



**GRIEKSPoor**  
THERMAL COATINGS

**Product Specification Sheet**  
**TOPCOAT ULTRA+**  
**300µm, 2-layer**  
**Ni based superalloy / Cr<sub>2</sub>O<sub>3</sub> ceramic coating**

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

Intermediate coating	HP-HVOF	TOPCOAT 177 (Ni-superalloy)	≥ 100µm (max. 3000µm)
Topcoat	Plasma	Cr <sub>2</sub> O <sub>3</sub> SiO <sub>2</sub> TiO <sub>2</sub>	≥ 200µm (max. 600µm)

**Key coating information**

Description	International standard	Minimum value	Griekspoor Standard
Tensile Adhesive Strength	ISO 14916	≥ 40 N/mm <sup>2</sup>	≥ 50 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	>2000h
Porosity		<4%	<2.5%
Chem. 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 or negligible break-out or cracking
Dynamic bending test 500 x / σ 300 N/mm <sup>2</sup>	NOV/DNV-M3	No cracks after bending of minimum of 500 cycles	No cracks after bending of minimum of 500 cycles
Micro hardness	HV0.3	950HV (DNV>600)	1000-1100HV
Macro hardness	HR15N	>75	>87
Operating temp.	---	-40°C ≤ T ≤ 120°C	-40°C ≤ T ≤ 540°C
Wear testing	ASTM G065B		
Surface finish	NEN-EN ISO4287	Ra <0.5µm Rz < 5.0µm Rpk < 0.2µm	Ra < 0.3µm Rz < 4.0µm Rpk < 0.1µm
Seal advice		1. Good sealing properties (sealing advice on Griekspoortc.com) 2. Advised 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			Good

**General information**

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

TOPCOAT ULTRA+ is the most wear resistant and dense ceramic coating with excellent corrosion and chemical resistance. TOPCOAT ULTRA+ can be ground to excellent finishes.

Finishing can be very smooth (Ra <0.15µm) however Griekspoor advises to use an Ra-roughness of 0.2-0.4µm. The advice is to use a "Stepseal" seal construction (see Griekspoortc.com in TOPCOAT section). This seal construction, together with the advised roughness, will guarantee maximum lifetime with optimal sealing properties (no leakage, no stick-slip, low friction, etc.).

This coating is designed to withstand maritime environments where very good wear resistance is required. In very severe environments it is advised to choose an intermediate coating of approx. 200µm to increase corrosion resistance.

Typical uses and applications are; hydraulic rods/parts, plungers, automotive parts, components for the chemical industry (testing may be needed for the specific environment/situation), electrical insulation, and dielectric applications, pump seal wear rings, casing rings, down hole plungers in petrochemical industry.