



# GRIEKSPoor

## THERMAL COATINGS

### Product Specification Sheet

#### TOPCOAT WCR+

300µm 2-layer  
Ni based superalloy / Tungsten Carbide

#### Coating construction and composition (2-layer coating system)

Intermediate coating	HP-HVOF	TOPCOAT 177 (Ni-superalloy)	≥ 150µm (max. 3000µm)
Topcoat	HP-HVOF	Cr <sub>3</sub> C <sub>2</sub> + WC + NiCr	≥ 100µm (typically 150µm, max. 250µm)

#### Key coating information

Description	International standard	Minimum value	Griekspoor Standard
Tensile Adhesive Strength	ISO 14916	≥ 50 N/mm <sup>2</sup>	≥ 80 N/mm <sup>2</sup>
Corrosion test	NOV/DNV-C2	No corrosion visible after 500h	>1000h
	Endurance test acc. NBD10300	No permeability after 1000h (ECP-test > -350mV)	>1000h (ECP-test > -150mV)
Corrosion resistance	ISO 9227 AASS ASTM G85	No corrosion after 1000h	>1000h
Porosity		<1%	<0.7%
Chemical resistance 1. NaCl (acid) 2. H <sub>2</sub> SO <sub>4</sub> (acid) 3. HCl (acid) 4. NaOH (base)		1. Excellent 2. Excellent 3. Excellent 4. Excellent	
Impact toughness test	NOV/DNV-M1 (0.8kpm)	No cracking outside the impact area, min. energy 0.8kpm (8J)	No cracking outside the impact area, min. energy 0.8kpm (8J)
Rockwell indentation test	NOV/DNV-M2	No or negligible break-out or cracking	No break-out or cracking
Dynamic bending test 500 x / σ 300 N/mm <sup>2</sup>	NOV/DNV-M3	No cracks after a minimum of 500 bending cycles	No cracks after a minimum of 500 bending cycles
Micro hardness	HV0.3	950HV (NOV/DNV>600)	1200-1300HV
Macro hardness	HR15N	>75	>90
Operating temp.	---	-40°C ≤ T ≤ 120°C	-40°C ≤ T ≤ 700°C
Wear testing	ASTM G065B		<3,5mm <sup>3</sup>
Surface finish	NEN-EN ISO4287	Ra < 0.25µm Rz < 4.0µm Rpk < 0.1µm	Ra < 0.25µm Rz < 2.5µm Rpk < 0.1µm

Seal advice		1. Excellent sealing properties. 2. Surface roughness and structure/texture can be adjusted for optimum seal life time. 3. Free choice of sealing constructions.
Possibility of integrated Linear Positioning Measuring (LPM-system)		Yes, over full capacity <b>Length 23 meters, Diameter approx. 1 meter, Weight 20 tons.</b>
Elasticity		Fair

#### General information

The bond/intermediate coating is a Griekspoor developed nickel based superalloy, designed to withstand the most severe environments in (chemical) corrosion.

The top coating is a chromium carbide/tungsten carbide coating in a metal matrix as a binder for the carbides. Coatings are dense and show good bond strength combined with excellent corrosion resistance. This coating is designed to withstand severe maritime environments in combination with very good/excellent wear resistance.

Because of the high density (porosity <0.7%) finishing can be very smooth. Average roughness (Ra) can be as low as 0.03µm. Griekspoor can "adjust" the roughness between 0.03 and 0.6µm depending on the optimum roughness required for the chosen seals (translation as well as rotation). This combination leads to maximum seal life time and optimal sealing properties: no leakage, no stick-slip, low friction etc.

Typical uses and applications are (sluice gate) hydraulic rods, pumps, waste incinerator fire walls, components for use in chemical plants. Topcoat® WCR+ is a very good alternative for hard chrome plating, providing a wear

resistance 3x better than hard plated chrome and much better corrosion resistance, even to chemicals, with no pitting.