ITW Chemische Produkte GmbH

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Technical Product Data Sheet for
VARYBOND® Titanium

Product information:

A high performance alloy reinforced epoxy putty engineered to make precision repairs to critical stress bearing equipment. It is used to protect new or repaired surfaces from cavitation, erosion and corrosion.

Feateures:

- Excellent wear and abrasion resistance
- High compressive strength
- Non rusting
- Machinable after 2-4 hours allowing precision repairs
- Excellent chemical resistance
- Excellent temperature resistance of up to 177ºC
- Returns essential equipment to service in just hours
- Makes durable, long-lasting repairs

Recommended Applications:

- Repairing worn pumps
- Repairing scored shafts
- Rebuilding wear rings
- Rebuilding pump impellers
- Rebuilding butterfly and gate valves
- Protecting wear plates
- Rebuilding tube sheets
- Preventing cavitation to condenser water boxes
- Repairing hydraulic rams
- Refitting keyways
- Restoring bearing housings
- Levelling and chocking critical equipment

Typical Properties:

Colour	Grey
Pot Life @ 21ºC	21 minutes
Mixed Consistency	Putty
Adhesive Tensile Shear	14N/mm²
Compressive Strength	130N/mm²
Operating Temperature	177ºC
Cured Hardness Shore D	87
Cured Density	2.36gm/cc
Specific Volume	424cm³/kg
Coverage, cm²/kg @ 5 mm	848
Dielectric Strength, kV/mm	2.2
Chemical Strength	wt. 4.3:1
Mix Ratio	vol. 3:1

Chemical Resistance:

7 days room temperature cure (30 days immersion @ 21ºC)

10% Phosphoric Acid	Fair
5% Bleach (Sodium Hypochlorite)	Excellent
5% Trisodium Phosphate	Excellent
40% Phosphoric Acid	Very Good

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10% Sulphuric Acid	Excellent
10% Sodium Hydroxide	Excellent
50% Sulphuric Acid	Very Good
50% Sodium Hydroxide	Excellent
10% Hydrochloric Acid	Excellent
5% Alum (Aluminium Sulphate)	Excellent
10% Nitric Acid	Very Good
Ferric Chloride	Excellent
40% Nitric Acid	Unsatisfactory
10% Acetic Acid	Unsatisfactory

Epoxies are very good in water, saturated salt solution, leaded gasoline, mineral spirits, ASTM #3 oil and propylene glycol. Epoxies are generally not recommended for long term exposure to concentrated acids and organic solvents.

Application Information:

General Surface Preparation: Proper surface preparation is essential to a successful application. The following procedures should be considered:

- All surfaces must be dry, clean and rough.
- Remove all paint, rust and grime from the surface by abrasive blasting or other mechanical techniques.
- Aluminium repairs: Oxidation of aluminium surfaces will reduce the adhesion of an epoxy to a surface. This film must be removed before repairing the surface, by mechanical means such as grit-blasting or chemical means.
- Provide a “profile” on the metal surface by roughening the surface. This should be done ideally by grit blasting (8-40 mesh grit), or by grinding with a coarse wheel or abrasive disc pad. An abrasive disc may be used provided white metal is revealed. Do not 'feather edge' epoxy materials. Epoxy material must be 'locked in’ by defined edges and a good 3 - 5 mil profile.
- Metal that has been handling sea water or other salt solutions should be grit blasted and high pressure water blasted and left overnight to allow any salts in the metal to 'sweat' to the surface. Repeat blasting may be required to 'sweat out' all the soluble salts. A test for chloride contamination should be performed prior to any epoxy application. The maximum soluble salts left on the substrate should be no more than 40 p.p.m. (parts per million).
- Chemical cleaning should follow all abrasive preparation. This will help to remove all traces of sandblasting, grit, oil, grease, dust or other foreign substances.
- Under cold working conditions, heating the repair area to 38ºC - 43º C immediately before applying any of VARYBOND® Metal-filled Epoxies is recommended. This procedure dries off any moisture, contamination or solvents and assists the epoxy in achieving maximum adhesion to the substrate.
- Always try to make the repair as soon as possible after cleaning the substrate, to avoid oxidation or flash rusting. If this is not practical, a general application of FL-10 Primer will keep metal surfaces from flash rusting.
- Note: Large surface areas or equipment subjected to thermal shock, impact or constant vibration should have expanded metal tack welded to

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the surface. The expanded metal should be solvent wiped, grit blasted and solvent wiped again to remove oil, grease and dust. The expanded metal should be raised at least 1.6mm off the surface to ensure that VARYBOND® Titanium will get in between and under the expanded metal.

Mixing:

Mix ratio - Weight: 4.3:1 Volume: 3:1
VARYBOND® Titanium is formulated to be a dense mix that can be applied easily to overhead and vertical surfaces without running or sagging. Add the hardener to resin and mix thoroughly on a mixing board using a spatula. Do not mix in the containers.

Application:

For best results, product should be kept and applied at room temperature. VARYBOND® Titanium can be applied when temperatures are between 15ºC and 32ºC. When temperatures are below 21ºC, cure and pot life will be longer, and above room temperature, cure and pot life will be shorter. Using a putty knife, trowel or spatula, a very light coat should be applied to "wet out" the surface, allowing for 100% contact and further thickness buildup. Then continue to build up a desired thickness. VARYBOND® Titanium can be trowelled to a smooth finish with water or by warming the trowel with a torch and lightly trowelling over the uncured wear system.

Cure:

VARYBOND® Titanium cures functionally in about 4 hours at 21ºC at 12.5mm thick. Working time is 21 minutes @ 21C. The full core may be increased by applying external heat to 65°C for 2-3 hours. This can be done with a hot box, heat lamps or other heat source. Never expose this system to a direct flame.

Shelf Life:

A shelf life of three years from date of manufacture can be expected when stored at room temperature (22ºC) in their original containers.

Precaution:

For complete safety and handling information, please refer to the appropriate Material Safety Data Sheets prior to using this product.

Warranty:

ITW Chemische Produkte GmbH will replace any material found to be defective. Because the storage, handling and application of this material is beyond our control we can accept no liability for the results obtained.