

Markets in Wear Coatings:

Hard Chrome and Its Alternatives

Thintri Inc. announces the release of Markets in Wear Coatings: Hard Chrome and its Alternatives, 2013, a new update of its study on hard chrome in wear coatings and chrome replacement. This comprehensive examination of the subject discusses the various technologies, the industries in which they will, and won't, be used, and forecasts to 2020.



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Background on Wear Coatings

Used as a fundamental coating in a wide range of industries—aerospace, heavy equipment, automotive and others — hard chrome plating has become increasingly difficult in recent years. Regulations designed to protect against the health and environmental hazards of hexavalent chrome have increased the cost of chrome plating and burdened facilities performing plating services with extensive regulation and paperwork. At the same time, hard chrome's intrinsic performance limitations have proven troublesome in wear applications where requirements are consistently more demanding.

A number of alternatives to hard chrome are available. Chrome substitutes are dominated by thermal spray, in particular high-velocity oxy-fuel (HVOF), often favored due to its high strength and wear resistance, relatively low cost, and fast turnaround time. However, other new processes are emerging and capturing chrome and HVOF markets as well. These include electroless nickel composite plating, which can deposit highly uniform diamond-composite coatings which are not restricted to line-of-sight geometries, as is HVOF. Other emerging techniques include explosive bonding, which can be used to fabricate stainless-steel or titanium coatings, and electrodeposited nanocrystalline cobalt-phosphorus alloys specifically targeted at inner diameters. Plasma vapor deposition (PVD) can make thin, high quality coatings for less cost, in many cases, than even decorative chrome.

At one time many predicted a near abandonment of chrome plating to one or more of these new technologies but this has not happened. Indeed, in some markets, the adoption of thermal spray as an alternative to hard chrome

has slowed. One reason is that some sectors, like aerospace, are almost fully converted to alternatives already. Another is that the initial enthusiasm for thermal spray as a chrome alternative has waned as its own limitations become more widely known. For that reason, while HVOF markets are still growing, many users are investigating other alternatives, including newer thermal spray processes as well as plating and vapor deposition.

The market picture is mixed and wildly uncertain. For both chrome and its substitutes, coating demand in the oil and gas sector is booming, thanks to new oilfield development techniques like fracking and horizontal drilling, while forestry and pulp & paper continue a precipitous, long term decline.

And while industry downsizing and consolidation resulting from health and environmental legislation has led to the closure or offshore relocation of as many as half of the chrome plating shops in North America, the chrome plating market today is fairly stable. Most existing chrome plating shops, having accommodated new regulations, are now thriving and profitable. And many traditional customers have little or no interest in giving up on chrome.

Suppliers of alternative coating technologies are facing highly segmented markets where some chrome plating users resistant making large capital investments in new coating technologies, while others have eagerly embraced alternatives. Yet all face highly uncertain markets in the current economic climate, buffeted by wild swings in the cost of raw materials and lingering effects of the sluggish economy.

Understand the Markets

Success in wear coating markets will depend almost completely on a balance of cost and performance that will be highly application-specific. Many, if not most, chrome substitutes like thermal spray will require higher up-front costs, usually in the form of equipment purchases. However, longer lifetimes and reduced frequency of repairs can lead to significant long-term savings, not to mention the benefits of improved performance. Other alternatives offer a crossover benefit that depends on the scale of implementation or other factors. For example, PVD is more expensive than chrome for small lots but can be significantly less expensive in large-scale production. Most alternatives also offer a large advantage in reduced hazardous waste management costs compared to hexavalent chrome.

Thintri's study *Markets in Wear Coatings: Hard Chrome and its Alternatives* examines each of the leading alternative technologies in detail: its capabilities, limitations and most promising applications. The report also explores their potential in major market segments and forecasts markets to 2020.

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