

17634: BASE 17636 with CURING AGENT 97334

For product description refer to product data sheet 17634

Scope: These Application Instructions cover surface preparation, application equipment and application details for HEMPADUR QUATTRO 17634.

Ballast tanks: See separate instructions for applications according to IMO PSPC.

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, BN9-BN10 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 sand papering, 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 to be abrasive spot-blasted. However, mechanical cleaning to St 3 may be acceptable if zones are narrow and an extra coat of HEMPADUR QUATTRO 17634 is applied to these areas. The procedure of masking off with tape or using the zinc epoxy primer as described above may advantageously be used in case of mechanical cleaning.

Repair:

Corroded pits deeper than approx 2 mm, but not repaired by welding, are recommended to be filled with HEMPADUR EPOXY FILLER 35250 after blast priming has been carried out.

Stainless Steel: (Ballast tanks of chemical carriers) to be abrasive blast cleaned to a uniform, sharp, **dense**, profile (Rugotest No. 3, BN9-10, 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.

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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 Wa 2½ (ISO 8501-4:2006).

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. Acceptable degree of flash rust is maximum M (ISO 8501-4:2006). Inhibitors are **not** to be used.

All surfaces must be free from contamination at 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 water 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 of 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 water jetting, any surplus of water is mopped up or removed by vacuum cleaning. Allow to dry.

Note: Actual type of steel work and surface preparation is dependent on factors such as shipyard technology, contractual specification, required lifetime, etc.

Application equipment: HEMPADUR QUATTRO 17634 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/metres (theoretical)
Input pressure:	Min. 6 bar/ 90 psi
Spray hoses:	Max. 100 metres/ 300 feet, 1/2" internal diameter Max. 30 metres/ 100 feet, 3/8" internal diameter Max. 6 metres/ 20 feet, 1/4" internal diameter
Filter:	60 mesh
Nozzle size:	0,021"-0,025"
Fan angle:	60-80°

To spray complicated surfaces smallest nozzles should be used.

After finishing the application, clean the equipment immediately with HEMPEL'S TOOL CLEANER 99610.

Note: Increasing hose diameter may ease paint flow thereby improving the spray fan. 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 08450 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 coating it is of special importance that a continuous, pinhole-free paint film is obtained at application of each spray applied 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

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these areas a stripe coat will usually be necessary. To obtain good and steady atomising, 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 homogeneously and as close to the specification as possible. The consumption of paint must be controlled to avoid exaggerated film thickness, e.g. 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.

Stripe coating: may either be applied by airless spray, (relatively small, narrow-angled nozzles) or by hand-tools. Apply the stripe coat as a uniform, regular film without excessive brush or roller marks in order to avoid cratering by entrapped air.

Application on zinc silicate:

A proper mist-coat technique is necessary in order to avoid/reduce the risk of popping/"pinholes". Add up to 50% thinner depending on the actual conditions of application.

Pot life/ mixing/ induction time:

When measured under standard conditions the pot life for spraying is 3 hours at 15°C/59°F and 2 hours 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 may make the corresponding practical pot life shorter.

- Mix the entire content of corresponding base and curing agent packing. If it is necessary to mix smaller portions, this must be done properly by either weighing base and curing agent in the prescribed weight ratio: 86 parts by weight of base and 14 parts by weight of curing agent or by volume: 4.0 parts by volume base and 1.0 parts by volume curing agent.
- Stir the mixed paint thoroughly by means of a clean mechanical mixer until a homogeneous mixture is obtained.
- Use all mixed paint before the pot life is exceeded. The pot life depends on the temperature of the paint as shown in table below (valid for a 20 litres can):

Temperature of mixed paint	15°C/59°F ¹⁾	20°C/68°F	25°C/77°F	30°C/86°F ²⁾
Pot life (spray application)	3 hours	2 hours	1½ hours	1 hour

1) At 15°C/59°F and below, the viscosity can be too high for airless spray application.
2) Temperatures above 30°C/86°F should preferably be avoided.

Induction time:

At **steel** temperatures below 5°C/41°F the paint may advantageously be pre-reacted e.g. 10-20 minutes (depending on paint temperature) before spray application (longer pre-reaction time at lower temperatures).

When two-component spray equipment is used, heating may be relevant to obtain a proper spray fan and a uniform and smooth paint film. This can either be done by preheating the two-component paint or by using a flow-heater on the pressure side. As an indication, a paint temperature of approx 40°C/104°F will be relevant, but has to be adjusted according to the actual conditions.

Physical data versus temperature:

HEMPADUR QUATTRO 17634 in a dry film thickness of 125-150 micron/5-6 mils:

Surface temperature	-10°C/14°F	0°C/32°F	10°C/50°F	20°C/68°F	30°C/86°F	40°C/104°F
Drying time	35 hours	14 hours	7 hours	4 hours	3 hours	2 hours
Curing time	56 days	28 days	14 days	7 days	3½ days	40 hours
Initial curing(1)	40 days	20 days	10 days	5 days	2½ days	30 hours

1) 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 that all painted areas have been subject to thorough ventilation.
2) Short term exposure to air or steel temperature as low as -15°C/5°F may be acceptable

Overcoating:

Overcoating intervals (provided proper ventilation)

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HEMPADUR QUATTRO 17634 in a dry film thickness of 125 micron/5 mils:

Surface temperature	-10°C/14°F	0°C/32°F	10°C/50°	20°C/68°F	30°C/86°F	40°C/104°F
MINIMUM overcoating interval related to later conditions of exposure:						
Interval for overcoating with HEMPADUR						
Atmospheric, medium	36 hours	18 hours	8 hours	4 hours	3 hours	2 hours
Atmospheric, severe	36 hours	18 hours	8 hours	4 hours	3 hours	2 hours
Immersion	36 hours	18 hours	8 hours	4 hours	3 hours	2 hours
Interval for overcoating with HEMPATHANE, HEMPAXANE and HEMPATEX qualities						
Atmospheric, medium	36 hours	18 hours	8 hours	4 hours	3 hours	2 hours
Atmospheric, severe	36 hours	18 hours	8 hours	4 hours	3 hours	2 hours
Interval for overcoating with HEMUCRUL qualities						
Atmospheric, medium	N.R.	N.R.	8 hours	4 hours	3 hours	2 hours
Atmospheric, severe	N.R.	N.R.	8 hours	4 hours	3 hours	2 hours
Maximum overcoating interval related to later conditions of exposure:						
Interval for overcoating with HEMPADUR qualities						
Atmospheric, medium	90 days	90 days	60 days	30 days	22,5 days	15 days
Atmospheric, severe	90 days	90 days	60 days	30 days	22,5 days	15 days
Immersion ¹	90 days	90 days	60 days	30 days	22,5 days	15 days
Interval for overcoating with HEMPATHANE and HEMPAXANE qualities						
Atmospheric, medium	90 days	90 days	40 days	20 days	15 days	10 days
Atmospheric, severe	7 days	7 days	5 days	4 days	4 days	4 days
Interval for overcoating with HEMPATEX qualities						
Atmospheric, medium	68 hours	34 hours	15 hours	8 hours	6 hours	4 hours
Atmospheric, severe	68 hours	34 hours	15 hours	8 hours	6 hours	4 hours
Interval for overcoating with HEMUCRYL qualities						
Atmospheric, medium	N.R.	N.R.	6 days	3 days	54 hours	36 hours
Atmospheric, severe	N.R.	N.R.	3 days	1½ days	27 hours	18 hours

1) Depending on actual local conditions, extended maximum overcoating intervals may apply. Please contact Hempel for further advice.

Maximum overcoating intervals:

If the maximum overcoating interval is exceeded, whatever the subsequent coat, roughening of the surface is necessary to ensure optimum intercoat adhesion or in the case of overcoating with coatings other than HEMPADUR, apply a (thin) additional coat of HEMPADUR QUATTRO 17634 within the following directions for overcoating:

- **Long overcoating intervals:**
A completely clean surface is mandatory to ensure intercoat adhesion, especially in the case of long overcoating intervals. Any dirt, oil and grease have to be removed with e.g. suitable detergent followed by high pressure fresh water cleaning. Salts are to be removed by fresh water hosing.
- **Any degraded surface layer, as a result of a long exposure period, must be removed as well.** Water jetting may be relevant to remove any degraded surface layer and may also replace the above-mentioned cleaning methods when properly executed. Consult HEMPEL for specific advice if in doubt.

To check whether the quality of the surface cleaning is adequate, a test patch may be relevant.

Time to first cargo:

"Time to first cargo" for a coating applied strictly according to Hempel's specifications is the minimum curing time required before loading.

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The “time to first cargo” depends on the type of cargo as well as the curing temperature of the coating as depicted in the following tables. Examples of hard angular cargoes are coal, iron and bauxite; and of soft cargoes are peanut shells or soya beans.

Carriage of hard, angular cargoes must only take place after the coating has been exposed to a minimum curing temperature of 5°C/41°F. Required minimum curing times before loading the first cargo are presented in the table below.

The “time to first cargo” also depends occasionally on the loading temperature as reflected on below tables according with remark (1).

Values for time to first cargo to be modified as per below:

Hard cargoes:

Surface Temperature	5°C/ 41°F	10°C/ 50°F	15°C/ 59°F	20°C/ 68°F	25°C/ 77°F	30°C/ 86°F
Time to first cargo	NR	14 days	9 days	7 days	5 days	3 days

Soft cargoes ⁽¹⁾:

Surface Temperature	-10°C/ 14°F	-5°C/ 23°F	0°C/ 32°F	5°C/ 41°F	10°C/ 50°F	15°C/ 59°F	20°C/ 68°F	25°C/ 77°F	30°C/ 86°F
Time to first cargo	NR	NR	45 days	21 days	14 days	9 days	4 days	3 day	2 day

⁽¹⁾ Restricted to a maximum cargo temperature of 25°C/77°F

Note: For conditions not stated in the tables please contact HEMPEL for further information.

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.

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These Application Instructions supersede those previously issued.

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