APPLICATION INSTRUCTIONS

For product description refer to the product data sheet

HEMPADUR* 45141/ HEMPADUR* 45143

High temperatures: 45141 with CURING AGENT 97820
Low to medium temperatures: 45143 with CURING AGENT 97430

Scope:

These Application Instructions cover surface preparation, application equipment and application details for HEMPADUR 4514.

Surface preparation:

General: In order to obtain best performance, abrasive blast cleaning is recommended. However, HEMPADUR 4514 may be applied on rusty steel surfaces where higher performance is needed than obtainable with conventional coatings but where mechanical cleaning and dust removal can only be carried out (beside the removal of salts and of oily contaminants).

Remove oil and grease with suitable detergent, salt and other contaminants by (high pressure) fresh water cleaning.

REPAIR AND MAINTENANCE:

Spot-repairs:

Clean damaged areas thoroughly by power tool cleaning to St 3 or by abrasive blasting to minimum Sa 2, preferably Sa 2½. Improved surface preparation will improve the performance of HEMPADUR 4514. As an alternative to dry cleaning, water jetting to minimum WJ-3, preferably WJ-2 (NACE No. 5/SSPC-SP12), may be used. A flash-rust degree of FR-1 maximum FR-2 (Hempel standard) is acceptable before application. Feather edges to sound and intact areas. Brush off loose material. Touch up to full film thickness.

Compatibility: HEMPADUR 4514 may be used in connection with other generic paint systems than epoxy and polyurethanes.

In any case it is a must that the old paint system is tightly adhering and is properly prepared before the touch-up is performed. It is recommended to make a test patch.

Full coating:

Compatibility with old system: HEMPADUR 4514 may exceptionally be applied directly on top of an old alkyd paint system provided this is tightly adhering. It is furthermore preferable that the old system is less than approximately 500 micron in film thickness. A test patch should always be performed before fullcoating is decided. Even old chlorinated rubber and vinyl systems may be overcoated but with an inherent risk of later tendency to "liftings" along mechanical damage and similar weaknesses.
Removal of old system: Full coating after mechanical removal of an old paint system is possible too. Yet, it must be considered that mechanical cleaning may produce a very smooth surface giving reason to reduced adhesive forces.

Note: Another risk is left over of a hard black rustscale being cleaned to an apparent brightness without showing any adhesive defects. Yet, the exposure to open air during cleaning may have started a continuous oxidation of the hard black rust making it mechanically weak and of poor adhesion to the underlying steel surface. Later, during service, the scale plus overlaying paintmaterial may flake off.

When used for immersion service:

1. Abrasive blasting to Sa 2½. After abrasive blasting, clean the surface carefully from abrasives and dust. For temporary protection, if required, use suitable shopprimer. All damage to shopprimer and contamination from storage and fabrication should be thoroughly cleaned prior to final painting.

Stainless Steel: (Ballast tanks of chemical carriers) to be abrasive blast cleaned to a uniform, sharp, dense, profile (Rugotest No. 10, BN10, ISO Comparator Medium (G), Keane-Tator Comparator 3.0 G/S). Any salts, grease, oil etc. to be removed before abrasive blasting is commenced.

2. If the HEMPADUR 4514 will form an integral part of heavy duty systems (impact and antiabrasion purposes) best performance will be obtained by applying it directly to the blastcleaned steel, subsidiary using HEMPADUR 1559 as "blast primer".

Note: On old steel surfaces having been exposed to salt water, excessive amounts of salt residues in pittings may call for high pressure water jetting, wet abrasive blasting, alternatively dry abrasive blasting, high pressure fresh water hosing, drying, and finally, dry abrasive blasting again.

Application equipment:

HEMPADUR 4514 being a high viscosity material, may require special measures to be taken at application.

Recommended airless spray equipment:

Pump ratio:	min 45:1
Pump output:	12 litres/minute (theoretical)
Input pressure:	min. 6 bar/90 psi
Spray hoses:	max. 30 metres/100 feet, 3/8" internal diameter
	max. 6 metres/20 feet, 1/4" internal diameter
Filter:	60 mesh

Regular surfaces:

Nozzle size:	.021"-.023"
Fan angle:	60-80°.

Complicated surfaces (and touch up):

Nozzle size:	.019"
Fan angle:	40°.

After finishing the application, clean the equipment immediately with HEMPEL'S TOOL CLEANER 9961.

Note: If longer hoses are necessary it may be necessary to raise the pump ratio to 60:1, maintaining the high output capacity of the pump.

Alternatively up to approximately 5% THINNER 0845 may be added, but thinning must be done with care as the maximum obtainable film thickness is reduced significantly by overthinning.

Airless spray data are indicative and subject to adjustment.

Application:

Film-build/continuity: With this paintmaterial applied in one/few coat(s) it is of special importance that a continuous, pinhole-free paint film is obtained at application of each coat. 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. Thus, on these areas a stripecoat will usually be necessary. 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. At high working temperatures, use of extra thinner may be necessary to avoid dust-spray.

The paint layer must be applied homogenously and as close to the specification as possible. Avoid exaggerated film thickness due to the risk of sagging, cracks and solvent retention. The paint consumption must be controlled.

The finished coating must appear as a homogeneous film with a smooth surface and irregularities such as dust, dry spray, abrasives, should be remedied.

On **poorly prepared surfaces** it is always recommended to apply first coat by brush. Extra thinning will facilitate the penetration of the paint material but will also require an extra layer to be applied.

Wet/dry film thickness:

The thixotropic nature of HEMPADUR 4514 may give a rather "wavy"surface of the paint just after application. This smoothens at drying but can make it necessary to let the wet film readings be of a higher value than indicated. In many cases the wet film thickness. reading should be 25-50 micron/1-2 mils higher than calculated. As the wavy surface becomes more smooth at drying this extra wet film thickness readings will not cause a higher paint consumption than otherwise stipulated.

Pot life:

When measured under standard conditions the pot life is 3 hours at 10°C/50°F and 2 hours at 20°C/68°F when using CURING AGENT 97430. However, for a 20 litres/5 US gallons mix, the heat developed by the chemical reaction between BASE and CURING AGENT may make the corresponding practical pot life shorter.

At these temperatures 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.) Anyhow, at paint temperatures, as an exception, being lower than 15°C/59°F allow the mixture to pre-react approximately 30 minutes before use. After this induction time, apply the paint immediately.

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. Harmful or fatal if swallowed; immediately seek medical assistance if swallowed. Avoid inhalation of possible solvent vapours or paint mist, as well as paint contact with skin and eyes. Apply only in well ventilated areas and ensure that adequate forced ventilation exists when applying paint in confined spaces or when the air is stagnant. Always take precautions against the risks of fire and explosions.

Attached:

Table of "physical data versus temperature"

Physical data versus temperature:

(HEMPADUR 45143 in a dry film thickness of 150 micron/6 mils):

Surface temperature	-10°C/14°F	0°C/32°F	10°C/50°F	20°C/68°F
Drying time	35 hours	14 hours	7 hours	4 hours
Curing time	2 months	28 days	14 days	7 days
Minimum recoating interval related to later conditions of exposure:				
Interval for recoating with 1628				
Immersion	54 hours	27 hours	12 hours	6 hours
Interval for recoating with 4633, 4641, 5636				
Atmospheric: Medium	28 hours	14 hours	6 hours	3 hours
Severe	36 hours	18 hours	8 hours	4 hours
Immersion*	36 hours	18 hours	8 hours	4 hours
Interval for recoating with 5803				
Atmospheric: Medium	Not relevant	Not relevant	12 hours	6 hours
Severe	Not relevant	Not relevant	12 hours	6 hours
Immersion	Not relevant	Not relevant	Not relevant	Not relevant
Interval for recoating with HEMPADUR and HEMPATHANE qualities				
Atmospheric: Medium	36 hours	18 hours	8 hours	4 hours
Severe	45 hours	23 hours	10 hours	5 hours
Immersion**	54 hours	27 hours	12 hours	6 hours
Maximum recoating interval related to later conditions of exposure:				
Interval for recoating with 1628				
Atmospheric: Medium	9 days	4½ days	48 hours	24 hours
Severe	6 days	3 days	32 hours	16 hours
Immersion	4½ days	2 days	24 hours	12 hours
Interval for recoating with 4641, 4633				
Atmospheric: Medium	4 days	45 hours	20 hours	10 hours
Severe	4 days	45 hours	20 hours	10 hours
Immersion*	3 days	36 hours	16 hours	8 hours
Interval for recoating with 5636				
Atmospheric: Medium	2½ days	34 hours	15 hours	7½ hours
Severe	2½ days	34 hours	15 hours	7½ hours
Immersion	Not relevant	Not relevant	Not relevant	Not relevant
Interval for recoating with 5803				
Atmospheric: Medium	Not relevant	Not relevant	6 days	3 days
Severe	Not relevant	Not relevant	3 days	1½ days
Immersion	Not relevant	Not relevant	Not relevant	Not relevant
Interval for recoating with HEMPADUR qualities				
Atmospheric: Medium	None	None	None	None
Severe***	(90 days)	90 days	60 days	30 days
Immersion***	(90 days)	90 days	60 days	30 days
Interval for recoating with HEMPATHANE qualities				
Atmospheric: Medium	90 days	45 days	20 days	10 days
Severe	30 days	15 days	6 days	3 days
Immersion	Not relevant	Not relevant	Not relevant	Not relevant

* Only 4633 is recommended for this exposure.
** Not relevant for HEMPATHANE qualities.
*** If the coating has been subjected to direct sunlight for a short period only, the maximum recoating interval may be prolonged.

Physical data versus temperature: (HEMPADUR 45141 in a dry film thickness of 150 micron/6 mils):

Surface temperature	20°C/68°F	30°C/86°F
Drying time	7 hours	3½ hours
Curing time	7 days	3½ days
Minimum recoating interval related to later conditions of exposure:		
Interval recoating with 1628, 4633, 4641, 5636		
Atmospheric: Medium	6 hours	3 hours
Severe	8 hours	4 hours
Immersion*	8 hours	4 hours
Interval for recoating with 5803		
Atmospheric: Medium	11 hours	6 hours
Severe	11 hours	6 hours
Immersion	Not relevant	Not relevant
Interval for recoating with HEMPADUR and HEMPATHANE qualities		
Atmospheric: Medium	8 hours	4 hours
Severe	9 hours	5 hours
Immersion***	12 hours	6 hours
Maximum recoating interval related to later conditions of exposure:		
Interval for recoating with 1628		
Atmospheric: Medium	24 hours	12 hours
Severe	16 hours	8 hours
Immersion	12 hours	6 hours
Interval for recoating with 4641, 4633		
Atmospheric: Medium	12 hours	6 hours
Severe	12 hours	6 hours
Immersion**	10 hours	5 hours
Interval for recoating with 5636		
Atmospheric: Medium	10 hours	5 hours
Severe	10 hours	5 hours
Immersion	Not relevant	Not relevant
Interval for recoating with 5803		
Atmospheric Medium	3 days	36 hours
Severe	1½ days	18 hours
Immersion	Not relevant	Not relevant
Interval for recoating with HEMPADUR qualities		
Atmospheric: Medium	None	None
Severe****	30 days	15 days
Immersion****	30 days	15 days
Interval for recoating with HEMPATHANE qualities		
Atmospheric: Medium	10 days	5 days
Severe	3 days	36 hours
Immersion	Not relevant	Not relevant

* Only 1628 and 4633 are recommended for this exposure.
** Only 4633 is recommended for this purpose.
*** Not relevant for HEMPATHANE qualities.
**** If the coating has been subjected to direct sunlight for a short period only, the maximum recoating interval may be prolonged.