

	
Title	PAINTING PROCEDURE
Document No.	L03-RE035-QC-PCJ-002
Revision	00

1. Purpose

This work-instruction is applicable whenever epoxy primer and final standard coating is required on bare compressor and compressor packages. It regards carbon steel and cast iron frame, piping and equipment surfaces only. See below for further detail.

2. Definitions

Not applicable

3. Performers

All thereto appoint operators, which had the related 'on the job training'.

4. Instructions and criteria's

4.1. Surface preparation:

All equipment which needs to be painted will be cleaned as follows:

Thoroughly degreasing of all surfaces by use of Benzine D and air pressurized pistol.
 Removing all discontinuities (e.g. weld spatters) by chipping and by grit blasting.
 Grit blasting according SA 2 ½" where applicable.
 Drying all surfaces by blowing air with an air pressurized pistol.
 All surfaces will be clean and free from any contamination before the painting action will be proceeded.
 Protect all openings, flange facings, identification plates, stem threads etc... by use of proper protection material.

4.2. Painting:

Check thoroughly for cleanliness of all surfaces and protection of all area's which need not to be painted, before proceeding.

Painting shall be done after hydro-test.

The paint will be applied by means of a manual spray pistol with an opening between 1.2 - 1.5 mm.
 The spray pressure will be between 3 - 5 barA.

The paint action will be performed with a smooth horizontal or vertical movement of the spray pistol.
 The distance between spray pistol and equipment will be ± 40 cm.
 Painting shall be done indoors. The air temperature will be 5 – 40deg.C.
 The relative humidity will be 50 – 80%.
 All steel temperatures will be at least 3deg.C above dew point of the surrounding air.

Items not to be painted:

- 1) Stainless steel surfaces
- 2) Aluminium surfaces (except caps)
- 3) Name- and tag plates
- 4) Levers
- 5) Galvanized surfaces
- 6) Visual wiring
- 7) Coupling covers
- 8) Insulation
- 9) Stem threads
- 10) Flange facings
- 11) SS Valve body, stem, handle, Actuators

Items painted to Manufacturer Standard:

- 1) Electric Motors
- 2) Instruments
- 3) Heaters
- 4) PLC panel, junction boxes
- 5) Compressor and oil pump

Following coats will be applied on all other surfaces:

1st Coat : Hempadur Fast Dry 15560 Or Equivalent
2 component zink fosfate HB primer
Layer thickness: min. 75 µm DFT

2nd Coat: Hempadur 15570 Or Equivalent
2 component epoxy primer,
Layer thickness: min. 75 µm DFT

Final Coat : Hempthane HS 55610 Or Equivalent
Top coat is a high build 2 component acrylic polyurethane finish.
Layer thickness: min. 75 µm DFT

Dilution: as specified in the final coating technical documentation
Remover: BENZINE D or other appropriate remover
Drying time: as specified in the final coating technical documentation
Hardness: as specified in the final coating technical documentation

Final dry film thickness will be min. 225 µm

4.3. Colors:

Process and utility piping Pressure vessels, heat exchanger	RAL 7038
Compressors, Pumps	RAL 7038
Motors	RAL5015
Safety valves	RAL 7038
Base frame and external steel work	RAL 7038
Ladders, stages & supports	RAL 7038
Local panel, Junction boxes	Mfr. Standard

5. Registration

After cleaning following requirements shall be met:

- All surfaces will be visually clean and free from any contamination.

Before painting:

- Ambient conditions (impression).
- Steel condition (impression).

After painting following requirements shall be met:

- Uniform consistency of paint
- No paint gutters allowed
- No blank material visible
- No foreign materials in paint

After painting a visual inspection according the above requirements and a thickness measurement will be performed.

All results will be recorded on an inspection report and filed within the relevant job order file.

All above mentioned coats (DFT) will be measured by the use of the coating thickness gauge ELCOMETER 345 or other appropriate equipment. Perform a measurement at 20 different spots of the equipment.

All readings must be within the tolerances.

Inspection report: thickness of all layers must be within the tolerances. Registration in report MF/10/Q009

6. Appendix

Selected coating technical documentation – Hempadur Fast Dry 15560, Hempadur 15570, Hemptthane HS 55610 or Equivalent which is subjected to client confirmation.



Product Data

HEMPADUR FAST DRY 15560

15560: BASE 15569 : CURING AGENT 97560

Description:	HEMPADUR FAST DRY 15560 is a two-component epoxy paint with a very short drying time. Contains zinc phosphate.
Recommended use:	As a quick drying primer or intermediate coat in HEMPADUR systems for especially fast recoatable in-shop applications. Can be used for on-site work too if eg VOC compliance is requested.
Service temperature:	Maximum, dry exposure only: 140°C/284 °F
Certificates/Approvals:	Complies with EU Directive 2004/42/EC: subcategory j.
Availability:	Part of Group Assortment. Local availability subject to confirmation.

PHYSICAL CONSTANTS:

Shade nos/Colours:	12170* / Grey. see REMARKS overleaf.
Finish:	Flat
Volume solids, %:	62 ± 1
Theoretical spreading rate:	6.2 m ² /l [248.6 sq.ft./US gallon] - 100 micron/4 mils
Flash point:	27 °C [80.6 °F]
Specific gravity:	1.4 kg/litre [12 lbs/US gallon]
Surface dry:	0.5 approx. hour(s) 20 °C/68 °F
Dry to touch:	1 - 1.5 hour(s) 20 °C/68 °F
Fully cured:	7 day(s) 20 °C/68 °F
VOC content:	351 g/l [2.9 lbs/US gallon] <i>*other shades according to assortment list.</i>

The physical constants stated are nominal data according to the HEMPEL Group's approved formulas.

APPLICATION DETAILS:

Version; mixed product:	15560
Mixing ratio:	BASE 15569 : CURING AGENT 97560 4 : 1 By volume
Application method:	Airless spray / Air spray / Brush
Thinner (max.vol.):	08450 (5%) / 08450 (15%) / 08450 (5%)
Pot life:	2 hour(s) 20 °C/68 °F
Nozzle orifice:	0.019 - 0.021 "
Nozzle pressure:	175 bar [2537.5 psi] (Airless spray data are indicative and subject to adjustment) HEMPEL'S TOOL CLEANER 99610
Cleaning of tools:	HEMPEL'S TOOL CLEANER 99610
Indicated film thickness, dry:	100 micron [4 mils] see REMARKS overleaf.
Indicated film thickness, wet:	175 micron [7 mils]
Recoat interval, min:	According to specification.
Recoat interval, max:	According to specification.
Safety:	Handle with care. Before and during use, observe all safety labels on packaging and paint containers, consult HEMPEL Safety Data Sheets and follow all local or national safety regulations.

15570: BASE 15579: CURING AGENT 95570

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.
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 Ballast water service. Resists normal ambient temperatures at sea (Avoid long-term exposure to negative temperature gradients). Other liquids: Contact HEMPEL
Certificates/Approvals:	Complies with European Fire Standard EN 13501-1; classification B-s1, d0. Approved as a low flame spread material when used as part of a predefined paint system. Please refer to "Declaration of Conformity" on www.Hempel.com for further details. Complies with EU Directive 2004/42/EC:subcategory j. (see REMARKS overleaf)
Availability:	Part of Group Assortment. Local availability subject to confirmation.
PHYSICAL CONSTANTS:	
Shade nos/Colours:	12430 (MIO)* / Reddish grey
Finish:	Flat
Volume solids, %:	54 ± 1
Theoretical spreading rate:	5.4 m ² /l [216.5 sq.ft./US gallon] - 100 micron/4 mils
Flash point:	25 °C [77 °F]
Specific gravity:	1.4 kg/litre [11.6 lbs/US gallon]
Surface-dry:	1 hour(s) 20°C/68°F
Through-dry:	5 hour(s) 20°C/68°F
Fully cured:	7 day(s) 20°C/68°F
VOC content:	414 g/l [3.4 lbs/US gallon]
Shelf life:	3 years for BASE and 3 years (25°C/77°F) for CURING AGENT from time of production. <i>*other shades according to assortment list.</i>
	<i>The physical constants stated are nominal data according to the HEMPEL Group's approved formulas.</i>
APPLICATION DETAILS:	
Version, mixed product:	15570
Mixing ratio:	BASE 15579: CURING AGENT 95570 3 : 1 by volume
Application method:	Airless spray / Air spray / Brush
Thinner (max.vol.):	08450 (5%) / 08450 (15%) / 08450 (5%)
Pot life:	2 hour(s) 20°C/68°F
Nozzle orifice:	0.019 - 0.021 "
Nozzle pressure:	175 bar [2537.5 psi] (Airless spray data are indicative and subject to adjustment)
Cleaning of tools:	HEMPEL'S TOOL CLEANER 99610
Indicated film thickness, dry:	100 micron [4 mils] see REMARKS overleaf
Indicated film thickness, wet:	200 micron [8 mils]
Overcoat interval, min:	see REMARKS overleaf
Overcoat interval, max:	see REMARKS overleaf
Safety:	Handle with care. Before and during use, observe all safety labels on packaging and paint containers, consult HEMPEL Safety Data Sheets and follow all local or national safety regulations.

SURFACE PREPARATION:

New steel: Abrasive blasting to Sa 2½ (ISO 8501-1:2007). For temporary protection, if required, use a suitable shopprimer. All damage of shopprimer and contamination from storage and fabrication should be thoroughly cleaned prior to final painting. For repair and touch-up use: HEMPADUR

Other metals and light alloys: Thorough degreasing and (light) abrasive sweeping to remove contamination and to secure adhesion - surface profile depending on later exposure.

Stainless steel: (eg. ballast tanks of chemical carriers) to be abrasive blast cleaned to a uniform, sharp, dense profile (Rugotest No. 3, BN9a, ISO Comparator Medium (G), Keane-Tator Comparator 2.0 G/S) corresponding to Rz minimum 50 micron. Any salts, grease, oil, etc. to be removed before abrasive blasting is commenced.

Maintenance: Remove oil and grease etc. thoroughly with suitable detergent. Remove salts and other contaminants by high pressure fresh water cleaning. Clean damaged areas thoroughly by power tool cleaning to St 3 (ISO 8501-1:2007) (minor areas) or by abrasive blasting to min. Sa 2, preferably to Sa 2½ (ISO 8501-1:2007). Improved surface preparation will improve the performance of the product. As an alternative to dry cleaning, water jetting to sound, well adhering coat and/or to steel. Intact coat must appear with roughened surface after the water jetting. By water jetting to steel, cleanliness shall be: Wa 2 -Wa 2½ (atmospheric exposure) / minimum Wa 2½ (immersion) (ISO 8501-4:2006). Acceptable flash-rust degree before application: maximum M (atmospheric exposure) / M, preferably L (immersion) (ISO 8501-4:2006). Feather edges to sound and intact areas. Dust off residues. Touch up bare spots to full film thickness. This should be done when the painted surface has reached the condition of being damp, possibly moist. In case of wet abrasive blasting a suitable inhibitor may be used. Surplus inhibitor and residual abrasives and sludge must be removed by (high pressure) fresh water cleaning before recoating. Cleaning with hot water is recommended.

Note 1: Inhibitors are generally not recommended for surfaces which will be immersed during service.

Note 2: Damp surfaces: water is not readily detectable, but the temperature of the surface is below the dew point. **Moist surfaces:** pools of water and droplets have been removed, but there is a noticeable film of water. **Wet surface:** droplets or pools of water are present.

APPLICATION CONDITIONS: Use only where application and curing can proceed at temperatures above: -10°C/14°F. At the freezing point and below be aware of the risk of ice on the surface, which will hinder adhesion. The temperature of paint itself should be 15°C/59°F or above. In confined spaces provide adequate ventilation during application and drying. Occurrence of standing water or droplets on the painted surface immediately after application may result in discolouration.

PRECEDING COAT: None, or as per specification.

SUBSEQUENT COAT: None, or as per specification. Recommended systems are: HEMPADUR, HEMPETHANE, HEMPATEX

REMARKS:

VOC - EU Directive 2004/42/EC:

Product	As supplied	15 vol. % thinning	Limit phase II, 2010
1557012430	414 g/l	480 g/l	500 g/l

For VOC of other shades, please refer to Safety Data Sheet.

Weathering/service temperatures: The natural tendency of epoxy coatings to chalk in outdoor exposure and to become more sensitive to mechanical damage and chemical exposure at elevated temperatures is also reflected in this product.

Film thicknesses/thinning: May be specified in another film thickness than indicated depending on purpose and area of use. This will alter spreading rate and may influence drying time and overcoating interval. Normal range dry is: 50-125 micron/2-5 mils

Overcoating: Overcoating intervals related to later conditions of exposure: If the maximum overcoating interval is exceeded, roughening of the surface is necessary to ensure intercoat adhesion. Before overcoating after exposure in contaminated environment, clean the surface thoroughly with high pressure fresh water hosing and allow drying.

A specification supersedes any guideline overcoat intervals indicated in the table.

Environment	Atmospheric, medium					
	-10°C (14°F)		0°C (32°F)		20°C (68°F)	
	Min	Max	Min	Max	Min	Max
HEMPADUR	36 h	Ext.	18 h	Ext.	4 h	Ext.
HEMPATEX	18 h	3 d	9 h	36 h	2 h	8 h
HEMPATHANE	36 h	90 d	18 h	45 d	4 h	10 d
Environment	Immersion					
HEMPADUR	3 d	Ext.	1½ d	Ext.	8 h	Ext.

NR = Not Recommended, Ext. = Extended, m = minute(s), h = hour(s), d = day(s)

Note: **HEMPADUR 15570 For professional use only.**

ISSUED BY: HEMPEL A/S 1557012430

This Product Data Sheet supersedes those previously issued.

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55610: BASE 55619: CURING AGENT 97050

Description:	HEMPATHANE HS 55610 is a two-component glossy acrylic polyurethane topcoat, cured with aliphatic isocyanate, with good gloss and colour retention. Contains zinc phosphate.
Recommended use:	As a VOC-compliant, high-build finishing coat for protection of structural steel in severely corrosive environment. May be specified as a one coat "Direct To Metal" system in environments classified as C2 and C3.
Service temperature:	Maximum, dry exposure only: 120°C/248°F see REMARKS overleaf
Certificates/Approvals:	Approved as a low flame spread material when used as part of a predefined paint system. Please refer to "Declaration of Conformity" on www.Hempel.com for further details. Complies with EU Directive 2004/42/EC: subcategory j.
Availability:	Part of Group Assortment. Local availability subject to confirmation.

PHYSICAL CONSTANTS:

Shade nos/Colours:	10000/ White. (see REMARKS overleaf)
Finish:	Glossy
Volume solids, %:	67 ± 1
Theoretical spreading rate:	6.7 m ² /l [268.7 sq.ft./US gallon] - 100 micron/4 mils
Flash point:	31 °C [87.8 °F]
Specific gravity:	1.4 kg/litre [12 lbs/US gallon]
Surface-dry:	3 hour(s) 20°C/68°F
Through-dry:	8 hour(s) 20°C/68°F
Fully cured:	7 day(s) 20°C/68°F
VOC content:	336 g/l [2.8 lbs/US gallon]
Shelf life:	3 years for BASE and 2 years (25°C/77°F) for CURING AGENT from time of production. <i>*Wide range of colours available via Hempel's MULTI-TINT system. *other shades according to assortment list.</i> <i>The physical constants stated are nominal data according to the HEMPEL Group's approved formulas.</i>

APPLICATION DETAILS:

Version, mixed product:	55610
Mixing ratio:	BASE 55619: CURING AGENT 97050 7:1 by volume
Application method:	Airless spray (see REMARKS overleaf) / Brush (see REMARKS overleaf)
Thinner (max.vol.):	08080 (5%) / 08080 (5%)
Pot life:	2 hour(s) 20°C/68°F
Nozzle orifice:	0.017 - 0.021 "
Nozzle pressure:	175 bar [2537.5 psi] (Airless spray data are indicative and subject to adjustment)
Cleaning of tools:	HEMPEL'S THINNER 08080
Indicated film thickness, dry:	100 micron [4 mils] / 4 mils (see REMARKS overleaf)
Indicated film thickness, wet:	150 micron [6 mils] / 6 mils
Overcoat interval, min:	see REMARKS overleaf
Overcoat interval, max:	see REMARKS overleaf

Safety:	Handle with care. Before and during use, observe all safety labels on packaging and paint containers, consult HEMPEL Safety Data Sheets and follow all local or national safety regulations.
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SURFACE PREPARATION: According to specification.

APPLICATION CONDITIONS: Apply only on a dry and clean surface with a temperature above the dew point to avoid condensation. Minimum temperature for curing is: -10°C/14°F
At the freezing point and below be aware of the risk of ice on the surface, which will hinder adhesion. The film formation may be adversely affected by light rain, high humidity and/or condensation during application and the following interval after application: 24 hours, 20°C/68°F
In confined spaces provide adequate ventilation during application and drying.

PRECEDING COAT: According to specification. Recommended systems are: HEMPADUR FAST DRY 15560, HEMPADUR MASTIC 45880/45881

SUBSEQUENT COAT: None.

REMARKS:

VOC - EU Directive 2004/42/EC:

Product	As supplied	5 vol. % thinning	Limit phase II, 2010
5561010000	336 g/l	362 g/l	500 g/l

For VOC of other shades, please refer to Safety Data Sheet.

Colours/Colour stability: Colour stability for some shades may be effected by exposure to harsh chemical atmospheres. This does not affect the performance of the coating. For certain colours (yellow, red, orange, green, etc.), extra coats may be necessary to obtain full opacity.
For aluminium pigmented shades scratching actions or high humidity/water may cause discolouration/disturbances of the surface. This will have no influence on the performance. This phenomenon may be avoided by applying a clear varnish.

Weathering/service temperatures: At service temperature above 100°C/212°F, slight discolouration may be expected. The product will become softer.

Application(s): When specified as a one coat "Direct to Metal"-system follow "Good Painting Practise" and apply stripe coating before the spray application on areas difficult to cover properly by spray application.
CURING AGENT 97050 : is sensitive to moisture.
Even small traces of water in the mixed paint will reduce the pot life and result in film defects.

Film thicknesses/thinning: May be specified in another film thickness than indicated depending on purpose and area of use. This will alter spreading rate and may influence drying time and overcoating interval. Normal range dry is: minimum 50 micron/2 mils (diluted), minimum 75 micron/3 mils (undiluted), maximum 125 micron/5 mils
Store in a dry place and keep the can tightly closed until use.

Storage Conditions: This product is available in several aluminium pigmented shades with different volume solids content. Contact HEMPEL for more information.

Shades:

Curing agent: Open curing agent cans with caution as overpressure might exist.

Overcoating: Overcoating intervals related to later conditions of exposure: If the maximum overcoating interval is exceeded, roughening of the surface is necessary to ensure intercoat adhesion.
Before overcoating after exposure in contaminated environment, clean the surface thoroughly with high pressure fresh water hosing and allow drying.

A specification supersedes any guideline overcoat intervals indicated in the table.

Environment	Atmospheric, medium					
	-10°C (14°F)		0°C (32°F)		20°C (68°F)	
	Min	Max	Min	Max	Min	Max
HEMPATHANE	30 h	None	18 h	None	6 h	None

NR = Not Recommended, Ext. = Extended, m = minute(s), h = hour(s), d = day(s)

Overcoating note: A completely clean surface is mandatory to ensure intercoat adhesion, especially at long overcoating intervals. Any dirt, oil, grease, and other foreign matter must be removed with suitable detergent followed by (high pressure) fresh water cleaning. Salts to be removed by fresh water hosing.
To check whether the quality of the surface cleaning is adequate, a test patch may be relevant.

Note:

HEMPATHANE HS 55610 For professional use only.

ISSUED BY:

HEMPEL A/S

5561010000

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