



# Product Data

## HEMPADUR® MULTI-STRENGTH® 35530

BASE 35539 with CURING AGENT 95530

- Description:** HEMPADUR MULTI-STRENGTH 35530 is a solvent-free, two-component, high-build, polyamine cured epoxy paint, which cures to a coating with good resistance to fresh water, sea water, crude oil, and to abrasion. Applicable in thick coats by standard heavy duty airless spray equipment. Harmless to grain cargo.
- Recommended use:**
1. As a heavy duty coating on steel exposed to abrasion where solvent-free materials are required. Full colour retention will be of secondary importance. If solvent containing paints are accepted, HEMPADUR MULTI-STRENGTH 45751 substitutes.
  2. As a lining in potable water tanks and pipelines. Please see Certificates/Approvals. For application in warm climates. Please see APPLICATION CONDITIONS overleaf.
- Service temperatures:**
- |          |                    |                                     |
|----------|--------------------|-------------------------------------|
|          | Dry exposure only: | In fresh water (directly on steel): |
| Maximum: | 140°C/284°F        | 35°C/95°F (no temperature gradient) |
- See REMARKS overleaf.
- Certificates/Approvals:** Tested for non-contamination of grain cargo at the Newcastle Occupational Health, Great Britain. Approved by Water Research Centre, Great Britain, for potable water up to 23°C/73°F. Approved by Ministry of Electricity & Water, Bahrain, for potable water. Complies with EU Directive 2004/42/EC, subcategory j (see REMARKS overleaf).
- Availability:** Part of Group Assortment. Local availability subject to confirmation.
- PHYSICAL CONSTANTS:**
- |                             |  |
|-----------------------------|--|
| Colours/Shade nos:          | Grey/10500 - Red/51320   |
| Finish:                     | Semi-gloss   |
| Volume solids, %:           | 100  |
| Theoretical spreading rate: | 3.3 m <sup>2</sup> /litre - 300 micron<br>134 sq.ft./US gallon - 12 mils |
| Flash point:                | > 100°C/212°F  |
| Specific gravity:           | 1.3 kg/litre - 10.8 lbs/US gallon  |
| Surface dry:                | 12 (approx.) hrs at 20°C/68°F (ISO 1517)                                 |
| Dry to touch:               | 24 (approx.) hours at 20°C/68°F  |
| Fully cured:                | 7 days at 20°C/68°F  |
| V.O.C.:                     | 10 g/litre - 0.1 lbs/US gallon   |
- The physical constants stated are nominal data according to the HEMPEL Group's approved formulas. They are subject to normal manufacturing tolerances. The theoretical spreading rate has been calculated on the basis of a 100% solids volume.*
- APPLICATION DETAILS:**
- |                                |   |
|--------------------------------|---|
| Mixing ratio for 35530:        | Base 35539 : Curing agent 95530<br>3 : 1 by volume  |
| Application method:            | Stir CURING AGENT before adding it to the BASE.<br>Airless spray      Brush (touch up)<br>(Consult the separate APPLICATION INSTRUCTIONS) |
| Thinner (max.vol.):            | Do not dilute (Consult the separate APPLICATION INSTRUCTIONS)   |
| Pot life:                      | 1 hour (20°C/68°F) (Consult the separate APPLICATION INSTRUCTIONS)  |
| Nozzle orifice:                | .019" -.031"  |
| Nozzle pressure:               | min. 250 bar/3600 psi<br>(Airless spray data are indicative and subject to adjustment)  |
| Cleaning of tools:             | HEMPEL'S TOOL CLEANER 99610   |
| Indicated film thickness, dry: | 300 micron/12 mils (See REMARKS overleaf)   |
| Indicated film thickness, wet: | 300 micron/12 mils  |
| Recoat interval, min:          | See REMARKS overleaf and separate APPLICATION INSTRUCTIONS  |
| Recoat interval, max:          | See REMARKS overleaf and separate APPLICATION INSTRUCTIONS  |
- Safety:** Handle with care. Before and during use, observe all safety labels on packaging and paint containers, consult HEMPEL Material Safety Data Sheets and follow all local or national safety regulations. Avoid inhalation, avoid contact with skin and eyes, and do not swallow. Take precautions against possible risks of fire or explosions as well as protection of the environment. Apply only in well ventilated areas.



## HEMPADUR MULTI-STRENGTH 35530

**SURFACE PREPARATION:** **When used as a heavy duty coating or in potable water tanks and pipelines:** Abrasive blasting to min. Sa 2½ with a surface profile corresponding to ISO Comparator Rough Medium (G). Oil and grease must be removed with suitable detergent, salts and other contaminants by (high pressure) fresh water hosing prior to blasting. After blasting, clean the surface carefully from abrasives and dust.

On old steel surfaces having been exposed to salt water, excessive amounts of salt residues in pittings may call for abrasive blasting, high pressure fresh water hosing, drying, and finally, dry abrasive blasting again. Alternatively, water jetting may be used provided the steel surface has already the surface profile as described above.

**Concrete:** Remove slip agent and other possible contaminants by emulsion washing followed by high pressure hosing with fresh water. Remove scum layer and loose matter to a hard, rough and uniform surface, preferably by abrasive blasting, possibly by other mechanical treatment, flame cleaning or acid etching. Seal surface with suitable sealer, eg HEMPADUR SEALER 05990 (furthermore, please see Product Data Sheet for 05990).

**APPLICATION CONDITIONS:** Use only where application and curing can proceed at temperatures above 10°C/50°F at all times until curing is completed. The temperature of the paint itself must be above 15°C/59°F for proper application. In-can temperature of the paint should preferably be below 25°C/77°F. Apply only on a dry and clean surface with a temperature above the dew point to avoid condensation. Relative humidity max 85%. For application in warm climates, HEMPADUR MULTI-STRENGTH 45751 may preferably replace HEMPADUR MULTI-STRENGTH 35530 as a heavy duty coating. For potable water tanks and pipes please check local product assortment.

**PRECEDING COAT:** None, HEMPADUR SEALER 05990, HEMPADUR 15590 or according to specification.

**SUBSEQUENT COAT:** None, HEMPADUR or HEMPATHANE qualities as per specification.

**REMARKS:**  
 VOC - EU directive 2004/42/EC:  
 VOC:

	As supplied	0 vol. % thinning	Limit phase I, 2007	Limit phase II, 2010
VOC in g/l	10	10	550	500

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

**Certificates** have been issued under the former quality number 3553.

**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:** 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 recoating interval. Normal range dry is 200-300 micron/8-12 mils.

**Recoating:** Recoating intervals related to later conditions of exposure:  
 (300 micron/12 mils dry film thickness of HEMPADUR MULTI-STRENGTH 35530)

	Minimum		Maximum	
Surface temperature	20°C/68°F		20°C/68°F	
	Atmospheric	Water immersion	Atmospheric	Water immersion
Recoated with	Severe		Severe	
HEMPADUR	24 hours	24 hours	5 days	5 days
HEMPATHANE	12 hours	Not relevant	24 hours	Not relevant

Mix and stir the two components until an even colour is achieved, where after the paint is ready for use. If improved colour stability is requested for exposure to sunshine, it is recommended to topcoat with e.g. HEMPATHANE TOPCOAT 55210.

Potable water tanks: See APPLICATION INSTRUCTIONS, as to time before taking into use and post treatment of coated surfaces to be in contact with potable water.

**Note:** **HEMPADUR MULTI-STRENGTH 35530 is for professional use only.**

**ISSUED BY:** HEMPEL A/S - 3553010500C0003

**This Product Data Sheet supersedes those previously issued.**

**For explanations, definitions and scope, see "Explanatory Notes" in the HEMPEL Book.**

**Data, specifications, directions and recommendations given in this data sheet represent only test results or experience obtained under controlled or specially defined circumstances. Their accuracy, completeness or appropriateness under the actual conditions of any intended use of the Products herein must be determined exclusively by the Buyer and/or User.**

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# Application Instructions

For product description refer to product data sheet

## HEMPADUR MULTI-STRENGTH 35530

BASE 35539 with CURING AGENT 95530

**Scope:** These Application Instructions cover surface preparation, application equipment, and application details for HEMPADUR 35530.

**Surface preparation:**

**Steel:**

Abrasive blasting to min. Sa 2½ with a surface profile corresponding to ISO Comparator Rough Medium (G). Oil and grease must be removed with suitable detergent, salts and other contaminants by (high pressure) fresh water hosing prior to blasting. After blasting, clean the surface carefully from abrasives and dust. HEMPADUR 15590 may be used as a blast primer/hold-coat.

**On old steel surfaces having been exposed to salt water,** excessive amounts of salt residues in pittings may call for dry abrasive blasting, high pressure fresh water hosing, drying, and finally, dry abrasive blasting again. Alternatively, water jetting may be used provided the steel surface has already the surface profile as described above.

**In case of extensively pit-corroded surfaces (tank bottoms):** Remove oil and grease with suitable detergent. Blasting to Sa 2, ISO 8501-1: 2007. Pittings on tank bottoms are often omega-shaped (typically in the case of chloride-induced corrosion) for which reason the following procedure is recommended:

After rough cleaning for dust and abrasives, the tank surfaces are to be thoroughly high pressure fresh water hosed. Let the water remain in the tank so that all pit corroded areas are covered by approx 5 cm/2" of water.

After 24 hours the water is removed by wet vacuum cleaning and the tank is dried. If needed, i.e. if there is still salt contamination to be found in the pits, the washing treatment has to be repeated. After cleaning, the surfaces are blasted to min. Sa 2½ with a surface roughness profile as described above. After blasting clean the surface carefully for abrasives and dust. Special care must be taken when cleaning the tank bottom.

**Concrete:** The concrete must be of good quality and fully cured, eg 28 days for normal Portland cement, and completely dry with a humidity content in the surface below 4%. The concrete must also be controlled for absence of capillary water action or for subsoil water.

Minimum pull-off value should normally be 20 kilopond/cm<sup>2</sup> measured after surface preparation. Any cracks, crevices and voids must be repaired.

All possible slip agent, oil, grease and other contaminants must be removed by eg abrasive blasting, volatilising by flame cleaning or treatment with suitable detergent. The last mentioned in the following way: Saturation of the surface with fresh water. Washing with suitable detergent followed by fresh water hosing.

Depending on construction and purpose, abrasive blast, high pressure water jet or treat the concrete with power tools to obtain a rough and firm surface free of scum layer and other contamination. Remove dust and loose material.

If mechanical treatment is impossible, the surface may be treated with acid etching. For this purpose an approx. 5% w/w nitric or phosphoric acid solution is recommended.

**Note:** Strong acids, take necessary precautions, make sure that safety regulations are obeyed!

# HEMPEL

Application Instructions



## HEMPADUR MULTI-STRENGTH 35530

Prior to etching the concrete should be saturated with fresh water to prevent acid corrosion of the reinforcement bars. Leave the acid to act for 3-4 minutes and hose down the surface with fresh water - preferably first a 5% w/w sodium hydroxide solution - and scrub carefully. After that the surface must dry homogeneously and appear as an even, rough surface free of a loose outer layer. The surface must have a pH reaction of between 6.5-8.0. If any of these conditions are not fulfilled, the process must be repeated. The surface must be dried with good ventilation for at least 2 days at 65% relative humidity and 20°C/68°F. The pre-treatment is controlled by scraping with a strong knife. The surface must feel solid and hard, and the knife must only leave a clear scratch mark.

Seal the surface with HEMPADUR SEALER 05990 in such a way that the surface **is just saturated. Surplus must be removed** (do also see the Product Data sheet for HEMPADUR SEALER 05990).

### Application equipment:

HEMPADUR MULTI-STRENGTH 35530, being a solvent free, high viscosity material, requires special measures to be taken at application.

#### Standard airless heavy duty spray equipment:

Pump ratio: min 45:1 (See Note below)  
Pump output: 12 litres/minute (theoretical)  
Input pressure: min 6 bar/90 psi  
Spray hoses: max 15 metres/50 feet, 3/8" internal diameter  
max 3 metres/10 feet, 1/4" internal diameter

#### Regular surfaces:

Nozzle size: .023" through .031"  
Fan angle: 40-60°.

#### Complicated surfaces:

Nozzle size: .019" through .023"  
Fan angle: 40°

**Note:** Avoid the use of a suction hose. Use an interchangeable pipe, which makes it possible to remove cured paint. If longer spray hoses are necessary the pump ratio must be raised to 60:1 or more, yet the high output capacity of the pump must be maintained.

### Thinning:

Alternatively 1-2% THINNER 08450 may be added, but thinning must be done with care as the antisagging properties are drastically reduced by overthinning. **Do NOT use thinning when coating surfaces to be in contact with potable water.**

Airless spray data are indicative and subject to adjustment.

### Mixing:

Stir the CURING AGENT 95530 well before mixing with BASE. Continue the mixing until a complete uniform colour is achieved.

#### Hot airless spray equipment:

Use the same airless spray pump as described above.

On the output side of the pump an electrically heated, explosion proof, high pressure, material heater is fitted. For instance 2500 Watt, max. working pressure well above 300 bar (4-1 safety factor) equipment.

Spray hoses: 45 metres/150 feet, 3/8" internal diameter.  
3 metres/10 feet, 1/4" internal diameter.

#### Regular surfaces:

Nozzle size: .023" through .031"  
Fan angle: 40-60°

#### Complicated surfaces:

Nozzle size: .019" through .023".  
Fan angle: 40°.



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### Procedure for hot airless spray:

- a) Follow the supplier's instructions for the use of the heater.
- b) At surrounding temperatures below approximately 15°C/59°F start by heating up the hoses by recirculation of THINNER 08450 or HEMPEL'S TOOL CLEANER 99610.
- c) Keep THINNER 08450 or HEMPEL'S TOOL CLEANER 99610 readily available for fast cleaning of the equipment.
- d) Start spraying immediately after proper mixing and mechanical stirring of BASE 35539 and CURING AGENT 95530.
- e) Adjust the heater to approximately 50°C/122°F and check this temperature at short intervals.
- f) The spraying should as far as possible run continuously. At any break longer than 2-3 minutes, switch off the heat and flush the equipment immediately and thoroughly with one of the solvents mentioned above under c).
- g) After finishing the application, switch off the heat and clean the equipment immediately with THINNER 08450 or HEMPEL'S TOOL CLEANER 99610. Continue the cleaning by re-circulation for at least 30 minutes.

**Pit-corroded surfaces:** In case of extensive pit corrosion (old tank bottoms) it is advisable to apply the first coat by brush. The coating must be worked well into all pits facilitating a good wetting of the steel and closing the porosities. The following coat(s) can be applied by brush as well as by airless spray (as per above) securing full covering of the uneven/rough surface.

### Pot life:

When measured under standard conditions the pot life is one hour at 20°C/68°F. However, for a 20 litres/5 US gallons mix, the heat developed by the chemical reaction between BASE and CURING AGENT is so intense that the corresponding practical pot life is **substantially shorter**.

Therefore:

- Irrespective of equipment, use the paint immediately after mixing. At a normal application speed the 20 litres/5 US gallons are used in approx. 10 minutes.
- Keep an eye on the paint temperature frequently for instance by touching the can with your hand. If it feels more than hand warm, discard the paint and flush the equipment immediately irrespective of type of spray equipment.

### Paint temperature:

If the in-can temperature is below approximately 15°C/59°F viscosity will be too high for application. If the paint temperature at mixing is 25°C/77°F or higher a substantial risk of shortened pot life and curing in can/spray equipment exists. **When working in warm, subtropical/ tropical climates a refrigerated container can be used for storing/ cooling of the paint before application.**

### Application:

**Film-build/continuity:** With this typical one-coat tank coating it is of great importance that a continuous, pinhole-free paint film is obtained. An application technique which will ensure good film formation on **all** surfaces must be adopted. It is very important to use nozzles of the correct size, not too big, and to have a proper, uniform distance of the spray gun to the surface, 30-50 cm should be aimed at. Furthermore, great care must be taken to cover edges, openings, rear sides of stiffeners etc. The usual way of obtaining this result is to spray-coat all these areas separately followed by a full coat all over. Furthermore, stripe coating by brush will typically be required. To obtain good and steady atomizing, the viscosity of the paint must be suitable and the spray equipment must be sufficient in output pressure and capacity.

The paint layer must be applied homogeneously and as close to the specification as possible. The consumption of paint must be controlled to avoid exaggerated film thickness, eg by controlling paint consumption and/or measuring wet film thickness. The finished coating must appear as a homogeneous film with a smooth surface and irregularities such as dust, dry spray, abrasives, should be remedied.



## HEMPADUR MULTI-STRENGTH 35530

**Stripe coating:** Edges, corners, manual welds, and places difficult to cover properly by spray application should be stripe coated (touched up) either before or after the spray application.

One or two stripe coats will usually be necessary, but depending on actual conditions.

HEMPADUR MULTI-STRENGTH 35530 may be slightly thinned with THINNER 08450, except for stripe coating of surfaces to be in contact with potable water.

**Extra film thickness:** Extra thickness - extra layer(s) - may be necessary in case of severely pitted and/or where very high degrees of antiabrasive properties are needed.

**Two-coat application:** When applied in two coats it is an advantage to apply the first coat thicker than the second coat, for instance 300 micron for first, 200 micron for the second layer.

**Recoating intervals:** Within a maximum of 85% Relative Humidity the following recoating intervals apply (d=days h=hours):

Steel temperature °C/°F		10/50	15/59	20/68	25/77	30/86	35/95	40/104
HEMPADUR qualities	Min	60 h	38 h	24 h	16 h	12 h	9 hours	8 hours
	Max	13 d	8 d	5 d	3½ d	2½ d	44 hours	36 hours
HEMPATHANE qualities	Min	30 h	19 h	12 h	8 h	6 h	4½ h	4 h
	Max	60 h	38 h	24 h	16 h	12 h	9 h	8 h

The layer of HEMPADUR MULTI-STRENGTH 35530 must NOT be exposed to (steel) temperatures below 10°C/50°F, to condensing humidity nor to relative humidities higher than 85% before recoating.

**Curing table:** The following curing times apply:

Steel temperature °C/°F	10/50	15/59	20/68	25/77	30/86	35/95	40/104
Fully cured	18 days	11 days	7 days	5 days	3½ days	2½ days	2 days
"Initial curing"	7½ days	5 days	3 days	2 days	1½ days	1 day	1 day

**Time before taking into use:** Tanks or pipelines should generally not be taken into use before HEMPADUR MULTI-STRENGTH 35530 is fully cured (see above).

Full curing is mandatory in case of potable water service.

Exposure to ballast water and crude oil may exceptionally take place after an "initial curing" time as listed above.

**Water resistance:** HEMPADUR MULTI-STRENGTH 35530 is resistant to light showers and condensation after an initial curing time as listed:

Steel temperature	10°C/50°F	15°C/59°F	20°C/68°F	25°C/77°F	30°C/86°F
Minimum time	60 hours	32 hours	24 hours	20 hours	15 hours

**Note:** HEMPADUR 35530 must not be exposed to water or high humidity between stripe coating and full coating respectively between full coating and any necessary second full coating as there is a certain risk of curing agent exudation which will hinder adhesion. If exudation is present on the surface this must be removed by very thorough cleaning. Cleaning should be carried out by hand-warm fresh water washing at a pressure of approx 60 bar. Such cleaning must not take place before the minimum curing time for obtaining water resistance as listed above has elapsed. Contact the nearest Hempel office for further details.

**Ventilation during application:** Ventilation is not required for drying/curing of the coating, but some ventilation is recommended in order to remove eg spray dust from application.



## HEMPADUR MULTI-STRENGTH 35530

### Minimum out-docking interval of ships:

When the painted surface will be exposed to abrasion shortly after out-docking, the recommended minimum drying/curing time before out-docking is:

Steel temperature °C/°F	10/50	15/59	20/68	25/77	30/86	(35/95)	(40/104)
Minimum days	12½	8	5	3½	2½	(2)	(1½)

When out-docking takes place into water with a temperature at or above 10°C/50°F, and sufficient time afterwards is allowed for full cure before the coating is exposed to abrasion, the recommended minimum time before out-docking is:

Steel temperature °C/°F	10/50	15/59	20/68	25/77	30/86	(35/95)	(40/104)
Minimum days	7½	5	3	2	1½	(1)	(1)

### Notes:

1. The temperatures in the tables above are mean values, but the temperature during curing should at no time come below 10°C/50°F.
2. Curing will proceed under water when the water temperature is above 10°C/50°F.

### Remarks:

Stripe coating is recommended in tanks.

In case of deep pittings higher film thickness is recommended on areas with pittings.

### Post treatment of coated surfaces to be in contact with potable water:

After complete curing, i.e. minimum 7 days at 20°C/68°F, and before being taken into use, the surfaces must be cleaned properly. This will be subject to local/individual specification or regulation but as a minimum for tanks a careful hosing down with clean fresh water (max. 40°C/104°F if warm water is used) and/or - ideally - by filling with water allowed to stand for at least 24 hours. Drain and repeat the procedure, and finally flush with clean fresh water. Disinfection by for instance chlorination can be very aggressive towards the coating and separate instructions are available.

### Safety:

Handle with care. Before and during use, observe all safety labels on packaging and paint containers, consult HEMPEL Material Safety Data Sheets and follow all local or national safety regulations. Avoid inhalation, avoid contact with skin and eyes, and do not swallow. Take precautions against possible risks of fire or explosions as well as protection of the environment. Apply only in well ventilated areas.

### ISSUED BY:

HEMPEL A/S - 3553010500C0004

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