



Product Specification Sheet
TOPCOAT® CCR+
300µm 2-layer
Inconel / Chromium-carbide 2857

Coating construction and composition (2-layer coating system)

Bond/intermediate coating	HP-HVOF	Inconel/Hastelloy	>= 150µm (max. 3000µm)
Topcoat	HP-HVOF	Cr ₂ C ₃ - NiCr (5-2857)	>= 150µm (max. 250µm)

Key coating information

Description	International standard	Minimum value	Griekspoor Standard
Tensile Adhesive Strength	EN 582 or ISO 41916	>= 50 N/mm ²	>= 80 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	500 to 1000h No damage of base material, acid marks can occur on coating
Porosity		<1%	<0.7%
Chem. Resistance 1. H ₂ SO ₄ (acid) 2. HCL (acid) 3. NaOH (base)			1. Good 2. Fair 3. 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 or cracking
Dynamic bending test 500 x / σ 300 N/mm ²	DNV-M3	No cracks after a minimum of 500 bending cycles	
Micro hardness	HV0,3	950HV (DNV>500)	1150HV
Macro hardness	HR15N	>75	>90
Max. operating temp.	---	-40°C ≤ T ≤ 120 °C	-40°C ≤ T ≤ 870°C
Wear testing	ASTM G065	Approx. 50% better than galvanic chromium	
Surface finish	NEN-EN ISO4287	Ra < 0.2µm Rz < 4.0µm Rpk < 0.1µm	Ra < 0.2µm Rz < 2.5µm Rpk < 0.1µm
Seal advice		1. Excellent sealing properties 2. Surface roughness and structure/texture can (on customers request) 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 Length 23 meters, Diameter approx. 1 meter, Weight 20 tons.	

General information

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

The TOPCOAT® CCR+ is a chromium carbide coating in a nickel/chromium matrix as a binder for the carbides. TOPCOAT® CCR+ has excellent corrosion and oxidation resistance. This coating is almost an economic optimum combining wear resistance and corrosion resistance.

This coating is a better (corrosion resistance as well as wear resistance) alternative for galvanic chromium. No construction changes are necessary when switching from galvanic chromium to TOPCOAT®-CCR+.

Because of the high density (porosity <0.7%) finishing can be very smooth. Average roughness (Ra) can go as low as 0.03µm. Griekspoor can "adjust" the roughness between 0,05 and 0,6µm. This means that the roughness can be set on the optimum roughness for the chosen seals (translation as well as rotation), which gives maximum lifetime for the seals with optimum sealing properties; no leakage, no stick-slip, low friction etc.

This coating is specially designed to withstand severe, maritime environments.

Typical uses and applications are hydraulic rods, engine valve spindles, liners/bushes, ball valves etc.