

APPLICATION INSTRUCTIONS

For product description refer to the product data sheet

HEMPADUR* 17081/ HEMPADUR* 17082

High temperatures: 17081 with CURING AGENT 97820

Low to medium temperatures: 17082 with CURING AGENT 97430

Scope:

These Application Instructions cover surface preparation, application equipment and application details for HEMPADUR 1708.

Ballast tanks, steel work:

All welding seams must have a surface finish which ensures that the quality of the paint system will be maintained in all respects. Holes in welding seams, undercuts, etc. should be avoided. If found, they may necessitate extra stripe coating or filling (however, the classification societies' recommendations are to be followed).

All sharp edges to be broken or rounded depending on the actual conditions and the design lifetime. Laminations to be removed. However, rolled profiles, etc. from the steel mills normally have acceptably rounded edges.

All loose weld spatters to be removed.

Well adhering, scattered weld spatters are acceptable, but will need additional touch-up. If dense, they must be removed by grinding.

Requirements to the "surface quality" of welds according to WELD REPLICA NACE RP 0178 minimum Grade E (NACE Standard RP078-91).

Abrasive blasting/ abrasive sweep blasting:

Before blasting any deposits of grease or oil must be removed from the steel surface with a suitable detergent followed by fresh water hosing. Minor spots of oil/grease may be cleaned with thinner and clean rags - avoid smearing out the contamination. Possible alkali weld deposits, chemicals used for testing of welds, soap residues from the pressure testing must be removed by fresh water hosing.

Repair:

Before blasting, old steel surfaces must be checked for any contamination. Possible blisters must be broken. If thick rust scale has been removed or deep pittings have been encountered, control procedures for contamination must be carried out. If still contaminated, the abrasive blast cleaned steel surface will need a repeated cleaning for salts and/or oil/grease followed by final abrasive blast cleaning.

Newbuilding/new steelwork: To obtain full performance of the ballast tank coating, **welds, burns, damaged and rusty shopprimer** must be abrasive blast cleaned to Sa 2½. Minor areas mechanically cleaned to St 3.

If welds have previously been coated with a (shop)primer just after welding this (shop)primer must be removed by abrasive blasting (sweeping) in order to obtain optimum performance.

Intact shopprimer:

Zinc salted surfaces, deposits of black iron oxides of plasma cutting and similar foreign matters to be removed by light abrasive sweep blasting. Chalk markings and plate marking of a non-compatible nature to be removed as well.

The shopprimer must have been checked randomly for excessive film thicknesses and areas detected to have film thicknesses above approx 40 micron/1.6 mils (as measured directly on the shopprimed surface with equipment calibrated on smooth steel) are to be sweep blasted in order to remove most of the shopprimer.

Spot-checking for possible salt contamination of the surface to be executed before and after abrasive sweep blasting.

When blasting, the importance of working systematically must be stressed. Poorly blasted areas covered with dust are very difficult to locate during the blast inspection made after the rough cleaning.

In the case of abrasive blast cleaning, the surface profile must be equivalent to Rugotest No. 3, BN9a-10 or Keane-Tator Comparator, 3.0 G/S. According to ISO 8503-1 the grade will be MEDIUM (G).

Note: If any doubt exists about the quality of the primary surface preparation (before shoppriming), the substrate must be re-blasted in situ as defined above.

Block assembly zones: Overlap zones must be treated with great care. Damage caused by possible over-blasting must be avoided, paint edges must be feathered and consecutive layers of paint coatings given greater and greater overlaps - old layers being roughened corresponding to these overlaps (when sandpapering, use free-cut paper, grain size 80).

Furthermore, these areas may be either masked off with tape - to keep them as narrow as possible - or left with a **thin** zinc epoxy primer coat applied on these areas after secondary surface preparation at blockstage.

Secondary surface preparation of block assembly zones are preferably abrasive spot-blasted. However, mechanical cleaning to St 3 may be acceptable if zones are narrow and an extra coat is applied on these areas. The procedure of masking off with tape or using the zinc epoxy primer as described above may advantageously be used in this connection.

Repair:

Corroded pits deeper than approx 2 mm, but not repaired by welding, are recommended to be filled with HEMPADUR EPOXY FILLER 3525 after blast priming has been carried out.

Water jetting:

This procedure will primarily be relevant for repair jobs. However, the very good removal of water-soluble salts may also make it useful in other cases.

The resulting standard is to be equal to the WJ-2/SC-2 grade of the joint standard NACE No. 5/SSPC-SP 12 ("Surface Preparation and Cleaning of Steel and other Hard Materials by High and Ultra-High Pressure Water Jetting prior to Recoating", 1995).

It is usually recognized that at least 2000 bars (200 MPa, 30.000 psi) pressure of the water is necessary to obtain such a standard of surface preparation.

Sufficient dehumidification equipment must be used to dry out the tanks as quickly as possible between the water jetting and the coating application.

Local ventilators may be required to distribute the drying air evenly in tanks. All "slurry" is to be removed before it dries. New rust will be acceptable as discoloration only, **not** as powdery, loose rust. Inhibitors are **not** to be used.

All surfaces must be free from contamination as the time of painting and the relative humidity is to be below 85%.

Refurbishment:

It is recommended to carry out rough abrasive blast cleaning - or hydro-jetting - to facilitate visual inspection and any necessary repair of the existing steel work. In the case of pit-corroded tank bottoms this rough blasting will also provide a better basis for a decision between welding or corroded pits or repair by filling.

A main concern is the contamination from sea water (water-soluble, corrosive salts). The preventive method will be to include very thorough cleaning with plenty of fresh water, please see below.

The maximum allowable concentration of chlorides on steel surfaces immediately before application is 7.0 microgrammes/cm² as detected by the "Bresle Method".

In the case of contamination, cleaning procedures must be repeated and/or improved. Especially pit-corroded steel will need special attention and the only possible way to remove contamination from the pits may often be to carry out very thorough cleaning with fresh water after abrasive blast cleaning. After repeated control and drying, the entire surface will need abrasive blast cleaning to obtain the specified degree of cleaning. Alternatively, the pit-corroded areas are cleaned by fresh water hydro-jetting, any surplus of water is mopped up or removed by vacuum cleaning, allow to dry.

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.

Application equipment:

HEMPADUR 1708, 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"
Fan angle: 60-80°.

Complicated surfaces:
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 ballast tank coating 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. 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.

Pot life:

When measured under standard conditions the pot life is 2 hours at 15°C/59°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.

**Physical data
versus temperature:**

(HEMPADUR 17081 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
Initial curing*	5 days	2½ days
Maximum recoating interval:		
	30 days**	15 days**

* When the state "initial curing" has been reached, the coating may exceptionally be exposed to ballast water provided it has been applied within the specified limits of film thicknesses **and** the all painted areas have been subject to thorough ventilation.

** 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 17082 in a dry film thickness of 150 micron/6 mils):

Surface temperature	0°C/32°F	10°C/50°F	20°C/68°F
Drying time	14 hours	7 hours	4 hours
Curing time	28 days	14 days	7 days
Initial curing*	20 days	10 days	5 days
Maximum recoating interval:			
	90 days**	60 days**	30 days**

* When the state "initial curing" has been reached, the coating may exceptionally be exposed to ballast water provided it has been applied within the specified limits of film thicknesses **and** the all painted areas have been subject to thorough ventilation.

** If the coating has been subjected to direct sunlight for a short period only, the maximum recoating interval may be prolonged.

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.

This Product Data Sheet supersedes those previously issued. For definition and scope, see explanatory notes to applicable Product Data Sheets.

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