

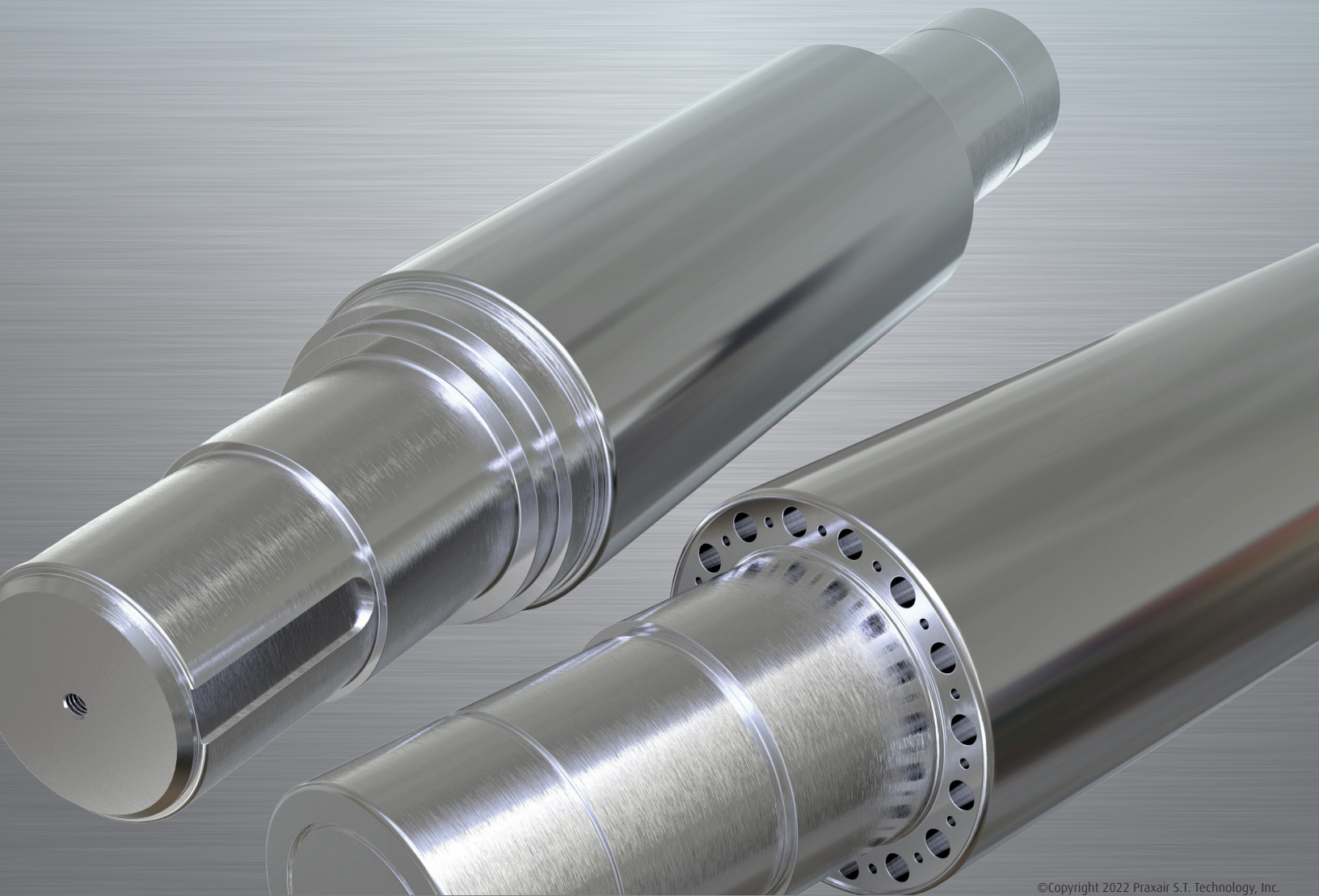
A Linde company



Making our world
more productive

Replacement of Hard Chrome Plating on Smooth and Textured Work Rolls

ExoGard™ coatings are REACH-compliant and environmentally
friendly alternatives to hard chrome plating



ExoGard™ is our advanced high velocity coating process that produces dense, thin, and smooth coatings

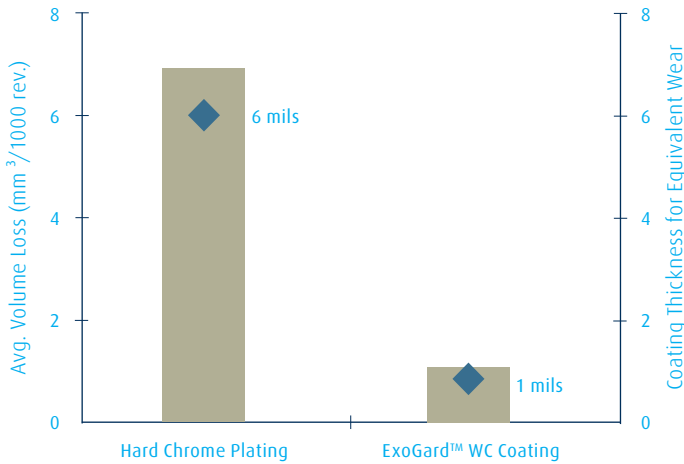
Situation

Steel and aluminum mills utilize smooth and textured work rolls to reduce the thickness of their products and imprint desired surface textures. To extend the life of these work rolls, hard chrome plating has been applied as a surface treatment. Hard chrome plating is recognized as being environmentally unfriendly. Our ExoGard™ coatings are your alternative to hard chrome plating.

Solution for Smooth Work Rolls

Since 2006, Praxair Surface Technologies has coated smooth work rolls for the aluminum industry with our patented technology. The uncoated or hard chrome plated rolls experiences profile loss, surface deterioration, and build-up which impacts quality and productivity. By utilizing coated work rolls from our ExoPro™ coating family, customers see these key benefits:

- No profile loss or edge build-up resulting in flexible coil scheduling (narrow to wide)
- No surface deterioration resulting in continued high quality
- Less downtime with at least three times longer life than hard chrome plating



1 mil of WC coating gives equivalent wear as 6 mils of hard chrome plating

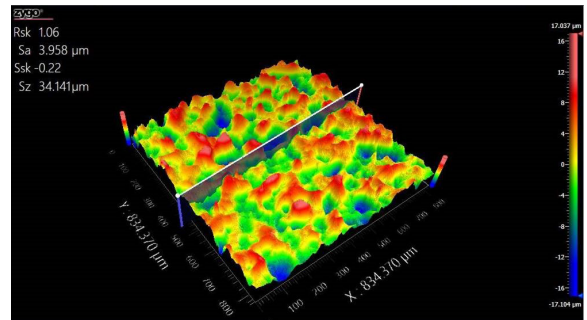
Solution for Textured Work Rolls

With the introduction of REACH legislation in Europe, the effort to find a replacement for hard chrome plating on work rolls accelerated. The textured work roll surface was our next challenge.

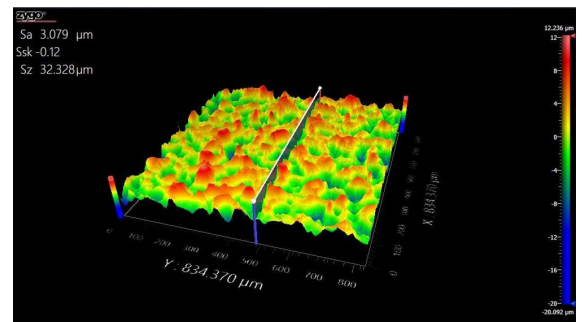
The challenge is to surface treat the roll without disturbing the texture. Our ExoFilm™ coatings, which are ultra-thin, can be applied at a nominal thickness of 5 microns (0.0002") with our patented technology.

The key benefits of the ExoFilm™ coatings are:

- Minimal disturbance of the original texture, see images below
- Longer campaign life, much better wear resistance than hard chrome plating
- REACH-compliant and environmentally friendly
- Very economical to hard chrome plating with multiple business models for justification to switch



Bare textured surface



Coated textured surface