



## Data sheet PCO<sup>®</sup> 12 - black (stated: 07/18)

### Surface treatment of magnesium alloys

Goal: Creation of a black corrosion-resistant surface

Procedure: Plasmachemical oxidation (PCO<sup>®</sup>) in calibrated electrolyte systems

Initial state demands:

- Flash-free work pieces with oil-free and ungreased surfaces
- Free from separating agents and/or residual paint
- Signposting of contacting points on the engineering detail drawing

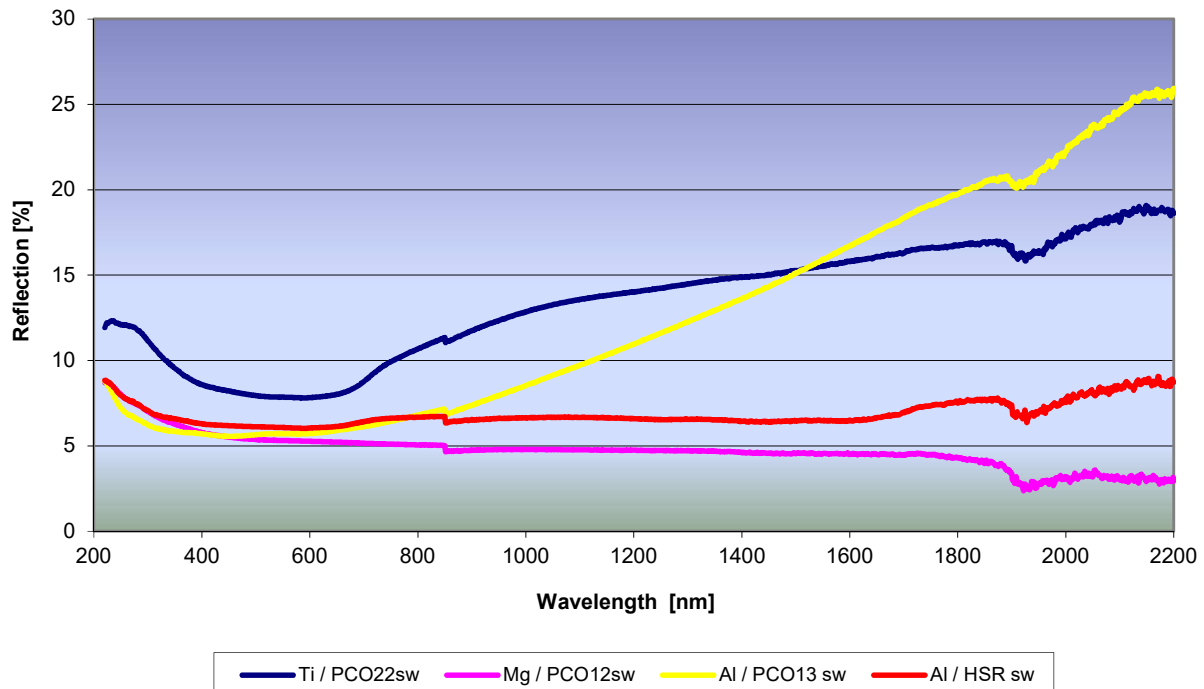
Alloys:

- Suitable for all magnesium alloys demanding a particular pre-treatment
- Examples: AZ31, AZ61, AZ80, AZ91, AM20, AM50, AM60, ZK60, HK31

Layer properties:

- Reflectance plot (ultraviolet-/visible-radiation):

Total reflection of black PCO- layers on light alloys



Layer composition:

- Anorganic layer character, formed by specific oxides and spinels, as well as embedded subgroup elements, comply with the directive 2002/95 / EG of 27.01.2003 (RoHS) and the REACH Regulation (EC No. 1907/2006) without exceptions



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<u>Layer thickness:</u>	Adjustable between 5 µm and 20 µm Preferred range: 7 µm +/- 3 µm ¼ anchoring ratio and ¾ epitaxial ratio
<u>Roughness:</u>	Based on initial state roughness properties and layer thickness desires R <sub>a</sub> values between 1,0 µm to 3,5 µm were observed.
<u>Examples:</u>	Die-casting work piece made of AZ91: Initial roughness: R <sub>a</sub> : 0,31 µm, R <sub>z</sub> : 1,2 µm Deposited: R <sub>a</sub> : 1,18 µm, R <sub>z</sub> : 6,0 µm
<u>Corrosion resistance:</u>	Corrosion-resistant fulfilling DIN ISO 9022-16-01. Combined with PCO <sup>®</sup> 12white (Σ≤20 µm) the coating fulfils DIN EN ISO 7253 enduring 100 h in a neutral evaporised saline solution test.

### General properties:

- Visual beamless surface
- Electrically isolating
- Resistant against constant temperature up to 423 K
- UV - resistant
- Wiping-proof
- Machinable
- Possibility of partial deposition
- Constant layer development, coatable through-holes with diameters between 1 mm and 5 mm
- Reconstruction coatings possible
- Non-resitant versus ultra-sonic treatment



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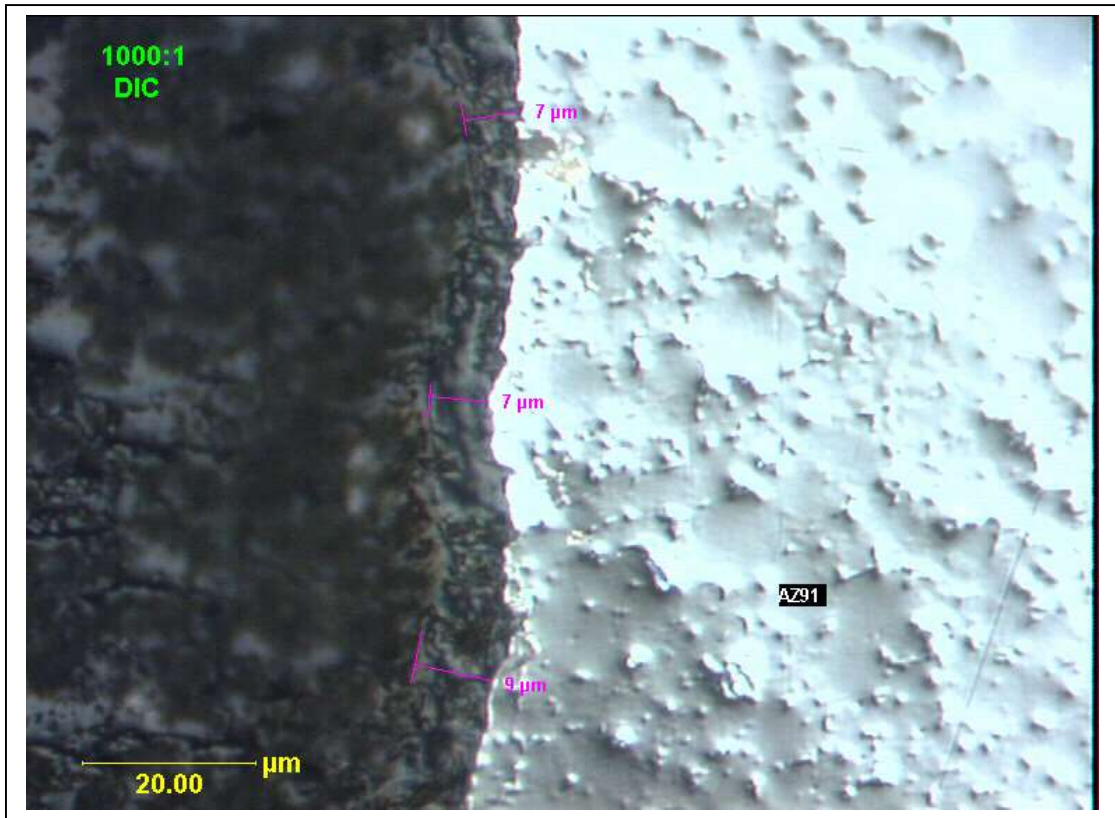


Figure 1: Cross-section polish of a PCO<sup>®</sup> 12 black – coating on AZ91

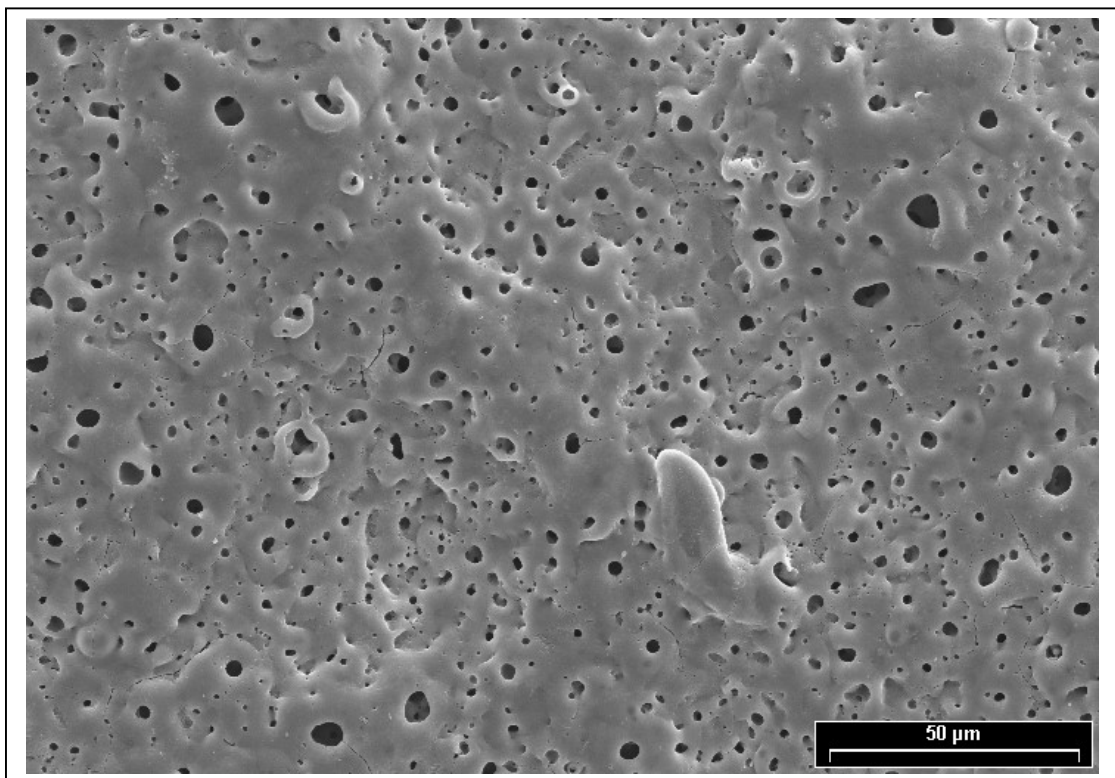


Figure 2: SEM – picture of a PCO12 – coated surface on AZ91