



# Graphene

## Graphene Modified Marine Heavy-duty Coatings Product manual



Science 科學

Creation 創新

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# Graphene Modified Marine Heavy-duty Coatings

## 【Product Introduction】

This product is a graphene modified titanium nano polymer alloy heavy duty marine coating which solidified at room temperature. It is made up as a set of the primer (ZTMR-TT4810B), intermediate paint (ZTMR-TT4827C) and finish paint (ZTMR-TT4834S). With addition of graphene, the anticorrosion property of this coating has been greatly improved. As a new marine heavy-duty anticorrosive coating material, this product is specially designed for offshore engineering applications such as marine transport, cross sea bridge, marine concrete structure, offshore oil operation platform, submarine pipeline laying, etc.

## 【Product Models】

Primer : ZTMR-TT4810B

Intermediate paint : ZTMR-TT4827C

Finish : ZTMR-TT4834S

## 【Applications】

- 1、It is recommend as the special protective coatings for corrosive environment, such as marine engineering etc.
- 2、For severe corrosive environment, it is recommended to use the whole set of coatings, including the bottom, middle and surface composite coatings.

## 【Physical Properties】

**Physical-chemical properties of graphene modified marine heavy anticorrosion coating**

Testing Items	Primer	Intermediate paint	Finish
Color and Appearance	gray	black	Dark grey
Glossiness	zero diopter	zero diopter	Bright
Solidity $\geq$	95	95	95
Viscosity (-4), s (group A) $\geq$	80	80	80
drying time (Table dry), 23°C/h	2	2	2
Adhesion (Circle method), level $\leq$	1	1	1
Hardiness $\geq$	3	3	4

Flexibility, mm	1	1	1
Abrasive Resistance (500g/ 500r), g	the quality of the test before and after the test		
Oil resistance * (Soaking mineral oil), 90d	unchanged		
Acid resistance *, 30% H <sub>2</sub> SO <sub>4</sub> , 90d	unchanged		
Alkali resistance *, 30NaOH, 90d	unchanged		
Saltwater resistance *, 5% NaCl solution, 90d	unchanged		
Marine climate exposure test *, 36 months	Rust≤1 level, Powder≤1 level , change colour≤2 level		
Artificial accelerated aging test *, 20000h	Perfect film, Powder≤1 level , change colour≤2 level		
Temperature resistant and damp heat salt spray test *, 10000h	Perfect film, Mild discoloration, Rust≤1 level		

### 【Coating thickness】

	Primer	Intermediate paint	Finish	Total thickness
Dry coat (μm)	70	100	80	250
Wet coat (μm)	120	150	130	400
Estimated Coverage (m <sup>2</sup> /L)	5	4	5	4.7

### 【Drying Time】

Factors such as ventilation condition, ambient temperature, film thickness and coating path will affect the coating drying time accordingly. The typical data listed in the following table are based on the following conditions:

- \* Good ventilation (outdoor or air natural circulation)
- \* typical coating thickness
- \* the single channel wet film thickness on the steel bottom should be at the ambient temperature of >60μm
- \*temperature >10 C and the relative humidity of <60%

Surface drying time: 25°C, 1h

Hard drying time: 25°C, 24h

Actual drying time: 25°C, 7d

Note: 1. The degree of coating cure can be tested by butanone MEK detection (ASTMD 4752-87) method.

2. Before construction, zinc salt and other pollutants should be removed from the base surface.

3. The above data are for guidance only. The interval between the actual drying time and the coating time may change, depending on the film thickness, ventilation condition, humidity, lower paint, early loading and unloading needs and mechanical strength. A complete set of supporting data is provided with the product, which contain all the technical parameters and special conditions.

### 【Surface Treatment】

All surfaces should be clean, dry, and free of dirt in accordance with ISO 8504 standards

On a bare steel surface:

Cleanliness: Sandblast clean the area to Sa 2.5 grade (ISO 8501-1: 200)

Roughness: Maintain a surface roughness according to ISO 8503-2 standards with a surface roughness of around 30-70 $\mu$ m,Ry5.

### 【Operation Conditions and Instructions】

The temperature of the base material should not be lower than 5 $^{\circ}$ C, and at least 3 $^{\circ}$ C higher than the local dew point temperature. Measurement of the humidity and temperature should be taken near the bottom of the operation point.

When the product is coated, the formal coating must be fully solidified before the next coating, otherwise it may affect the adhesion of the next coating.

### 【Operation Parameters】

**Ratio (quality):** group A: group B = 4~5:1. Note: the ratio may be changed, which is based on the ratio of the label of the factory packing or the factory inspection report.

**Mixing:** before use, the A component (paint material) and B component (curing agent) are mixed evenly according to the use ratio. Then wait for 15 minutes, before start to paint.

### 【Method of Operation】

The paint should be diluted with dilute, according to the dilution ratio instructed, and then is stirred evenly. After mixing, the paint needs to go through the 200-mesh screen cloth before use.

**For coating:** spraying with high-pressure airless spraying equipment. It is recommend to do a small-area-pre-coating test, to make sure the result is qualified with the specified dry film thickness (a thickness of more than 250 $\mu$ m). Then evaluate all aspects of the coating's quality, and make sure it is qualified before the construction on a large area.

**Dilution:** use special diluent to adjust the viscosity of the paint before use.

**The amount of diluent to use:** paint : thinner =10:1~1.5 (mass ratio). The ratio is the same for bottom, middle and surface paintings.

### 【Storage and Transportation】

The storage environment of this product should be kept dry, cool and ventilated, and avoids sources of heat and fire. The packing container should be kept closed.

The valid storage period is one year. If product's storage time exceeds the storage period, paints should be re-inspected to confirm whether it can be used.

Caution must be taken during handling. Stir well before use.

(Primer)



(Intermediate paint)



(Finish)



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