Rockit 485

Boosting caster roll service life with cost efficiency & sustainability

Continuous casting, or strand casting, transforms molten steel into solid slabs, billets, or blooms. The performance and longevity of caster rolls, which support, guide, and cool the solidifying strand, are critical to process efficiency. These rolls operate under extremely harsh conditions including high loads, thermal cycling, abrasive wear, and corrosion-oxidation from the cooling water, all of which degrade the roll surfaces. Service conditions vary by location on the casting line with the foot roll, located at the mold exits, and the bending segment, where the strand shifts from vertical to horizontal, being most exposed to extreme conditions. To withstand these conditions, caster rolls are coated with a corrosion-, oxidation-, and wear-resistant layer typically made of martensitic stainless-steel applied via Submerged Arc Welding (SAW). While this option offers benefits over uncoated rolls, further room for improvement exists.

Ensuring a long lifespan for the caster rolls is crucial, as it reduces downtime for maintenance or the need for roll replacement and maintains steel quality, thereby lowering costs and scrap rates. Additionally, it enhances worker safety by preventing accidents caused by damaged or worn rolls.

Rockit 485 is an innovative Fe-based powder designed for laser cladding of caster rolls in the bending segment. Developed using Höganäs' Integrated Computational Materials Engineering (ICME), this alloy aims to extend the service life of the caster rolls.

Pre-alloyed with Cr, Co, Ni, Mo, and Nb, **Rockit 485** offers superior resistance to oxidation, corrosion, and thermal fatigue compared to SAW martensitic stainless steel overlays. Its fine martensitic structure, reinforced with finely dispersed Nb-rich precipitates, ensures excellent wear resistance. Laser cladding with **Rockit 485** reduces material consumption, simplifies the process with fewer steps, and provides faster surface coverage. The lower heat input minimizes dilution from the base material, reducing powder consumption. It also results in less part distortion, combined with reduced coating waviness, diminishing the need for machining.

Main Product Features:

- Gas atomized for consistent metallurgy and powder flow
- Good weldability
  - No need for pre-heating or post-welding heat treatments, along with good machinability
  - Suitable for deposition in one or multiple layer coatings on carbon steel and stainless steel substrates
- Superior oxidation, thermal fatigue, and wear resistance
- Higher corrosion resistance compared to martensitic overlays type AISI 420
- Corrosion resistance and hardness stable over time at elevated temperature
- Improved economics and sustainability of the coating process compared to SAW

Typical Chemical Composition (wt%)								
Fe	C	Cr	Co	Ni	Mo	Nb	Si	Others
Bal.	0.15	13.0	4.5	4.0	2.8	0.8	0.6	<1

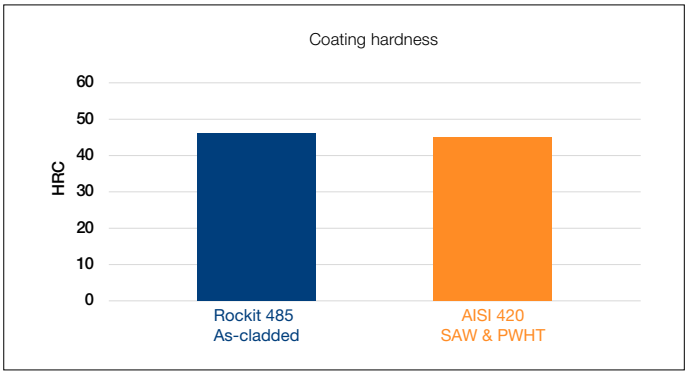
Typical Physical Properties	
Particle Size	53-150 µm
Hall Flow	13-18 s/50g
Apparent Density	4-5 g/cm^3

Coating Process	
Laser cladding	Can be deposited on C-steel or stainless steel substrate
	Pre-heating normally not required
	Post welding heat treatment normally not required

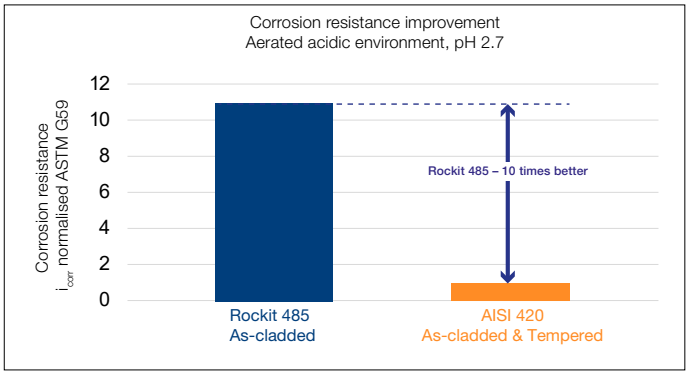
Coating Properties		
Hardness		43-49 HRC
Wear properties	Abrasive wear, (ASTM G65-method E)	~ 65 mm^3
	Sliding wear (ASTM G133), SiN ball, at 400°C	~ 0.2 mm^3
Corrosion properties	Neutral Salt Spray test (ASTM B117)	Passed after 1000 operating hours
	Polarization test in aerated conditions, acidic environment pH ~2.7 (ASTM G59 & G61)	Excellent resistance to uniform attack Protection against localized corrosion

The tests were conducted on coatings deposited by laser cladding onto a low carbon steel substrate. Dilution from the substrate into the coating was <5%.

Comparison of coating properties between Rockit 485 and martensitic stainless steel

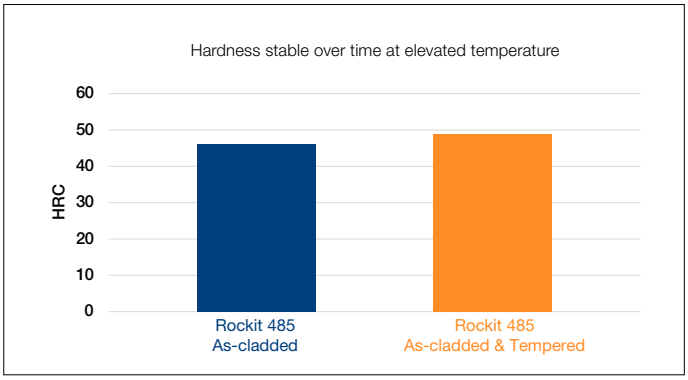


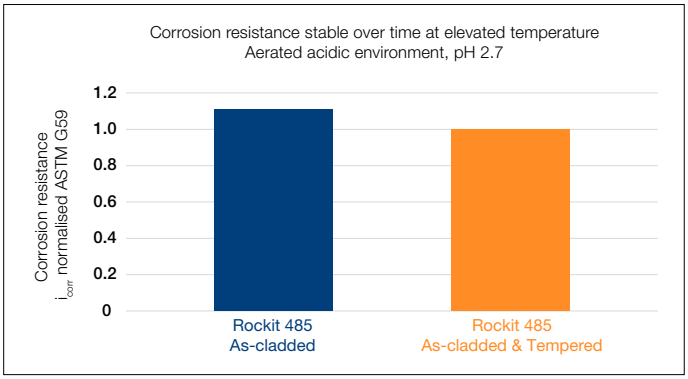
Rockit 485 laser cladded vs. AISI 420 martensitic stainless steel, submerged arc welded (SAW) and post welding heat treated (PWHT).



Rockit 485 laser cladded vs. AISI 420 martensitic stainless steel, laser cladded and tempered (500°C, 24h, in air).

Influence of aging on Rockit 485 coating performance





Rockit 485 was tempered at 500°C for 24h in air. The temperature was selected to represent the surface conditions of the caster rolls at steady state.

For more information on Rockit 485 and other Höganäs products, please contact your local sales representative or scan/click the QR code to fill out a contact form.

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