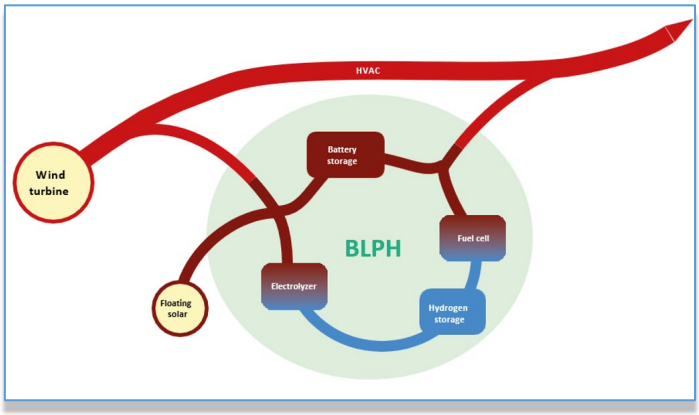


Figure 3 – BLPH Concept

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.

HOLLANDSE KUST NOORD WIND PARK

RISER – TIP – WATER SEAL – WIND TIP

Blue words _ Rev.2

Unoprima Customer: **TICI**	**Final customer:** **ROSETTI MARINO**						
		2	07/11/24	I.S.	A.M.	A.M	**1** of **40**
		1	25/10/24	I.S.	A.M.	A.M	
Customer Job: **393**	**Project:** **HOLLANDESE KUST**	0	26/09/24	I.S.	A.M.	A.M	
		REV.	**ISSUE DATE**	**PREPARED BY**	**CHECKED BY**	**APPROVED BY**	

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1. REFERENCE

CLIENT	TICI
PROJECT	HOLLANDSE KUST NOORD
CLIENT JOB NUMBER	393
DOCUMENT REFERENCE	123A90DDLMATSP60006 REV 01

2. SCOPE

This document describes the working procedure on, carbon steel and S.S: parts for surface preparation application painting application and inspection of external parts of Risers, windshield, water seal stair / handrails.

3. STANDARD

- **ASTM D 4285 - 2006**: Standard test method for indicating oil or water in compressed air.
- **ISO 4624**:**2016** Paints and Varnishes - Pull-off test for adhesion.
- **SSPC SP 16**:**2020** Brush-Off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-Ferrous Metals
- **ISO 8501-3:2006** Part 3: Preparation grades of welds, edges and other areas with surface imperfections
- **ISO 8502-3**:**2017** Preparation of steel substrates before application of paints and related products - Test for the assessment of surface cleanliness - Part 3: Assessment of dust on steel surfaces prepared for painting (pressure sensitive tape method).
- **ISO 8502-4**:**2012** Preparation of steel substrates before application of paint and related products - Test for the assessment of surface cleanliness - Part 4: Guidance on the estimation of the probability of condensation prior to paint application.
- **ISO 8502-6:2020** Preparation of steel substrates before application of paint and related products - Test for the assessment of surface cleanliness - Part 6: Extraction of soluble contaminants for analysis – The Bresle method.

- **ISO 8502-9**:**2020** Preparation of steel substrates before application of paint and related products - Test for the assessment of surface cleanliness – Part 9: Field method for the conduct metric determination of water-soluble salts.
  - **ISO 8503-1:2012** Preparation of steel substrates before application of paint and related products - Surface roughness characteristics of blast-cleaned steel substrates - Part 1: Specifications and definitions for ISO surface profile comparators for the assessment of abrasive
  - **ISO 8503-2:2012** Preparation of steel substrates before application of paint and related products
    Surface roughness characteristics of blast-cleaned steel substrates – Part 2: Comparator procedure.
  - **SSPC-SP 1**:**2004** Solvent cleaning.
  - **ISO 19840:2012** Measurement of dry film thickness

4. PRE – SURFACE INSPECTION & TREATMENT

Prior to surface preparation, substrate surfaces shall be free from dust, dirty and debris And cleaning as per SSPC SP1.

The metallic surface to be protected by paint shall comply with ISO 8501-3 grade P3.

5. CLIMATIC CONDITION & TREATMENT

The painting shall be carried out only at the following conditions:

- Air temperature: from 5 to 40 °C or as indicated in Technical Data Sheet.
- Air relative humidity: max 85%. or as indicated in Technical Data Sheet..
- Steel temperature: at least 3 °C above the dew point temperature of the surrounding air.

Temperature and humidity shall be monitored Before start of each shift and minimum twice per shift.

6. SURFACE PREPARATION

Sharp edges, fillets, corners and welds shall be rounded or smoothened by grinding to grade P3 as defined in ISO 8501-3, minimum radius 2 mm (performed by TICI)

The surfaces shall be free from any foreign matter such as weld flux, residue, slivers, oil, grease, salt etc. prior to blast cleaning.

All surfaces should be washed with clean fresh water prior to blast cleaning.

All machined parts shall be cleaned with a solvent liquid suitable to remove any machining fluids.

Any oil and grease contamination shall be removed in accordance with ISO 12944-4, prior to blasting operations.

The external surfaces in stainless steel shall be blast-cleaned with WHITE CORUNDUM in accordance to the visual standard, SSPC SP16 before painting.

Blast abrasives shall be free from oil, grease, or moisture.

The maximum total allowable level of soluble salts on a prepared surface is 20 mg/m². The salt level shall be assessed in accordance with

ISO 8502-6 and ISO 8502-9The dust level on the blast-cleaned surface at the time of coating shall not exceed Rating 2 in accordance with ISO 8502-3. Checks on dust levels shall be made at once per item.

7. PAINTING CYCLES - REPAIRS

Application will be performed by conventional spray

Before all spray application a suitable stripe coat will

Be performed

COATING SYSTEM 1B – CARBON STEEL PARTS

RISER + STAIRS AND HANDRAILS

(SEE NOTE FOR TEST PLATE QUALIFICATION)

- **SA 2½ – MEDIUM G**
- **AVANTGUARD 750 – 60µm**
- **HEMPAPRIME MULTI 500 - 180µm**
- **HEMPATHANE 55610 – 60µm –**
- **TOT DFT: 300µm**

RISER RAL 9002 – STAIRS AND HANDRAIL RAL 1023

COATING SYSTEM 6A – STAINLESS STEEL PARTS

WINDSHIELD and TIP

- **SSPC SP16 –**
- **HEMPADUR 15570 – 50µm**
- **HEMPAPRIME MULTI 500 - 100µm**
- **HEMPEL PRO ACRYLIC 5588 – 75µm – RAL 9002**
- **TOT DFT: 225µm**

All inspections, from surface preparation to adhesion test shall be followed by Unoprima's Frosio NS 476 Inspector, level III.

TEST QUALIFICATION PLATE FOR SYSTEM 1B

Before starting the work a qualification test plate (Norsok plate) will be worked for qualified system 1B.

All phases of working on plate's will be followed and certified By NS 476 Frosio Inspector level III.

REPAIRS

REPAIR OF DEFECTS

Any repair shall be performed according to the instructions listed in the PDS published by Paint Manufacturer. Failing or for better explain the instructions, the criteria reported in the following sections shall apply.

All damages occurred to previous coats shall be repaired before application of the next one and before the final acceptance of the Company.

Surface preparation activities shall be performed with materials and tools compatible with the metal support, e.g. SS compatible abrasives/tools on SS.

Inadequate coating thickness

In case an inadequate coating thickness is detected, investigation shall start in order to define which of the layers is faulty. If the primer is defective, the total coating shall be removed and reapplied. In case the failure is in the intermediate or finishing layers, all areas with inadequate coating thickness shall be thoroughly cleaned, if necessary, abraded and additional compatible coats applied until they meet the specified thickness.

These additional coats shall not be visible on the final coating and on adjoining areas.

Contaminated Surfaces

Surfaces to be over-coated, which have become contaminated by grease, oil, fatty materials and any other foreign material shall be cleaned and degreased according to the standard SSPC-SP 1.

Coating damages not exposing bare steel

The coating around the damaged area shall be feathered using sandpapering or rotary disking. The re-cleaning shall be extended, not less than 50 mm, to undamaged surrounding surfaces in order to assure film continuity. The complete specified paint system shall be applied on the cleaned area.

Coating damage exposing bare steel

Damaged areas shall be cleaned by abrasive blasting or power tooling as required by the original grade of cleaning.

Damage of small dimension

Any damaged areas less than 200 x 200 mm shall be cleaned at least by power tooling according to standard SSPC-SP 11 and coated with the original specified paint system.

Surface preparation shall be extended not less than 50 mm to the surrounding sound coating and the edges properly fathered.

Damage of medium dimension

Any damaged areas less than 1 m2 shall be cleaned by abrasive blasting according to standard SSPC-SP 10 and coated with the original specified paint system.

Surface preparation shall be extended not less than 50 mm to the surrounding sound coating and the edges properly fathered.

Extensive damage

The damaged areas shall be considered extensive in the following instances:

1. When the surface affected by damages is greater than 1 m2,
2. When the extension of the damages of small and/or medium dimension, is greater than 5% scattered or greater than 10% localized of the coated area.

In this circumstances the complete areas shall be re-blasted and re-coated as originally provided by the Specification.

8. QUALITY CONTROL PLAN

ITEM	INSPECTION TEST ON ITEM	FREQUENCY	ACCEPTANCE STANDARD	REPORT FORM	CONSEQUENCE
1.	INSPECTION ON SURFACE CONDITION / STEEL PREPARATION	ALL SURFACE	SURFACE SHALL BE DRY AND FREE FROM BURS, WELDS, DIRT AND OIL. CLEANING AS PER SSPC SP1. GRADE OF STEEL PREPARATION SHALL BE PER ISO 8501-3 GRADE P3	UNOPRIMA	DEFECT TO BE REPAIRED BY ALFA LAVAL. SOLVENT CLEANING AS PER SSPC – SP1
2.	CLIMATIC CONDITION	BEFORE START OF EACH SHIFT - MINIMUM TWICE PER SHIFT.	ISO 8502 – 4 SURFACE TEMP. 3°C ABOVE DEW POINT, HUMIDITY MAX 85%, AMBIENT TEMPERATURE MIN 5°C OR AS PER TDS	UNOPRIMA	USE HEATER AND / OR DEHUMIDIFICATOR
3.	ABRASIVES QUALITY	BEFORE BLASTING	CONDUCIVITY LESS THAN 150 µS/cm – ISO 11127 – ISO 8502/6-9	UNOPRIMA	CHANGE ABRASIVES OR RETEST
4.	ABRASIVE BLASTING	ALL SURFACE	STAINLESS STEEL PARTS SSPC SP16 CARBON STEEL PARTS SA 2½	UNOPRIMA	RE - BLASTING
5.	SURFACE PROFILE	ONE SHOT PER ITEM	ISO 8503-4 or ISO 8503-5 MEDIUM "G" FOR C.S. FINE "G" FOR S.S.	UNOPRIMA	RE - BLASTING
6.	CLEANING SURFACE / DUST TEST	ALL SURFACE	ISO 8502 – 3 CLASS 2 RATING 2	UNOPRIMA	RE – BLOWING AND TESTING
7.	SALT TEST	ONE EVERY LOT OF BLASTING	ISO 8502 – 06/09 – MAX ACC. VALUE 20mg/m²	UNOPRIMA	CLEAN ITEM WITH FRESH WATER AND RE-TEST
8.	COATING MATERIAL RECEIPT	ALL PRODUCT	Coating material traceability Legible labels clearly -Product name -Batch number -Storage instructions -Date of manufacturer	UNOPRIMA	NEW PRODUCT TO BE PROVIDED
9.	WFT	DURING PAINT APPLICATION	ISO 2808 1A	UNOPRIMA	INCREASE THICKNESS IF IS NOT ENAUGHT
10.	DFT	ISO 19840	ISO 19840	UNOPRIMA	APPLY ANOTHER COAT AS PER TDS
11.	ADHESION TEST	ISO 16276-1	MINIMUM ACCEPTANCE VALUE 5MPa	UNOPRIMA	TEST TO BE REPEATED
12.	VISUAL CHECK TO DETERMINE CURING, CONTAMINATION, SOLVENT RETENTION, PINHOLE/POPPING, RUNS SAGGING AND SURFACE DEFECT	100% ALL SURFACE	NO DEFECT	UNOPRIMA	REMOVAL AND REPAIR DEFECT

10. REPORT PAINTING

unoprima	**RAPPORTO DI VERNICIATURA - Painting report** Data / Date		Nr.	
CLIENTE Customer	COMMITTENTE FINALE Final costumer		COMM. CLIENTE FINALE Final Costumer Job	
OGGETTO Object	PROGETTO Project		CICLO VERNICIATURA Painting System	
PREPARAZIONE DELLA SUPERFICIE - Surface preparation				
Cleaning degree - *ISO 8501-1*	Anchor profile - ISO 8503 - 2	Salt test - *ISO 8502 -6&9*	Dust test - *ISO 8502 -3*	DATA - Date
TEMP. AMBIENTE - Air temperature	UMID. REL - Relative umidity	P.d.R - Dew point	TEMP SUPPORTO - Surf. temp	
VERNICIATURA - Painting				
STRATO - Coat	1st	2nd	3rd	4th
METODO DI APPLICAZIONE Application method				
DATA - Date *TIME - From _ To _*				
TEMPERATURA AMBIENTE Air temperature				
UMIDITA' RELATIVA Relative Humidity		FAC - SIMILE		
PUNTO DI RUGIADA Dew point				
TEMPERATURA SUPPORTO Surface temperature				
PRODOTTO VERNICIANTE Paint product lot/ batch number				
COLORE Color				
CONTROLLO FILM UMIDO µm Wet film thickness check				
CONTROLLO MEK - Mek test - ASTM D 4752-03				
D.F.T. REQUIRED µm				
D.F.T. AVERAGE µm - MIN _ MAX				
TEST DI ADESIONE Adhesion Test ASTM D3359 Meth "A" or ISO 4624				
TEST DIEL. - Holiday test ASTM D5162 Method A WET SPOUNGE TEST 90 V				
NOTE Remarks				
ISPETTORE UNOPRIMA Unoprima Inspector DATA - Date	ISPETTORE CLIENTE Customer Inspector DATA - Date		ISPETTORE COMMITTENTE FINALE Final customer Inspector DATA - Date	

Rapporto vern. Rev. 1 - 18.01.10

11.ATTACHMENT

	UNOPRIMA DAILY LOG					DATE	
1	ENVIROMENTAL CONDITION - ISO 8502 / 4						
	TIME	AIR T°	HUMIDITY %	SURF. T°	DEW POINT	UNOPRIMA'S JOB	CHECKED
2	INDICATING OIL or WATER IN COMPRESSED AIR - ASTM D4285						
	TIME	PLANT POSITION		RESULT		UNOPRIMA'S JOB	CHECKED
3	DETERMINATION OF SOLUBLE SALTS ON SURFACE - ISO 8502 - 6 / 9						
	TIME	FIND VALUE	ZERO SET		RESULTS	UNOPRIMA'S JOB	CHECKED
4	SURFACE ROUGHNESS CHECK - ISO 8503 - 1 / 5						
	TIME	ISO 8503 - 1 COMPARATOR		ISO 8503 - 5 STYLUS		UNOPRIMA'S JOB	CHECKED
5	VISUAL CLEANLINESS - ISO 8501 / 1						
	TIME	REQUEST		FIND		UNOPRIMA'S JOB	CHECKED
6	ASSESSMENT OF DUST ON STEEL SURFACE - ISO 8502 / 3						
	TIME	DUST SIZE CLASS FIND				UNOPRIMA'S JOB	CHECKED
7	NOTE						

TECHMA

Technical data sheet
High carbon steel grit

Description:	High carbon steel grit	
Size specification:	SPEC J444 All pass on 1.70 mm 30% max on 1.40 mm 85% min on 1.00 mm 97% min on 0.85 mm	
Hardness:	Type GP Type GL Type GH	480 ÷ 550 HV (47 ÷ 52 HRC) 570 ÷ 650 HV (54 ÷ 58 HRC) > 840 HV (> 65 HRC)
Bulk Density:	> 7 Kg / dm^3	
Chemical composition:	C 0,80 ÷ 1,2 Mn 0,35 ÷ 1,2% Si ≥ 0,40% S ≤ 0,05% P ≤ 0,05%	
Microstructure:	uniform martensite	

Lecco, 09.01.14

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TECHMA

Technical data sheet
White Alumina Oxide

Description:	White Alumina Oxide			
Form:	angular			
Size and symbols:	BB16	1,18	÷ 1,4 mm	(1230 micron)
	BB20	1,0	÷ 1,18 mm	(1040 micron)
	BB24	0,71	÷ 0,85 mm	(745 micron)
	BB30	0,60	÷ 0,71 mm	(625 micron)
	BB36	0,50	÷ 0,60 mm	(525 micron)
	BB40	0,425	÷ 0,50 mm	(438 micron)
	BB46	0,355	÷ 0,425 mm	(370 micron)
	BB60	0,25	÷ 0,30 mm	(260 micron)
	BB80	0,18	÷ 0,212 mm	(185 micron)
	BB100	0,125	÷ 0,15 mm	(129 micron)
	BB120	0,106	÷ 0,125 mm	(109 micron)
	BB150	0,075	÷ 0,106 mm	(82 micron)
	BB180	0,053	÷ 0,09 mm	(69 micron)
	BB220	0,045	÷ 0,075 mm	(58 micron)
Hardness:	2050 kN/mm^2			
Specific gravity:	3,98 g/cm^3			
Bulk density:	1,61 Kg/dm^3			
Chemical analysis:	Al_2O_3		> 99%	
	TiO_2		≈0,006%	
	SiO_2		≈0,023%	
	Fe_2O_3		≈0,035%	
	CaO		≈0,01%	
	Na_2O		≈0,15%	

Lecco, 11.02.2014

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Product Data Sheet

HEMPEL
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Hempadur 15553

Product characteristics

Description
Hempadur 15553 is a two-component epoxy paint. It cures to a flexible, well adhering coating with good abrasion and impact resistance. Contains zinc phosphate. Cures down to -10°C/14°F. Complies with EU Directive 2004/42/EC, The Paints Directive on the limitation of volatile organic compounds: subcategory j.

Recommended use
Hempadur 15553 is recommended as a primer for systems on hot dipped galvanized steel, aluminium, mild steel and stainless steel surfaces in moderately to severely corrosive environments. Hempadur 15553 is also suited in moderate corrosive environments when roughening of the surface is not possible. Please see surface preparation overleaf.

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.
- Complies with the European Fire Standard EN 13501-1, reaction to fire classification, when used as part of a predefined paint system. B-s1, d0.

Product safety

Flash point 30°C [86°F]

VOC content mixed product

Legislation	Value	5% thinning, by volume	Limit value, phase II (2010)*
EU	388 g/L [3.24 lb/US gal]	411 g/L [3.43 lb/US gal]	500 g/L [4.17 lb/US gal]
US (coatings)	388 g/L [3.24 lb/US gal]	-	-
US (regulatory)	388 g/L [3.24 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. *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
15553

Product components
Base 15557
Curing Agent 98021

Standard shade* / code
Pebble Grey 11320

Gloss
Flat

Volume solids
55 ± 2%

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

Unoprima Customer: TICI	Final customer: ROSETTI MARINO						16 of 40
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Customer Job: 393	Project: HOLLANDESE KUST	0	26/09/24	I.S.	A.M.	A.M	
		REV.	ISSUE DATE	PREPARED BY	CHECKED BY	APPROVED BY	

Product Data Sheet

HEMPEL
Trust is earned

Hempadur 15553

Specific gravity
1.5 kg/L [13 lb/US gal]

Reference dry film thickness
50 micron [2.0 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).
- 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.
- In some cases, roughening of the surface is not required for galvanized and stainless steel. Consult Hempel for advice.

Maintenance and Repair
- Abrasive blasting to min. Sa 2 (ISO 8501-1) / SP 6 (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.
- Feather edges to sound surrounding coating.
- Remove dust, blast media and loose materials.
- In some cases, roughening of the surface is not required for galvanized and stainless steel. Consult Hempel for advice.

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

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

Application

Mixing ratio
Base 15557 : Curing Agent 98021
(3 : 1 by volume)

Stir well before use.

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: 0.017-0.019"

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]	80 micron [3.1 mils]	50 micron [2.0 mils]
Wet film thickness	90 micron [3.5 mils]	150 micron [6 mils]	90 micron [3.5 mils]
Theoretical spreading rate	11 m²/L [450 sq ft/US gal]	6.9 m²/L [280 sq ft/US gal]	11 m²/L [450 sq ft/US gal]

For best performance, avoid excessive film thickness.

Product Data Sheet

Hempadur 15553

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.
- Optimal paint temperature for proper mixing, pumping and spraying is: 15-25°C [59-77°F].

Application remarks
- Flash-coat technique is recommended when overcoating porous substrates.

Drying and overcoating

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

Drying time

Surface temperature		20°C [68°F]
Touch dry	min	18
Hard dry	min	90
Fully cured	days	7

Determined for dry film thickness 50 micron [2.0 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		-10°C [14°F]	0°C [32°F]	20°C [68°F]
Atmospheric medium				
Hempadur 15553	Min Max	27 h Ext*	14 h Ext	3 h Ext
Hempathane HS 55610	Min Max	27 h 90 d	14 h 45 d	3 h 10 d

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 coatings have an inherent tendency of chalking, fading and discolouring. 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]	35°C [95°F]
Base	9 months	9 months
Curing Agent	36 months	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.

Product Data Sheet

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Hempadur 15553

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

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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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Product Data Sheet

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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.
- Complies with the European Fire Standard EN 13501-1, reaction to fire classification, when used as part of a predefined paint system. B-s1, d0.

Product safety

Flash point 25°C [77°F]

VOC content mixed product

Legislation	Value	15% thinning, by volume	Limit value, phase II (2010)*
EU	412 g/L [3.44 lb/US gal]	478 g/L [3.99 lb/US gal]	500 g/L [4.17 lb/US gal]
US (coatings)	412 g/L [3.44 lb/US gal]	-	-
US (regulatory)	412 g/L [3.44 lb/US gal]	-	-
China	412 g/L [3.44 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. *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

Product Data Sheet

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Hempadur 15570

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

Reference dry film thickness
100 micron [3.9 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 [3.9 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).
- Remove dust, blast media and loose materials.

Maintenance and Repair
- Remove dust, blast media and loose materials.
- Flash rust degree of maximum FR M (ISO 8501-4).
- Spot abrasive blasting to min. PSa 2 (ISO 8501-2) / SP 6 (SSPC).
- Water jetting to min. Wa 2 (ISO 8501-4).
- Minor areas can be cleaned by power tool to St 3 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 15579 : Curing agent 95570
(3 : 1 by volume)

Stir well before use.

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].

Product Data Sheet

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Hempadur 15570

Film thickness

Specification range	Low	High	Recommended
Dry film thickness	50 micron [2.0 mils]	125 micron [4.9 mils]	100 micron [3.9 mils]
Wet film thickness	90 micron [3.5 mils]	230 micron [9 mils]	190 micron [7 mils]
Theoretical spreading rate	11 m²/L [450 sq ft/US gal]	4.3 m²/L [180 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.

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 [3.9 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		20°C [68°F]
Atmospheric medium		
Hempadur 15570	Min Max	4 h Ext
Hempathane HS 55610	Min Max	4 h Ext
Hempatex Enamel 56360	Min Max	120 min 8 h
Immersion		
Hempadur 15570	Min Max	8 h 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.

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		REV.	ISSUE DATE	PREPARED BY	CHECKED BY	APPROVED BY	

Product Data Sheet

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Hempadur 15570

Storage

Shelf life

Ambient temperature	25°C [77°F]	35°C [95°F]
Base	36 months	24 months
Curing agent	36 months	24 months

Shelf life from date of production, when stored in original, unopened containers. Thereafter, the product quality must be re-inspected. Always check the best before date or expiry date on the label.

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.

Additional documents

Additional information is available at the Hempel website hempel.com or at your local Hempel website:

- Explanatory Notes explaining the fields in this Product Data Sheet.
- Surface Preparation Guidelines.
- Application Guidelines for different application methods.
- General Application Guidelines

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Unoprima Customer: TICI	Final customer: ROSETTI MARINO						23 of 40
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Customer Job: 393	Project: HOLLANDESE KUST	0	26/09/24	I.S.	A.M.	A.M	
		REV.	ISSUE DATE	PREPARED BY	CHECKED BY	APPROVED BY	

Product Data Sheet

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Hempaprime Multi 500

Product characteristics

Description
Hempaprime Multi 500 is a fast drying, high solids epoxy paint. It provides hard wearing and long lasting barrier protection in coating systems for severe corrosive environments. The product meets the requirements of ISO 12944 Part 5, 2019 when used as part of a predefined paint system.

Recommended use
Hempaprime Multi 500 is recommended as a high-build, intermediate coat in high performance coating systems where fast handling and short overcoating times are required. Due to its fast drying - up to twice as fast as comparable products - the product is excellent for projects where fast throughput is key. The product can also be used as a self-priming, surface tolerant coat and a finishing coat in heavy-duty coating systems. Suited for application down to 10°C [50°F]. The product is available in several MIO shades such as 18021 and 18061; both with 80% MIO content. The volume solids % for MIO shades is 82 ± 2.

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

Certificates / Approvals
- Meets requirements to ISO 12944 when used as part of a predefined paint system. Part 6, Im2; Part 9, CX.
- 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
- Fast overcoating.
- Crack resistant in high film thickness.
- Low VOC.
- Ready to use - optimised application properties.
- Surface tolerant.

Product safety

Flash point 25°C [77°F]

VOC content mixed product

Legislation	Value
EU	196 g/L [1.64 lb/US gal]
US (coatings)	196 g/L [1.64 lb/US gal]
US (regulatory)	196 g/L [1.64 lb/US gal]
China	196 g/L [1.64 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.

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
45950

Product components
Base 45959
Curing Agent 95090

Standard shade / code
Brownish red 50630 *

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

Gloss
Semi-gloss

* Slight discolouration may occur. This does not affect the performance of the coating.

Product Data Sheet

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Hempaprime Multi 500

Volume solids
85 ± 2%

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

Reference dry film thickness
150 micron [6.0 mils]

Aluminium shade / code
Aluminium grey 19002

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

Volume solids
78 ± 2%

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

Reference dry film thickness
150 micron [6.0 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).
- 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
- Spot abrasive blasting to min. PSa 2 (ISO 8501-2) / SP 6 (SSPC).
- Minor areas may be hand or power tool cleaned instead of abrasive blasting.
- Water jetting to min. Wa 2 (ISO 8501-4).
- Flash rust degree of maximum FR M (ISO 8501-4).
- 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.
- Feather edges to sound surrounding coating.
- 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 45959 : Curing Agent 95090
(4 : 1 by volume)

Stir well before use.

Thinner
Hempel's Thinner 08450

Product Data Sheet

HEMPEL
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Hempaprime Multi 500

Cleaner
Hempel's Tool Cleaner 99610
Hempel's Thinner 08450

Pot life

Product temperature	10°C [50°F]	20°C [68°F]	30°C [86°F]	40°C [104°F]
Pot life	2½ hours	1 hour	¾ hours	½ hours
Pot life (brush)	-	60 min	-	-

Application method

Tool	Thinning max vol.	Application parameters
Airless spray	5%	Nozzle pressure: 225 bar [3300 psi] Nozzle orifice: 0.019-0.023"
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]	250 micron [10 mils]	150 micron [6.0 mils]
Wet film thickness	118 micron [4.7 mils]	295 micron [12 mils]	177 micron [7.1 mils]
Theoretical spreading rate	8.5 m²/L [346 sq ft/US gal]	3.4 m²/L [139 sq ft/US gal]	5.6 m²/L [228 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
- Optimal paint temperature for proper mixing, pumping and spraying is: 20°C [68°F].
- 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 [50°F] during application and curing.

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

Application remarks
- Product requires heavy duty spray equipment; spray hoses shall be as short as possible.
- 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: None or according to Hempel's specification. Recommended products are: Hempadur, Hempaprime, Hempathane

Drying time

Surface temperature		10°C [50°F]	20°C [68°F]	30°C [86°F]	40°C [104°F]
Touch dry	hours	2½	1	⅔	½
Surface dry	hours	5½	2½	1	½
Hard dry	hours	8	3½	1½	¾
Fully cured	days	-	7	-	-

Determined for dry film thickness 150 micron [6.0 mils] at standard conditions, see Hempel's Explanatory Notes for details.

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Product Data Sheet

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Hempaprime Multi 500

Overcoating

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

Quality name		10°C [50°F]	20°C [68°F]	30°C [86°F]	40°C [104°F]
Atmospheric medium					
Hempaprime Multi 500	Min	7 h	3 h	2 h	90 min
	Max	Ext*	Ext	Ext	Ext
Hempathane HS 55610	Min	7 h	3 h	2 h	90 min
	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.
- According to Hempel's Specification.

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	24 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.

Carbon Footprint

Dry film thickness	1 µm	1 mil
GWP (Global Warming Potential)	5.5 g CO_2e/m^2	0.028 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.

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Product Data Sheet

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Hempaprime Multi 500

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.

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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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Product Data Sheet

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Hempel's Pro Acrylic

Product characteristics

Description
Hempel's Pro Acrylic 55883 is a two-component, isocyanate-free, acrylic finishing coat with good gloss and colour retention. It is resistant to water and spillage of aliphatic hydrocarbons.
Minimum curing temperature is 0°C/32°F.

Recommended use
Hempel's Pro Acrylic is recommended as a finishing coat for protection of structural steel in severely corrosive environment, where light-fastness and gloss retention are required.
The product may be specified as a one-coat direct-to-metal system in corrosive environments classified as C2 and C3.

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

Certificates / Approvals
- Meets requirements to NORSOK M-501 when used as part of a predefined paint system. Edition 6, System 1.

Product safety

Flash point 32°C [90°F]

VOC content mixed product

Legislation	Value
EU	362 g/L [3.02 lb/US gal]
US (coatings)	432 g/L [3.61 lb/US gal]
US (regulatory)	432 g/L [3.61 lb/US gal]
China	432 g/L [3.61 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.

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
55883

Product components
Base 55889
Curing Agent 97883

Standard shade* / code
White 10000 **

Gloss
Glossy

Volume solids
58 ± 2%

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

Reference dry film thickness
50 micron [2.0 mils]

Aluminium shade* / code**
Aluminium grey 19000 ****

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

* Wide range of colours is available via Hempel's Multi-Tint® system.
** Colour stability may be affected by exposure to chemicals, elevated temperatures, low light conditions and/ or inadequate ventilation.
*** Other shades are available, please contact your local Hempel representative.
**** Appearance of the aluminium pigmented coats will depend on application method, drying conditions, handling etc. Please see the Guideline on Aluminium pigmented coatings at hempel.com or at your local Hempel website.

Issued by Hempel A/S - December 2023

Product Data Sheet

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Hempel's Pro Acrylic

Volume solids
52 ± 2%

Specific gravity
1.1 kg/L [9 lb/US gal]

Reference dry film thickness
50 micron [2.0 mils]

Surface preparation

Cleanliness
- According to Hempel's Specification.

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

Application

Mixing ratio
Base 55889 : Curing Agent 97883
(7 : 1 by volume)

Stir well before use.

Thinner
Hempel's Thinner 08450

Cleaner
Hempel's Thinner 08450

Pot life

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

Application method

Tool	Thinning max vol.	Application parameters
Airless spray	5%	Nozzle pressure: 150 bar [2200 psi] Nozzle orifice: 0.017-0.019"

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]	120 micron [4.7 mils]	50 micron [2.0 mils]
Wet film thickness	90 micron [3.5 mils]	210 micron [8 mils]	90 micron [3.5 mils]
Theoretical spreading rate	12 m²/L [490 sq ft/US gal]	4.8 m²/L [200 sq ft/US gal]	12 m²/L [490 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 0°C [32°F] during application and curing.

Application remarks
- Two coats of the topcoat may be necessary to obtain full hiding power.

Drying and overcoating

Product compatibility
- Previous coat: According to Hempel's Specification. Recommended products are: Hempadur Mastic 4588W, Hempadur 45141/45143
- Subsequent coat: None.

Product Data Sheet

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Hempel's Pro Acrylic

Drying time

Surface temperature		20°C [68°F]
Surface dry	hours	4½
Hard dry	hours	10
Fully cured	days	7

Determined for dry film thickness 50 micron [2.0 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]	10°C [50°F]	20°C [68°F]
Atmospheric medium				
Hempel's Pro Acrylic	Min	18 h	9 h	6 h
	Max	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.

Storage

Shelf life

Ambient temperature	25°C [77°F]
Base	36 months
Curing Agent	18 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

- 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)	11.4 g CO_2e/m^2	0.059 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.

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		REV.	ISSUE DATE	PREPARED BY	CHECKED BY	APPROVED BY	

Product Data Sheet

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Hempel's Pro Acrylic

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

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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

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.

Product Data Sheet

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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)*
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. *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

Product Data Sheet

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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.

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Product Data Sheet

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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.

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Product Data Sheet

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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.

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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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Product Data Sheet

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Hempadur Avantguard 750

Product characteristics

Description
Hempadur Avantguard 750 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 is recommended as a versatile primer for long-term protection of steel in severely corrosive environments including offshore.

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

Certificates / Approvals
- Meets requirements to NORSOK M-501 when used as part of a predefined paint system. Edition 6, System 1. Edition 7, System 1B
- Reaction to fire tested (as part of a coating system with approved primer and topcoat) according to EN13501-1 B-s1, d0.

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 [77°F]

VOC content mixed product

Legislation	Value	5% thinning, by volume	Limit value, phase II (2010)*
EU	330 g/L [2.75 lb/US gal]	356	500
US (coatings)	330 g/L [2.75 lb/US gal]		
US (regulatory)	330 g/L [2.75 lb/US gal]		
China	330 g/L [2.75 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. *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
1736G

Product components
Base 1736U
Curing Agent 97043

Standard shade / code
Grey 19840

Gloss
Flat

Volume solids
65 ± 2%

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Product Data Sheet

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Hempadur Avantguard 750

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

Reference dry film thickness
60 micron [2.4 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 1736U : Curing Agent 97043
(8.5 : 1.5 by volume)

Products containing floating or settling particles/pigments need to be continuosly stirred during application. This is especially important in case of heavy thinning.

Thinner
Below 20°C [68°F] Hempel's Thinner 08960
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"

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]	60 micron [2.4 mils]
Wet film thickness	62 micron [2.5 mils]	154 micron [6.2 mils]	92 micron [3.7 mils]
Theoretical spreading rate	16 m²/L [652 sq ft/US gal]	6.5 m²/L [265 sq ft/US gal]	11 m²/L [448 sq ft/US gal]

Overthickness must be closely controlled and never locally exceed 200 micron [8.0 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.

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

Product Data Sheet

HEMPEL
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Hempadur Avantguard 750

Drying and overcoating

Product compatibility
- Previous coat: None.
- Subsequent coat: According to Hempel's Specification.

Drying time

Surface temperature		-10°C [14°F]	0°C [32°F]	20°C [68°F]	40°C [104°F]
Touch dry	min	50	30	10	5
Hard dry	hours	4½	3	1½	½

Determined for dry film thickness 60 micron [2.4 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]	0°C [32°F]	20°C [68°F]	40°C [104°F]
Atmospheric medium					
Hempaprime Multi 500 Winter	Min	3 h	90 min	45 min	25 min
	Max	Ext*	Ext	Ext	Ext
Hempathane HS 55610	Min	3 h	90 min	45 min	25 min
	Max	56 d	42 d	14 d	3½ d
Atmospheric severe					
Hempaprime Multi 500 Winter	Min	3 h	90 min	45 min	25 min
	Max	90 d	90 d	30 d	7 d
Hempathane HS 55610	Min	3 h	90 min	45 min	25 min
	Max	20 d	15 d	5 d	28 h

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.
- Remove zinc salts or other contamination before overcoating.
- The surface must be dry and clean prior to application.

Other remarks
- Hempel's Specification supersedes any recommendations given in the Product Data Sheets.

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 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)	18.9 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.

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Product Data Sheet

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Hempadur Avantguard 750

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.
- Substrates.
- Surface Preparation.
- Application Instruction for this product.
- Repair & maintenance.
- Inspection & quality control.

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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.

Unoprima Customer: **TICI**	**Final customer:** **ROSETTI MARINO**						**40** of **40**
		2	07/11/24	I.S.	A.M.	A.M	
		1	25/10/24	I.S.	A.M.	A.M	
Customer Job: **393**	**Project:** **HOLLANDESE KUST**	0	26/09/24	I.S.	A.M.	A.M	
		REV.	**ISSUE DATE**	**PREPARED BY**	**CHECKED BY**	**APPROVED BY**	