



Product Specification Sheet
TOPCOAT® ULTRA+
300µm, 2-layer,
UHCR / Cr₂O₃ ceramic coating

Coating construction and composition (2-layer coating system)

Bond/intermediate coating	HP-HVOF	Inconel/Hastelloy mix	>= 100µm (max. 3000µm)
Topcoat®	Plasma	Cr ₂ O ₃ SiO ₂ TiO ₂	>= 200µm (max. 600µm)

Key coating information

Description	International standard	Minimum value	Griekspoor Standard
Tensile Adhesive Strength	EN 582 or ISO 41916	>= 35 N/mm ²	>= 50 N/mm ²
Corrosion test	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	DIN 50021-ESS ASTM G85	No corrosion (10) after 1000h	>2000h
Porosity		<4%	<3,0%
Chem. Resistance 1. NaCl (acid) 2. H ₂ SO ₄ (acid) 3. HCl (acid) 4. NaOH (base)		1. Excellent 2. Excellent 3. Excellent 4. Excellent	
Impact toughness test	DNV-M1 (0.3kpm)	No cracking outside the impact area, min. energy 0,3kpm (3J)	
Rockwell indication test	DNV-M2	No or negligible break-out or cracking	No break-out, negligible cracking
Dynamic bending test 500 x / σ 300 N/mm ²	DNV-M3	No cracks after bending of minimum of 500 cycles	
Micro hardness	HV0,3	850HV (DNV>500)	1000-1100HV
Macro hardness	HR15N	>75	>87
Max. 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 < 0,35µm Rz < 4,0µm Rpk < 0,1µm
Seal advice		1. Good sealing properties 2. Advised choice of <u>sealing construction</u>	
Possibility of integrated Linear Positioning Measuring (LPM-system)		Yes, over full capacity Length 23 meters, Diameter approx. 1 meter, Weight 20 tons.	
Elasticity			Good

General information

The bond/intermediate coating is a Griekspoor development based on a superior stainless steel, especially developed to withstand the most severe environments.

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

Finishing can be very smooth (Ra <0,10µm) however Griekspoor advises to choose an Ra-roughness of approx. 0,2-0,3µm. Griekspoor's seal advice is to use a Stepseal seal construction. This seal construction, together with the advised roughness, will guarantee maximum lifetime with optimum seal properties (no leakage, no stick- slip, low friction etc.).

This coating is especially designed to withstand the most severe chemical and corrosive environments. In extremely severe environments is better to choose an intermediate coating of approx. 200µm.

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