

Carbide Coatings for Plastics Manufacturers

Roll Surface Wear

Are product quality, productivity and maintenance costs ever a concern in your operation? Chill rolls used to manufacture plastic film and sheet can experience severe surface degradation caused by wear, scratching and corrosion. Highly polished chrome-plated rolls, often finished to 2 μm Ra or lower, are typically used to impart the desired finish on the plastic. As roll surfaces degrade, surface characteristics of the sheet or film gradually change until they reach the point where quality is no longer acceptable. The used rolls must then be removed and refinished or replated.

Inconsistent or substandard product quality can put plastic film and sheet manufacturers at a competitive disadvantage. Roll changes and reworks contribute to higher maintenance costs. Lost production impacts deliveries and profitability. This all adds up to one overriding concern: lost revenue.

There Is a Solution

Praxair Surface Technologies carbide coatings provide hard, extremely dense, wear-resistant surfaces that can be ground and polished to exacting tolerances and finishes below 0.5 μm Ra. These coatings are significantly harder and more wear resistant than chrome plate. They also provide superior resistance to scratching, thermal expansion cracking, and corrosive attack. Carbide coatings developed by Praxair have been successfully used for years on calender rolls for plastics, paper, and other sheet products.



Wear-resistant tungsten carbide coatings last three to five times longer than welded repairs.

More and more plastic film and sheet manufacturers are utilizing Praxair coatings to improve product quality, increase productivity, and reduce costs. Consider the following for example:

Three Times Life Improvement vs. Chrome Plate

A major manufacturer of rigid PVC sheet was getting a year or less life from chrome plate on its calender rolls. Normal cleaning and periodic wrap removal resulted in scratching of the chrome surfaces, which in turn marked the sheet. Since switching to a harder, more scratch-resistant Praxair tungsten carbide coating, roll surfaces have remained scratch-free for over three years and counting.

Decreased Cleaning Downtime on a Polyester Film Line

A polyester film manufacturer was battling damage to its chrome-plated

rolls and lost product due to routine cleaning and removal of film from the roll surfaces. Cleaning the rolls without scratching the chrome surface was a time-consuming process. Praxair's 70-plus Rc tungsten carbide coating allows the film manufacturer to clean rolls aggressively without damaging the surface, thereby minimizing downtime.

Improved Corrosion Resistance, Reduction in Refinishing Costs

The chrome-plated calender rolls in PVC sheet operation were being refinished every two months due to severe corrosive attack. The chrome was replaced with a denser, less porous corrosion-resistant Praxair tungsten carbide coating. After more than eight months of use there are no signs of corrosive attack. Productivity has improved and costs have been reduced.

Greater Flexibility, Increased Productivity

Time-consuming, frequent change overs to different products were significantly affecting a rigid PVC sheet producer's productivity. Due to the variance in coefficients of thermal expansion between the roll substrate and the chrome plating, rolls had to be heated very slowly prior to start-up to avoid cracking the chrome. Because Praxair's tungsten carbide coating is less susceptible to thermal expansion cracking, heating rates have been increased and productivity has improved.

Nominal Characteristics of Tungsten Carbide Coating Compared to Chrome Plate

	Typical Chrome Plating	Praxair Tungsten Carbide
Hardness (average)	830 Vickers (65 Rc)	1110 Vickers (70 Rc)
Abrasion resistance*	5.6 mm ³ /1000 rev	1.0 mm ³ /1000 rev
Density		
Porosity	6.9 g/cc 2-5%	10.5 g/cc < 1%

The Praxair coating is harder, denser and over five times more wear resistant than chrome plate.

*ASTM G65-81 volume lost

Can You Benefit From Praxair Coatings?

- Do the surfaces of your casting or calender rolls degrade or become marred with use?
- Do degraded roll surfaces impact product quality?
- Do you have to refinish or re-chrome your rolls more often than you would like?
- Would you benefit from more consistent product quality?
- Are thermal expansion limitations robbing you of valuable production time?

If you answered yes to any or all of the above, you owe it to yourself to consider the use of a Praxair carbide coating to improve your bottom line through:

- Enhanced product quality
- Increased productivity
- Reduced costs



Mirror-finished rolls in a typical three-roll stack are an excellent candidate for Praxair carbide coatings.



© Copyright 2011 Praxair Technology, Inc.
All rights reserved

Praxair and the Flowing Airstream design are trademarks of Praxair Technology, Inc. in the United States and/or other countries.

The information contained herein is offered for use by technically qualified personnel at their discretion and risk without warranty of any kind.

Praxair Surface Technologies, Inc.
1500 Polco Street
Indianapolis, IN 46222

www.praxairsurfacetechologies.com
psti-info@praxair.com

Printed in the United States of America
03-2012

Printed on recycled paper
P-9092

Telephone:
+1 317 240 2500

Fax:
+1 317 240 2255