

# Titanium Supergrade HT

## High Temperature Epoxy Repair Paste

### Description

**Titanium Supergrade HT** is an alloy-reinforced, two-part epoxy paste with very high compressive strength and temperature resistance. It is used to repair stress-bearing equipment and systems exposed to temperatures up to 200°C (or 250°C with 50% properties). Titanium Supergrade can be used on metal, wood and most plastics. It protects and strengthens industrial machinery, rebuilds large sections of damage, fills holes and large cracks, and repairs areas of pitting.

It is ideal for the repair and maintenance of pipelines, tanks, pumps, valves, metal castings, worn shafts, damaged keyways and automotive bodywork. Titanium Supergrade HT is reinforced with corrosion resistant platelets, which provide excellent protection against corrosion and chemical attack for surfaces in aggressive environments. These platelets also give a smoother finish than regular epoxy pastes when machined.

Titanium Supergrade HT has a three-hour work time, allowing large quantities to be mixed and applied without the threat of premature curing - even at high ambient temperatures. A full cure is achieved in 24 hours. Its light consistency makes it easier to mix than stiff, heavy traditional epoxy pastes. It is thixotropic, meaning it will not sag. Titanium Supergrade HT is virtually odourless, with no unpleasant smell compared to other epoxy pastes.

### Applications

- Strengthening degraded and weakened pipes by rebuilding exterior wall thickness back towards original specification
- Rebuilding worn shafts and damaged keyways
- Filling in large cracks and holes in metalwork; repairing pitting
- Relining worn areas in pumps, valves and associated equipment
- Levelling equipment
- Protecting pipes, tanks, machinery and surfaces from corrosion and chemical attack

### Advantages

- Very high compressive strength and temperature resistance
- Easy to mix and apply with a long working time for complex applications
- Can be machined

### Technical Data

Minimum shelf life (months @ 24°C)	24
Mix ratio (weight)	3:1
Mix ratio (volume)	3:1
Working time (minutes)	180
Recoat time (hours)	4-6
Functional cure (hours)	16
Full cure (hours)	24
Coverage (cm <sup>2</sup> /kg @ 5mm thickness)	1212
Shore D hardness (full cure, 24 hrs.)	90
Lap shear tensile strength (Mpa)	
On Steel	14
Tensile strength (MPa)	35
Compressive strength (MPa)	130
Flexural strength (MPa)	100
Density (gm/cm <sup>3</sup> )	1.6
Shrinkage (%)	<1
Non-volatile content (%)	100
Maximum service temperature (°C)	
Continuous - room temperature cured	80
Continuous - post cured	200
Intermittent - post cured	250
Heat resistant, no load - post cured	300

(values are typical and should only be used as a guideline)

### Chemical Immersion (120 days)

25% Acetic Acid	Good
10% Nitric Acid	Good
30% Sulphuric Acid	Excellent
Acetone	Good
Toluene	Excellent
Methanol	Good
Ethanol	Excellent
10% Ammonium Hydroxide	Excellent
10% Sodium Hydroxide	Excellent
Deionised Water	Excellent

### Weight change:

Excellent: +/- 1%	Good: +/- 10%
Fair: +/- 10-20%	Poor: +/- over 20%

(if continuous tensile strength reduced by approx.50%, hardness 70 Shore D)  
(non-structural or pressurised repairs, hardness reduced to 57 Shore D. Once at room temperature, hardness fully returns)



Whilst all reasonable care is taken in compiling technical data on the Company's products, all recommendations or suggestions regarding the use of such products are made without guarantee, since the conditions of use are beyond the control of the Company. It is the customer's responsibility to satisfy themselves that each product is fit for the purpose for which they intend to use it, that the actual conditions of use are suitable and that in the light of our continual research and development programme the information relating to each product has not been superseded.

**Directions for Use****Surface Preparation**

- Surfaces must be prepared prior to application.
- All surfaces must be dry and free of grease. Clean and roughen the surface for optimum adhesion.
- Remove all paint, rust and grime from the surface by abrasive blasting or with sandpaper.
- If applying to aluminium, remove oxidation from surface for optimal adhesion.
- Roughen the surface first, ideally by grit blasting (8-40 mesh grit) or through grinding with a coarse wheel or abrasive disc pad. An abrasive disc may be used provided white metal is revealed. Do not 'feather edge' - Titanium Supergrade HT must be 'locked in' by defined edges and a good 3-5mm profile.
- Metal which has been in contact with seawater or other salt solutions should be grit blasted, high pressure water blasted and then left overnight to allow salts in the metal to 'sweat' to the surface. Repeat this process if necessary to 'sweat out' all of the soluble salts.
  - Test for chloride contamination before application.
  - The maximum soluble salts left on the substrate should be no more than 40 ppm.
- Use a solvent cleaner to remove all traces of sandblasting, grit, oil, grease, dust or other foreign substances.
- In cold working conditions, it is recommended the repair area is heated to 37°C-43°C prior to application. This will dry off any moisture, contamination or solvents for maximum adhesion.
- Apply Titanium Supergrade HT as soon as possible after preparation to avoid oxidation or rusting.

**Mixing Titanium Supergrade HT**

- Measure 3 parts resin to 1 part hardener by volume or weight. For convenience when mixing an entire kit, Industrial Metal is supplied with Part A and Part B in the correct 3:1 mix ratio.
- Mix together with a trowel, other hand tool or stirrer until the epoxy is streak free and a uniform colour.

**Application Method**

- Titanium Supergrade HT should be applied at room temperature, when temperatures are between 13°C and 52°C.
- Spread Titanium Supergrade HT over prepared surface with a putty knife. Press firmly to ensure maximum surface contact and avoid trapping air.
- To bridge large gaps or holes, use fibreglass, sheet metal or wire mesh.

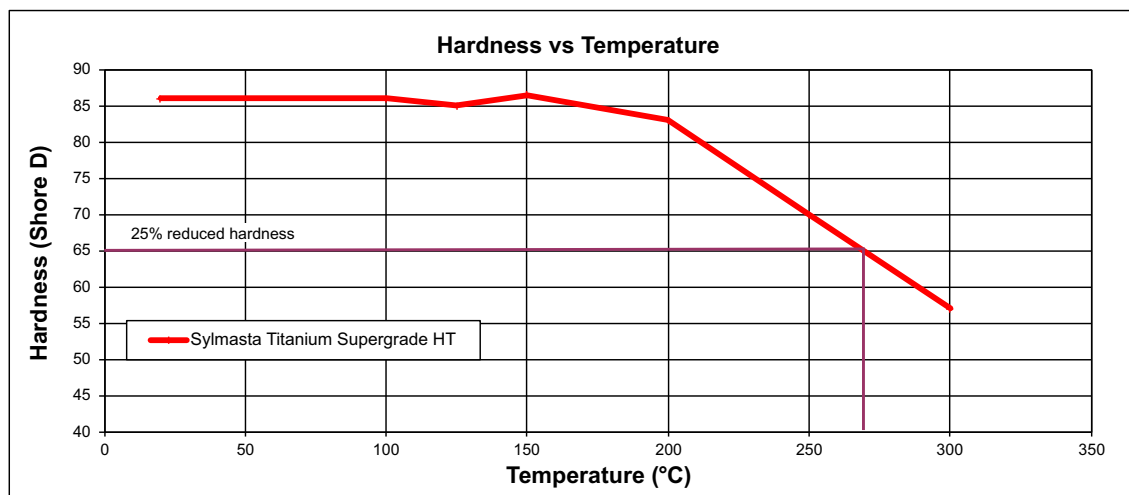
**Post Curing**

- Heat resistance can be as high as 250°C. Like all high temperature epoxy systems, Titanium Supergrade HT should be post-cured to enable secondary cross-linking and achievement of maximum temperature resistance.
- Cure at room temperature for 24 hours.
- Heat at 80°C for 2 hours.
- Heat at 130°C for 3 hours.
- Allow to cool.

**Note:** The effect of post-cure can also be realised during the normal ageing of the epoxy system in service, especially if operating at elevated temperatures - but it is not generally encouraged to rely on the service environment for completion of the cure reaction and establishing optimum adhesive strength as these are not controlled conditions.

**Hardness v Temperature**

Titanium Supergrade HT retains full hardness past 200°C. Hardness begins to drop off after 200°C and is reduced by 25% past 270°C.



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**Product Code: PHT****TECHNICAL DATA SHEET****Packaging**

Product Code	Pack Size
PHT-500g	500g
PHT-4x500g	4 x 500g
PHT-2kg	2kg
PHT-5kg	5kg
PHT-33kg	33.33kg

**Storage**

Titanium Supergrade HT should be stored out of direct sunlight in dry, frost free conditions at temperatures between 15°C and 20°C. Under such conditions, shelf life will be three years from the date of manufacture.

**Health & Safety**

Titanium Supergrade HT consists of epoxy resins and hardener systems. Please consult the individual Material Safety Data Sheet for hazard information. Wear eye protection and rubber or plastic coated gloves. Wash hands with soap and water immediately after use.

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