VALVE INDUSTRIAL PAINTING via Manzoni 18 C Magnago 20020 (MI) ITALY Tel.0331877593

GALLI & CASSINA

JOB 23341

REPAIR PROCEDURE
for external surfaces of carbon steel valves.

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1 STANDARD

- *ASTM D 4285: Standard test method for indicating oil or water in compressed air.*
- *ISO 2808: Paints and Varnishes – Determination of film thickness.*
- *ISO 8501-1: Preparation of steel substrates before application of paints and related products – Visual assessment of surface cleanliness – Part 1: Rust grades and preparation grades of uncoated steel substrates and of steel substrates after overall removal of previous coatings.*
- *ISO 8502-3: 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: 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: 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: Preparation of steel substrates before application of paint and related products – Test for the assessment of surface cleanliness – Part 9: Field method for the conductometric determination of water-soluble salts.*
- *ISO 19840: 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.*
- *SSPC-SP 1: Solvent cleaning.*
- *SSPC-SP 3: Power tool cleaning.*
- *SSPC-SP 11 Power tool cleaning*

2 PRE-BLASTING PREPARATION

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.

3 COATING REPAIRS

TOTAL DAMAGED COATING WITH EXPOSED METAL SUPPORT	***DAMAGED COATING WITHOUT EXPOSED METAL SUPPORT***
SURFACE PREPARATION *SSPC-SP 1 and power tooling of damaged area to SSPC SP11. SP3 acceptable only for the surroundings* *The reminder of the existing coated surface shall be properly protected with shields or screens to prevent any possible damage to the sound coating.*	***SURFACE PREPARATION*** *SSPC-SP 1 and sand-papering of the damaged area and its surrounding (for a min distance of 50 mm into the adjacent undamaged coating).* *The reminder of the existing coated surface shall be properly protected with shields or screens to prevent any possible damage to the sound coating.*
COATING APPLICATION • *HEMPADUR 45880 up to 250 µm (Two or more coat)* • *HEMPATHANE 55210 RAL 7030 50 µm* • *TOTAL DFT 300 µm*	***COATING APPLICATION*** • *Apply the intermediate and/or top coat only*

ANNEX#2

HEMPEL PDS

Hempadur Mastic 45880

Product characteristics

Description
Hempadur Mastic 45880 is a polyamide curing, high solids 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 system, 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.
- 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.
- Complies with US FDA and EU food regulations for contact with dry foodstuff. Consult Hempel for details.

Features
- Versatile.
- 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 **

Gloss
Semi-gloss

Volume solids
80 ± 2%

* 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

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

Reference dry film thickness
125 micron [4.9 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 [4.9 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.

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).
- 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).
- 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 45889 : Curing Agent 95880
(3 : 1 by volume)

Stir well before use.

Thinner
Hempel's Thinner 08450

Cleaner
Hempel's Tool Cleaner 99610

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].

Hempadur Mastic 45880

Film thickness

Specification range	Low	High	Recommended
Dry film thickness	100 micron [3.9 mils]	200 micron [7.9 mils]	125 micron [4.9 mils]
Wet film thickness	125 micron [5 mils]	250 micron [10 mils]	150 micron [6 mils]
Theoretical spreading rate	8 m²/L [330 sq ft/US gal]	4 m²/L [160 sq ft/US gal]	6.4 m²/L [260 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 [4.9 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		0°C [32°F]	20°C [68°F]	30°C [86°F]	40°C [104°F]
Atmospheric medium					
Hempadur Mastic 45880	Min	54 h	6 h	4½ h	3½ h
	Max	Ext	Ext	Ext	Ext
Hempathane HS 55610	Min	54 h	6 h	4½ h	3½ h
	Max	Ext	Ext	Ext	Ext
Atmospheric severe					
Hempadur Mastic 45880	Min	4 d	10 h	7½ h	5½ h
	Max	Ext	Ext	Ext	Ext
Hempathane HS 55610	Min	4 d	10 h	7½ h	5½ h
	Max	27 d	72 h	54 h	40 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.
- 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.

Hempadur Mastic 45880

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. 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.

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

Hempathane Topcoat 55210

Product characteristics

Description
Hempathane Topcoat 55210 is a glossy polyurethane topcoat that is cured with aliphatic isocyanate and delivers good gloss and colour retention.
Complies with EU Directive 2004/42/EC, The Paints Directive on the limitation of volatile organic compounds: subcategory j.

Recommended use
Hempathane Topcoat 55210 is recommended as a finishing coat for protection of structural steel in severely corrosive atmospheric environment, where colour fastness and gloss retention are required.

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.
- 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.

Features
- For severely corrosive atmospheric environment.
- The minimum temperature for curing is -10°C [14°F].
- Glossy with good gloss and colour retention.

Product safety

Flash point 33°C [91°F]

VOC content mixed product

Legislation	Value	10% thinning, by volume	Limit value, phase II (2010)[a]
EU	446 g/L [3.72 lb/US gal]	483 g/L [4.03 lb/US gal]	500 g/L [4.17 lb/US gal]
US (coatings)	446 g/L [3.72 lb/US gal]	-	-
US (regulatory)	446 g/L [3.72 lb/US gal]		
China	446 g/L [3.72 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
55210

Product components
Base 55219
Curing Agent 95370

Standard shade* / code
White 10000 **

Gloss
Glossy

Volume solids
51 ± 2%

* Wide range of colours is available via Hempel’s Multi-Tint® system.
** Colour stability may be affected by exposure to harsh chemical and/or high temperatures.

Hempathane Topcoat 55210

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

Reference dry film thickness
50 micron [2.0 mils]

Aluminium shade / code
Aluminium grey 19002

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

Volume solids
48 ± 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.

New build:
- According to Hempel's Specification.

Maintenance and Repair
- According to Hempel's Specification.

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

Application

Mixing ratio
Base 55219 : Curing Agent 95370
(7 : 1 by volume)

Stir well before use.

Thinner
Hempel's Thinner 08080

Cleaner
Hempel's Thinner 08080
Hempel's Thinner 08510

Pot life

Product temperature	10°C [50°F]	20°C [68°F]	30°C [86°F]
Pot life	6 hours	4 hours	2½ hours

Application method

Tool	Thinning max vol.	Application parameters
Airless spray	10%	Nozzle pressure: 150 bar [2200 psi] Nozzle orifice: 0.017-0.019"
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. To comply with Korean VOC regulation, thinning is limited to max. vol. 1%. Spray data are indicative and subject to adjustment. Pressure is for a material temperature of 20°C [68°F].

Hempathane Topcoat 55210

Film thickness

Specification range	Low	High	Recommended
Dry film thickness	40 micron [1.6 mils]	80 micron [3.1 mils]	50 micron [2.0 mils]
Wet film thickness	80 micron [3 mils]	150 micron [6 mils]	100 micron [4 mils]
Theoretical spreading rate	13 m²/L [530 sq ft/US gal]	6.4 m²/L [260 sq ft/US gal]	10 m²/L [410 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
- 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.
- The film formation may be adversely affected by light rain, high humidity and/or condensation during application and the following interval after application: “10 hours, 20°C/68°F”.

Relative Humidity:
- Relative humidity must be below 85% during 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: Hempaprime Multi 500 45950/3, Hempadur Quattro series, Hempadur Avantguard series.
- Subsequent coat: None.

Drying time

Surface temperature		-10°C [14°F]	0°C [32°F]	20°C [68°F]	40°C [104°F]
Touch dry	hours	2½	1⅔	¾	⅓
Surface dry	min	-	-	60	-
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]	40°C [104°F]
Atmospheric medium					
Hempathane Topcoat 55210	Min	30 h	18 h	6 h	100 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.
- 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 Topcoat 55210

Storage

Shelf life

Ambient temperature	25°C [77°F]	35°C [95°F]
Base	36 months	24 months
Curing Agent	24 months	16 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.

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