



Innovative protective coatings  
for  
Wind turbines

# Innovative protective coatings for Wind turbines

## **Wind power energy is attractive as a clean energy source.**

Windmill towers have been constructed alongside the coastal areas, benefitting from relatively strong winds for a number of years. In recent years, offshore windmill projects are particularly focused as a development of an alternative energy source. These windmill towers require protective and decorative coatings on the towers for long-term performance and hence minimising maintenance. The coating systems are specified for exterior's, interior's and underwater (including splash zone).





## Products - Exterior

### Primers

<b>A</b>	Epoxy zinc rich primer	<b>EPICON ZINC HB-2</b> <b>EPICON ZINC HB-2 SH</b>
High protective performance zinc primer with good workability.		

<b>B</b>	Inorganic zinc primer	<b>GALBON S-HB</b> <b>GALBON S-HB ID</b>
Best protective performance inorganic zinc rich primer. Subsequent finish coat is required by its mist coat.		

### Intermediate epoxy primers

<b>C</b>	Epoxy primer	<b>UMEGUARD series</b> <b>BANNOH 1500 series</b> <b>BANNOH 2000 series</b>
	Glassflake epoxy primer	<b>PERMAX series</b>
	Alternative	<b>Alternative epoxy primers</b>

### Finish coat system

<b>D</b>	Polyurethane finish	<b>UNY MARINE HS</b>
Standard weather resistant finishing coat. Gloss retention is less than 60% after Xenon Arc * 5,000 hrs with white shade product. Colour difference ( $\Delta E$ ) is less than 1.0 after Xenon Arc 5,000 hrs with white shade product.		

<b>E</b>	Polyurethane tie coat	<b>KEYSOL UNDERCOAT U</b>
	Organo-Polysiloxane finish	<b>KEYSOL No.100</b>
Good weather resistant finishing coat. Gloss retention is less than 80% after Xenon Arc * 5,000 hrs with white shade product. Colour difference ( $\Delta E$ ) is less than 1.0 after Xenon Arc 5,000 hrs with white shade product.		

<b>F</b>	Epoxy tie coat	<b>FLUOREX UNDERCOAT EP</b>
	Fluoresin finish	<b>FLUOREX FINISH</b>
Excellent weather resistant finishing coat. Gloss retention is more than 90% after Xenon Arc * 5,000 hrs with white shade product. Colour difference ( $\Delta E$ ) is less than 1.0 after Xenon Arc 5,000 hrs with white shade product.		

\* ISO 16474-1 Paints and varnishes -- Methods of exposure to laboratory light sources -- Part 1: General guidance

\* ISO 16474-2 Paints and varnishes -- Methods of exposure to laboratory light sources -- Part 2: Xenon-arc lamps

\* Normal acceleration test by Xenon Arc, data of degradation has correlation with actual outdoor exposure, consult Chugoku Marine Paints for further information.

**Coating systems (Exterior and Interior)**

Primers	Epoxy zinc rich primer	50 - 80 $\mu\text{m}$
	Inorganic zinc primer	60 - 80 $\mu\text{m}$
Intermediate epoxy primers	Epoxy primer	100 - 250 $\mu\text{m}$
	Glassflake epoxy primer	300 - 500 $\mu\text{m}$
Finish Coat systems	Polyurethane finish	50 - 70 $\mu\text{m}$
	Fluororesin finish	25 - 30 $\mu\text{m}$

**Coating systems (Under water areas and splash zone)**

Epoxy primer	2 or 3 coats	Total	450 -600 $\mu\text{m}$
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**Non-ferrous primers (for substrates other than steel)**

For galvanized surface	<b>GALVANITE No.200 PRIMER</b> <b>GALVANITE No.400 PRIMER</b>
For aluminium surface	<b>EPICON A-100 PRIMER</b>
For stainless surface	<b>EPICON S-100 PRIMER</b>
For brass, bronze surface	<b>EPICON B-100 PRIMER</b>
For titanium surface	<b>CMP TITAN PRIMER</b>



CMP's innovative coating specifications for wind turbines have been applied on thousands of units per year, worldwide.

The choice of reliable coating protection is expected before construction works are planned, and selected according to the environment around the location of windmills and a designed service life.

The decision is generally subject to a maintenance free lifetime of more than 15 years.

The classification of our environment in this respect can be taken from EN ISO 12944 part 2.

The corrosion categories according to EN ISO 12944 part2 (C3, C4 and C5 as well as Im1, Im2 and Im3)

Corrosivity category	Examples of typical environments in a temperate climate	
	Exterior	Interior
C3: medium	Urban and Industrial atmospheres, moderate SO <sub>2</sub> pollution, coastal areas with low salinity.	Production rooms with high humidity and some air pollution, e.g. food processing plants, breweries, laundries.
C4: high	Industrial and coastal areas with moderate salinity.	Chemical plants swimming pools. Coastal ship and boatyards.
C5-I: Very high	Industrial areas with high humidity and aggressive atmosphere	Buildings or areas with almost permanent condensation and high pollution.
C5-M: Very high	Coastal and off-shore areas with high salinity.	

Category	Environment	Examples of environment and structures
Im1	Fresh water	River installations, hydro- electric power plants.
Im2	Sea or brackish water	Harbour areas with structures like sluice gates, locks, jetties. Offshore structures.
Im3	Soil	Buried tanks, steel piles, pipes.





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**CMP CHUGOKU MARINE PAINTS, LTD.**

**HEADQUARTERS**

Tokyo Club Building, 2-6, Kasumigaseki 3-chome, Chiyoda-ku, Tokyo, 100-0013, Japan TEL : 81-(3)3506-3971 FAX : 81-(3)5511-8542

Website: <http://www.cmp.co.jp/global>

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