

## OXYPLAST EF-PRIMERS / ZINCOPRIM

### DESCRIPTION

OXYPLAST presents with its **EF products** a range of primers that, as a part of a two-layer system, can be applied on several types of metal substrates such as aluminium, steel or galvanized steel.

Depending on the required corrosion protection in a particular environment, the type of substrate to be coated and the applied oven parameters for the powder curing, one of the following products can be applied :

- **EF33/TR7146/70/180:**

Modified epoxy primer, providing a very good corrosion protection and an excellent adhesion with the topcoat.

- **EF23/TR1142/90/180:**

Epoxy primer, providing a very good corrosion protection, also in industrial environment or environment with very high salt concentration (e.g. atmospheric-corrosivity category C4, according to ISO 12944).

- **EF34/TR7146/70/150:**

"Low-bake" modified epoxy primer with a wide cross-linking profile; gives a very good compromise between corrosion protection and curing possibilities.

- **EF14/TR1142/70/150:**

"Low-bake" epoxy primer providing a very good corrosion protection in combination with low curing temperatures.

- **ZINCOPRIM NEW:**

Zinc-rich epoxy-based primer for use on shot-blasted steel; providing a very good corrosion protection on correctly pre-treated steel.

All these EF-primers show very good degassing properties when applied on degassing sensitive substrates like galvanized / hot-dip galvanized steel.

**New**

**New**

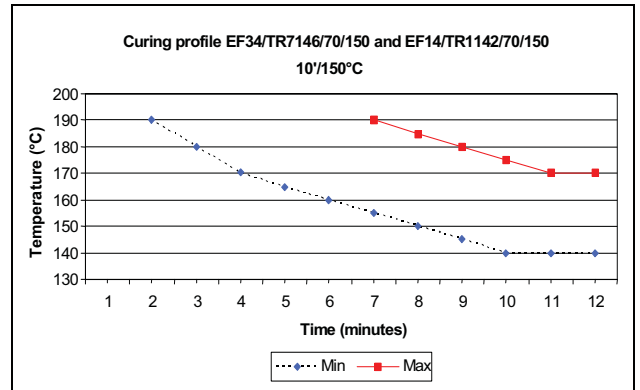
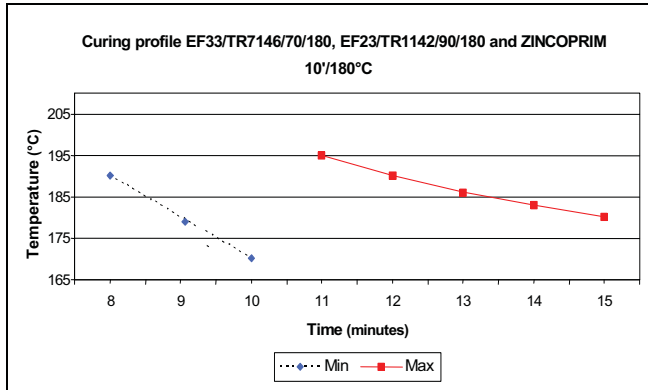
### PROPERTIES OF THE POWDER

- **Density (g/cm<sup>3</sup>)** (DIN 55990/3) 1.50 ± 0.05 (EF-primers)  
1.65 ± 0.05 (Zincoprim)
- **Colour** Light-grey (EF33 en EF34)  
Beige (EF23 en EF14)  
Dark-grey (Zincoprim)
- **Particle size distribution** Optimized for electrostatic application
- **Storage** Dry, max. 25 °C: at least 1 year
- **Application** Corona- and Tribo-chargeable / Film thickness: 50 - 70 µm
- **Curing schedule**
  - o 10 min. at 150 °C (metal temperature)
    - EF34/TR7146/70/150
    - EF14/TR1142/70/150
  - o 10 min. at 180 °C (metal temperature)
    - EF33/TR7146/70/180
    - EF23/TR1142/90/180
    - Zincoprim

For optimal adhesion with the topcoat, it is very important to cure according to the described curing schedule. Especially EF23, EF14 and Zincoprim can give adhesion problems with the topcoat in direct stoved gas ovens. Therefore we advise for these primers to reduce the curing time from 10 min. to 5 min. at the stated curing temperature (metal temperature) of each individual powder.

This incomplete curing of the primer has no negative influence on the corrosion resistance, because the crosslinking is further completed when curing the topcoat:

- o 5 - 6 min. at 150 °C for EF34 and EF14
- o 5 - 8 min. at 180 °C for EF33, EF23 and Zincoprim (time in function of the curing temperature of the topcoat):
  - 5 min. with a 10 min. / 180 °C curing topcoat
  - 8 min. with a 10 min. / 150 °C curing topcoat



**MECHANICAL  
PROPERTIES  
OF THE COATING**

- **Substrate** Cold-rolled steel (0.8 mm), degreased
- **Curing schedule** 10 min. at 150 °C or 10 min. at 180 °C (metal temperature)
- **Layer thickness** 60 ± 10 µm
- **Adhesion** (ISO 2409) Gt = 0
- **Erichsen** (ISO 1520) > 5 mm
- **Impact (reverse)** (ASTM D2794) > 20 kg.cm
- **Conical mandrel** (ISO 6860) < 10 mm

**ANTICORROSION  
PROPERTIES**

For an optimal adhesion and corrosion protection the correct pre-treatment must be applied. The choice of pre-treatment depends on the type of substrate, the condition of the substrate to be cured and the aimed protection lifetime.

Enclosed table gives an overview of several anti-corrosive systems applied on aluminium, steel and galvanized steel. For the systems applied on galvanized steel, an expected lifetime is indicated as proposed by GSB for approved systems (GSB ST 663) using the standard

ISO 12944-1:

- **Test panel**
  - o Cold-rolled steel: degreasing + shot blasting Sa 2½ (R<sub>a</sub> = 6 - 12 µm)
  - o Hot-dip galvanized steel and aluminium: degreasing, pickling, chromatisation (Cr<sup>VI</sup>) \*
  - o Metallized steel (Zn/Al: 85/15)
  - o Galvanized steel:
    - degreasing, pickling, zinc- or tri-cationic phosphatation \*
    - softly blasting
- **Powder system**
  - o EF33 / EF23 / ZINCOPRIM + PE64 / PE50
  - o EF34 / EF14 + PE65
- **Test** Neutral salt spray with scratch according to ISO 9227 (5% NaCl, 35 °C)
- **Evaluation** ISO 4628-2 (formation of blisters) / ISO 4628-8 (peeling-off + visual corrosion) after 500 h / 1000 h
- **Expected lifetime** For GSB certified powders (GSB ST 663), on hot-dip galvanized steel, in corrosivity categories C3 - C5-I (ISO 12944-1):  
K = short (2-5 y) / M = medium (5-15 y) / L = long (>15 y)

\* The recommendations of the supplier of the chemical pre-treatment must be strictly followed.

Substrate	Pre-treatment	Layer 1	Layer 2	Blistering after 500/1000 h	Peeling-off after 500/1000h	Corrosion after 500/1000h	Expected lifetime
steel	Shot blasting (Sa 2,5)	EF 23 (60µm)	PE64 (80µm)	<2(S2) / <2(S3)	<2 / <3	<1 / <2	/
steel	Shot blasting (Sa 2,5)	Zincoprim (60µm)	PE64 (80µm)	<2(S2) / <2(S3)	<2 / <3	<1 / <2	/
galvanized steel	chromatation	/	PE64 (100µm)	<2(S2) / <2(S3)	<1,5 / <2	<1 / <1,5	C3/L – C4/L – C5-I/-
galvanized steel	chromatation	EF 23 (60µm)	PE64 (80µm)	<1(S1) / <2(S2)	<1 / <1,5	<0,75 / <1	C3/L – C4/L – C5-I/M
galvanized steel	chromatation	EF 33 (60µm)	PE64 (80µm)	<1(S1) / <2(S2)	<1 / <2	<0,75 / <1,5	/
galvanized steel	chromatation	/	PE65 (80µm)	<2(S2) / <2(S3)	<2 / <4	<1,5 / <3	/
galvanized steel	chromatation	EF 14 (60µm)	PE65 (80µm)	<1(S1) / <2(S2)	<1 / <2	<1 / <1,5	C3/L – C4/L – C5-I/M
galvanized steel	chromatation	EF 34 (60µm)	PE65 (80µm)	<1(S1) / <2(S2)	<1,5 / <2,5	<1,5 / <2	/
galvanized steel	zinc phosphatation	/	PE64 (100µm)	<2(S2) / <2(S3)	<2 / <2,5	<1,5 / <2	C3/L – C4/M – C5-I/-

galvanized steel	zinc phosphatation	EF 23 (60µm)	PE64 (80µm)	<1(S1) / <2(S2)	<1,2 / <2	<1 / <1,5	C3/L – C4/L – C5-I/M
galvanized steel	zinc phosphatation	EF 33 (60µm)	PE64 (80µm)	<1(S1) / <2(S2)	<1,5 / <2,5	<1,5 / <2	/
galvanized steel	zinc phosphatation	/	PE65 (80µm)	<2(S2) / <2(S3)	<2 / <4	<1,5 / <3	/
galvanized steel	zinc phosphatation	EF 14 (60µm)	PE65 (80µm)	<1(S1) / <2(S2)	<1,2 / <2,2	<1,5 / <2	C3/L – C4/L – C5-I/M
galvanized steel	zinc phosphatation	EF 34 (60µm)	PE65 (80µm)	<1(S1) / <2(S2)	<1,5 / <2,5	<1,5 / <2	/
aluminium	Chromatation	/	PE50 (80µm)	0/0	0/0	0/0	/
aluminium	chromatation	EF 23 (60µm)	PE50 (80µm)	0/0	0/0	0/0	/
metallisation	/	/	PE64 (100µm)	0/0	0/0	0/0	/
metallisation	/	EF 33 (60µm)	PE64 (80µm)	0/0	0/0	0/0	/
metallisation	/	EF 14 (60µm)	PE65 (80µm)	0/0	0/0	0/0	/
metallisation	/	EF 34 (60µm)	PE65 (80µm)	0/0	0/0	0/0	/

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*This information is given in good faith. A warranty, expressed or implied, cannot be supplied as results may vary depending on application conditions.*