

Solutions Flash

Laser engraved Anilox Roll production benefits from high density coating solution with excellent economy

SF-0002.3 – October 2014



Today's situation

Plasma-sprayed, chrome oxide coatings on anilox rolls for the printing industry is a critical application, which must meet stringent requirements for successful laser engraving, in addition to maximizing profit potential:

- Coating equipment must be capable of long non-stop spray runs to achieve the desired coating quality. This is of particular concern for large rolls.
- High throughputs (coating deposit efficiency vs. material application rates) are required to minimize processing times and keep the laser engraving equipment supplied with coated rolls.

The Oerlikon Metco solution

The Oerlikon Metco TriplexPro™-210 Plasma Spray Gun is the ideal tool for application of chrome oxide coatings on anilox rolls. As Oerlikon Metco's latest cascading anode, triple cathode plasma spray gun, it delivers valuable benefits for anilox roll production.

When combined with Oerlikon Metco's Amdry™ high purity, chrome oxide materials, the resulting solution meets and exceeds all requirements for anilox roll coatings.

Chrome oxide coatings applied with TriplexPro-210 are very dense, homogeneous and reproducible. TriplexPro-210 sprays for hundreds of hours, shift after shift, with little or no process drift. When maintenance is required, gun components can be replaced in minutes using simple, in-house service procedures, eliminating the need for logistically difficult gun-exchange programs.

Amdry Chrome Oxide has been developed to meet the very specific requirements of anilox roll production. A high purity material, its blocky morphology results in very good feeding characteristics with excellent melting characteristics and lot to lot consistency.

Amdry Chrome Oxide is available in two standard particle sizes:

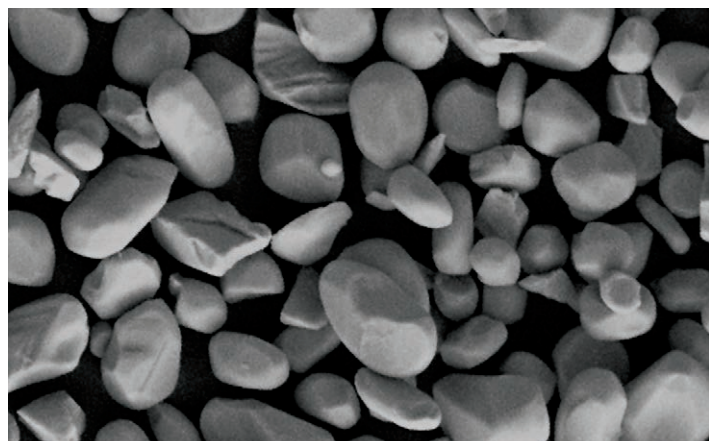
- **Amdry 6420:**
-45 +22 μm (smooth, as-sprayed surface finish)
- **Amdry 6415:**
-15 +5 μm (very smooth, as-sprayed surface finish)

The combination of Amdry Chrome Oxide and TriplexPro-210 delivers an application spray rate of 90 g/min with a deposit efficiency of 50 to 60%. This throughput is nearly 400% better than that of conventional, single cathode plasma spray guns spraying Amdry Chrome Oxide.

- The coating must be dense and homogeneous. As the requirement for engraved cell size decreases, the need for greater density and improved homogeneity increases.
- The applied coating cannot exhibit either macro or micro cracks, which could result in spallation or malformed cells during laser engraving.
- Free metallic chromium in the coating must be minimized as it has a detrimental affect on the laser engraving process.
- Downtime for coating equipment maintenance must be minimized, particularly for multiple shift operations.



TriplexPro-210 plasma spray gun with anilox roll



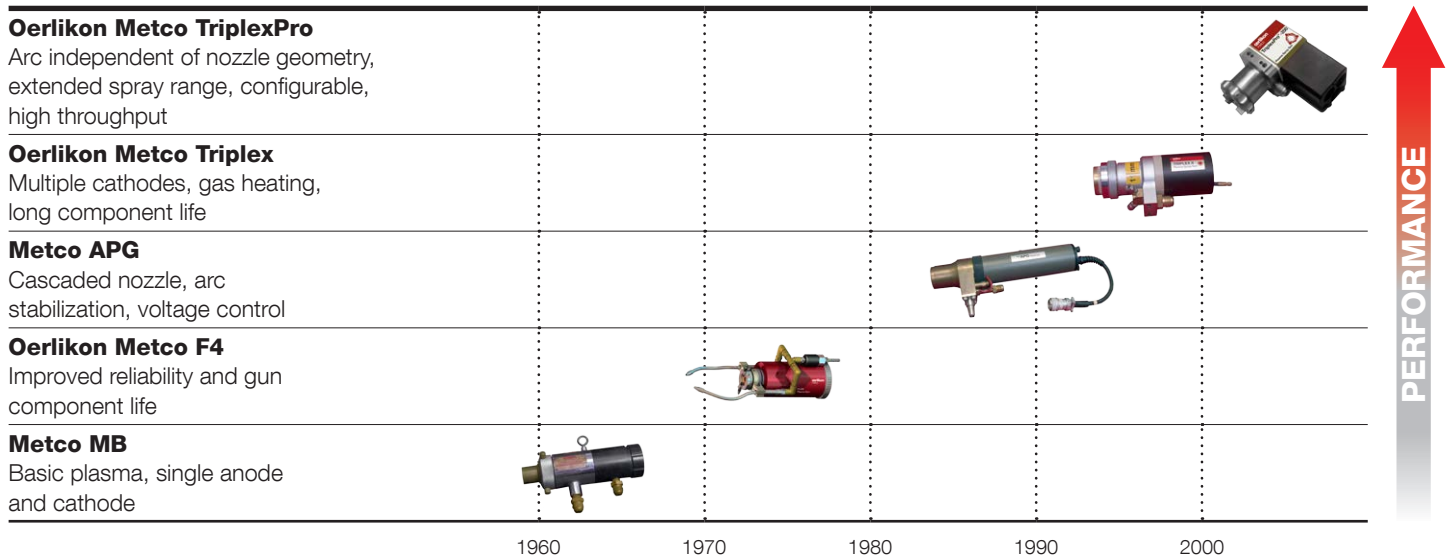
Amdry high purity chrome oxide powder

A history of invention

Oerlikon Metco has a long history as an innovative supplier to companies engaged in anilox roll production, with plasma gun development evolving to meet the ever-increasing requirements of this market. In 1988, the Metco APG gun was introduced, which was the first plasma gun with an arc voltage independent of arc gas type or flows; a breakthrough improvement with stabilized arc and voltage control. Subsequent introduction of the Triplex plasma spray gun, with its cascading anode and triple cathode design, brought further

improvement as the multiple arcs result in more even heating of the plasma gases while causing less damage to the nozzle and electrodes, increasing gun component life.

Building on these successful designs, the Oerlikon Metco TriplexPro-210 plasma spray gun is configured to produce very stable, fixed-length plasma arcs that are completely independent of the nozzle geometry. This design not only incorporates the best features of its predecessors, but also has very high throughput, improved process stability and excellent reproducibility.



Solution Description and Validation

The effectiveness, efficiency and economics of Oerlikon Metco's solution for anilox rolls has been validated through performance testing of TriplexPro-210 spraying Amdry 6420 high purity chrome oxide material.

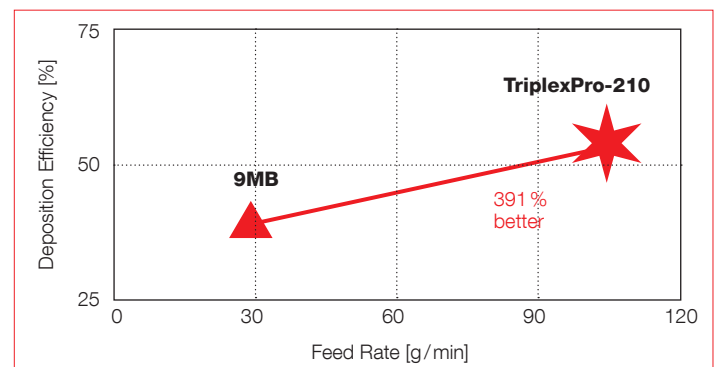
Total test time	200 h (no hardware changes)
Spray system	Oerlikon Metco UniCoat™
Total gun ignitions	62
Nozzle	9 mm
Plasma gases	argon/helium
Plasma power	62 kW
Spray distance	110 mm (4.33 in)
Powder injectors	(3) 1.8 mm @ 90°
Powder feed rate	90 g/min (12 lb/hr)
Coating thickness	0.4 mm (0.16 in) per test coupon (40 passes)
Online sensor system	Tecnar Accuraspray-g3

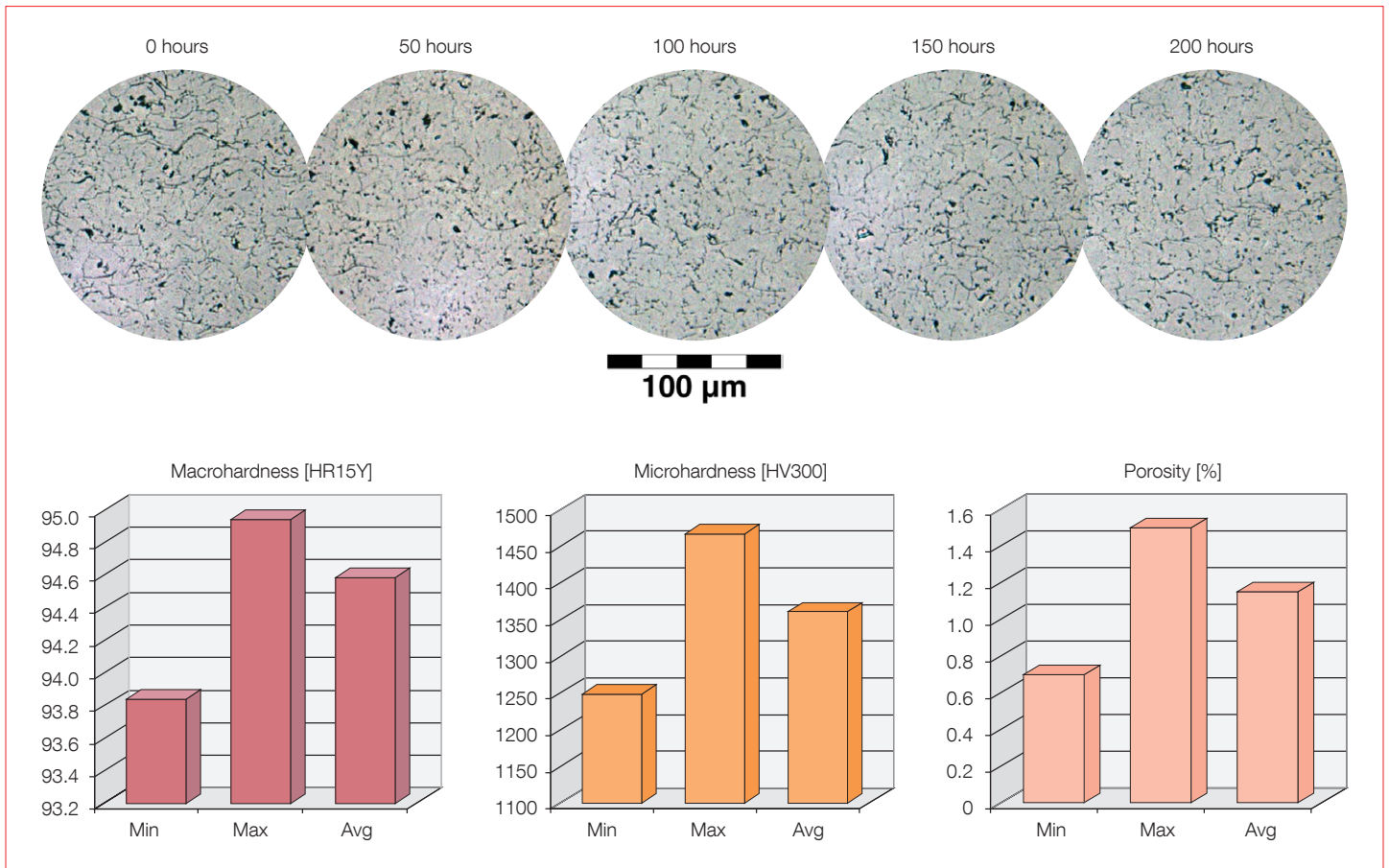
Endurance Test Conditions (provided for reference)

Coating results

At an application rate of 90 g/min, the deposit efficiency was 58%. This is a 391% improvement in throughput compared to single cathode, single anode plasma spray guns.

For the entire 200 hour test, the process did not drift and the coating characteristics remained constant with respect to density, hardness and microstructure.





Customer benefits

Effective

- Best possible engraving density through the production of high quality, homogeneous chrome oxide coatings that exhibit excellent density, low porosity and no cracking.
- Greatly reduce the need for strip and recoat through the elimination of free metalics in the coating that can result from gun component spitting.
- Reduce rework from coating 'spitting' that results from build-up ('icing') on powder port injectors.

Efficient

- High spray rates and improved deposit efficiency results in very high throughput: saves powder, energy and time.
- Enhanced process stability and highly consistent coatings resulting from the very efficient heat transfer into the plasma jet and constant gun voltage.
- Highly reproducible: achieve the desired process window again and again.

Economical

- Maintains constant performance over long periods with high coating consistency and no maintenance.
- Runs continuously for up to 16 spray shifts.
- Simple in-house service, when required, with quick exchange of gun consumables at designated service intervals.
- Improves utilization of capital investment: high throughput means fewer plasma spray booths.

Environmentally-friendly

- High purity chrome oxide material with no hexavalent chromium.
- No thoriated tungsten gun components, eliminating a waste disposal issue.
- High thermal efficiency reduces power consumption requirements.
- High throughput significantly reduces overspray waste.
- Quiet operation reduces noise pollution in the plant.

Information is subject to change without prior notice.