

# HVOF and ECORA: Complementary Surface Engineering Technologies



## Summary:

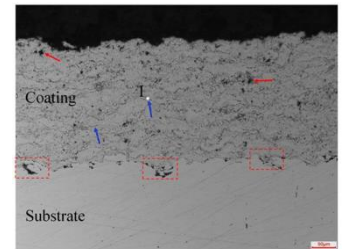
HVOF (High Velocity Oxygen Fuel) coatings and ECORA address two different engineering challenges and can work together as complementary surface technologies to improve equipment performance in mining operations.

ECORA can be applied over HVOF-treated surfaces as a low-adhesion tribological layer. While the HVOF coating continues protecting the substrate against abrasion, erosion and corrosion, ECORA optimises the interface between the equipment surface and the handled material by reducing adhesion. The result is improved material release and fewer cleaning interventions without altering the structural protection provided by the HVOF coating.

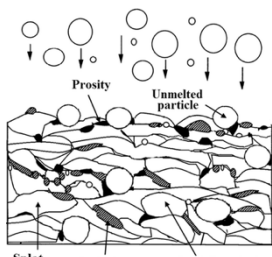
By reducing aggressive cleaning interventions and minimising material adhesion, ECORA has the potential to help maximise the service life and return on investment of HVOF-coated surfaces.

## HVOF (High Velocity Oxygen Fuel) coatings

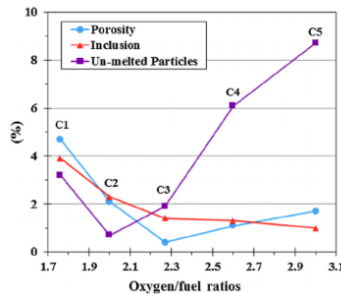
HVOF coatings are designed to protect the base metal against abrasion, erosion, oxidation and corrosion. When properly applied, HVOF produces a dense, hard and mechanically resistant surface capable of significantly extending component life under severe mining conditions.



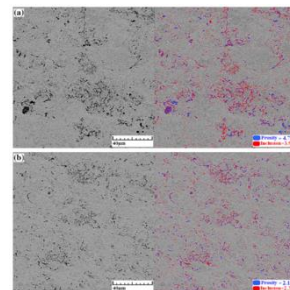
However, even the most advanced HVOF coating remains primarily a **wear protection technology**. It is specifically designed to resist mechanical degradation of the component but does not necessarily prevent sticky ore, clay-rich material or wet mineral fines from adhering to the equipment surface.



Schematics of cross section microstructure of the HVOF coating



Porosity, inclusion and un-melted particles percentage obtained from image analysis of the as-sprayed HVOF coatings produced at different oxygen/fuel ratio



SEM microstructures showing pores and inclusions of the as-sprayed HVOF coatings that applied using different oxygen/fuel ratios

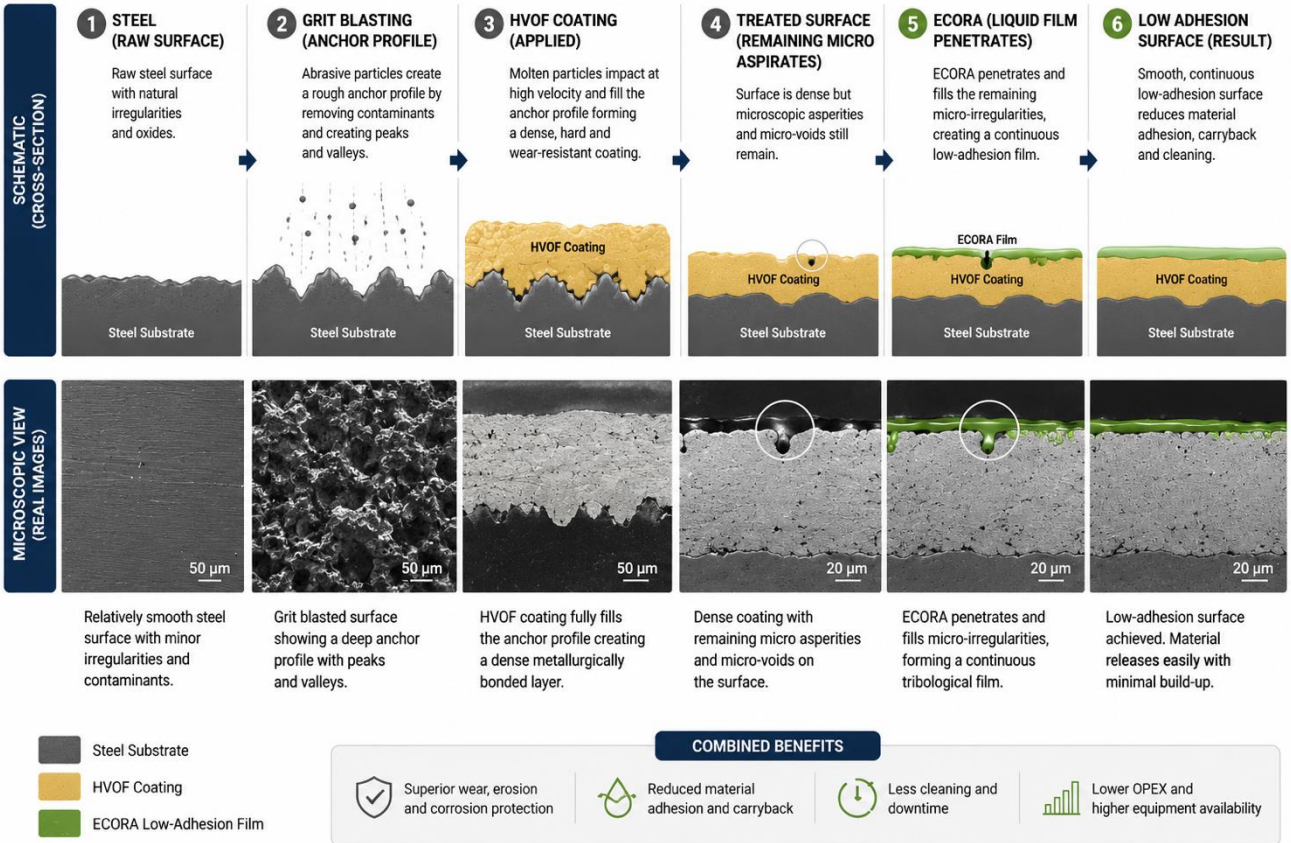
**HVOF reduces wear.**  
**ECORA reduces adhesion.**  
**Together, they help keep equipment protected and material moving.**

# How to unlock the value combining HVOF and ECORA?



## End to End process

Schematic Representation



From an engineering perspective, this combination is highly complementary. HVOF provides the hard, durable and wear-resistant foundation, while ECORA provides the low-adhesion operating surface. Together they address two independent degradation mechanisms: mechanical wear of the component and material adhesion to the surface. This allows each technology to perform the function for which it was specifically designed.

As with any engineered surface system, best practice is to validate compatibility and operational performance through a site-specific trial. Surface roughness, coating characteristics, material type, moisture content and operating conditions vary between mining applications, making field validation the most effective approach for confirming long-term performance under actual operating conditions.

During an ECORA trial <sup>TM</sup>, a protocol is used to determine the optimal product dosage and procedure to achieve maximum performance. The trial involves saturating the equipment surface to fully seal micro-gaps and defects, ensuring the best release results under specific material, equipment, and environmental conditions.

As these variables change over time, performance may vary, so it is recommended to periodically recalibrate the protocol to maintain performance and deliver the best return on investment (ROI).

# Financial & Asset Management Perspective

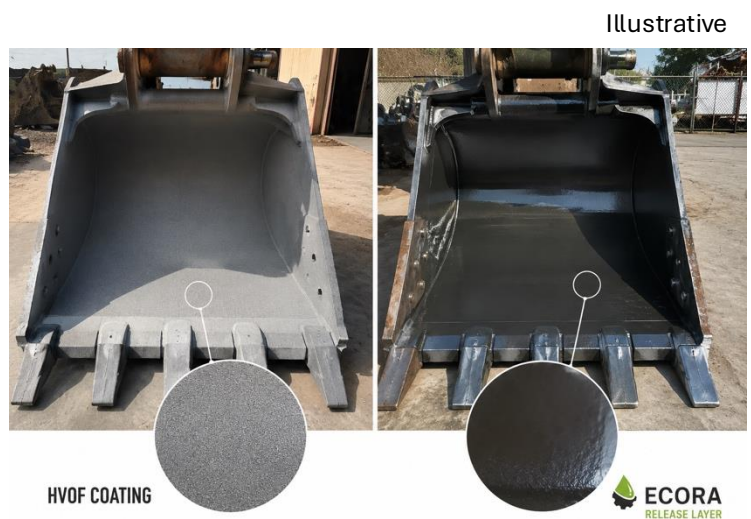


World-class mines don't choose between protecting their assets and improving productivity—they do both. Combining HVOF and ECORA allows each technology to deliver its full value, creating a smarter, more efficient and higher-performing operation.

From an asset management perspective, HVOF coatings represent a significant capital investment intended to extend the service life of high-value mining components. Their value is maximised when the coating remains intact and continues protecting the underlying substrate throughout its intended maintenance interval.

By reducing material adhesion, build-up and carryback, ECORA has the potential to reduce the frequency of aggressive cleaning interventions, including mechanical scraping, high-pressure washing and prolonged equipment downtime. These activities are often necessary to restore productivity but can also contribute to unnecessary mechanical stress on coated surfaces.

While HVOF continues performing its primary function of protecting against abrasion, erosion and corrosion, ECORA helps maintain cleaner operating conditions that may reduce maintenance-related damage and unnecessary surface loading.



This complementary approach has the potential to maximise the utilisation of the HVOF coating throughout its service life while improving equipment availability and reducing operational interruptions.

From a Total Cost of Ownership (TCO) perspective, with the combined approach operations may benefit from:

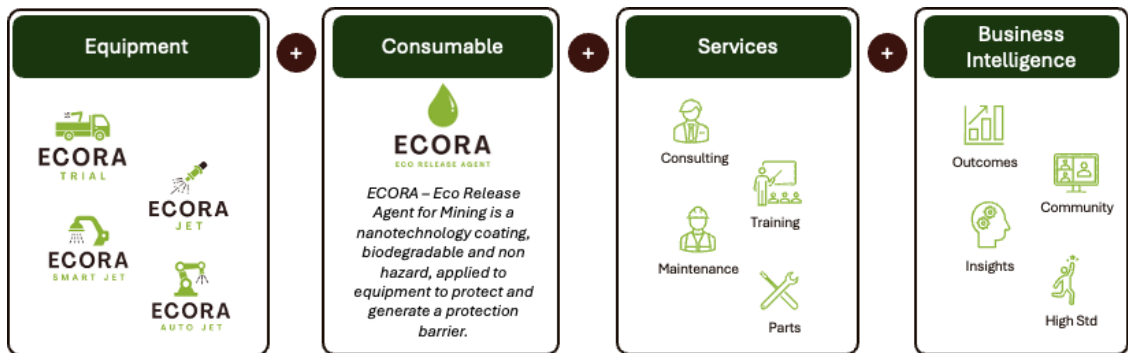
- Higher return on investment from premium HVOF-coated components.
- Reduced cleaning labour and maintenance costs.
- Lower equipment downtime.
- Improved asset utilisation.
- Reduced operational risk associated with cleaning interventions.
- More consistent production rates and material flow.
- Potential extension of maintenance intervals, subject to site validation.

Technology	Primary Objective	Financial Benefit
HVOF	Protect the asset	Reduce capital replacement and refurbishment costs
ECORA	Optimise material flow	Reduce operating costs and maximise equipment utilisation
<b>Combined</b>	Protect the asset <b>and</b> optimise production	Maximise return on both capital (CAPEX) and operational (OPEX) investment

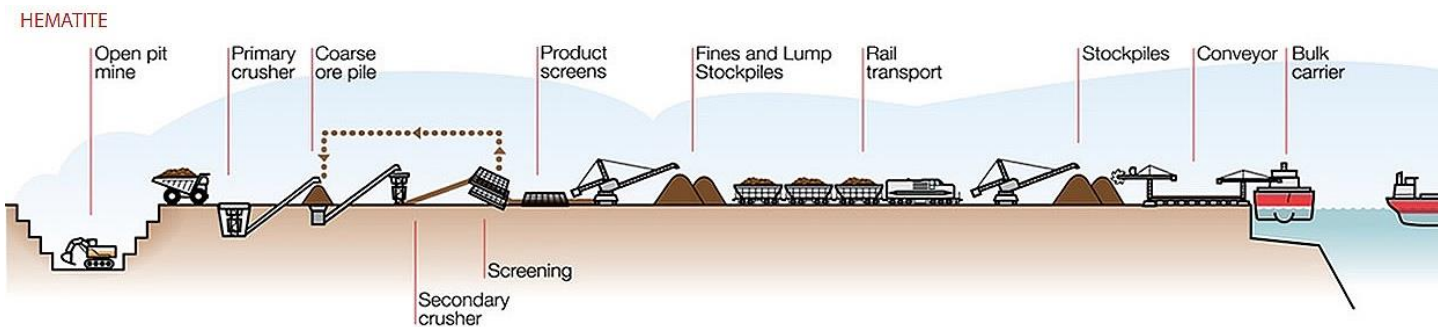
ECORA helps operators maximise the value of their HVOF investment.

# AT ECORA SOLUTIONS WE ARE OBSESSED TO SOLVE YOUR ISSUES WITH BUILD UP MATERIAL

Each of the four integrated components — equipment, consumables, services, and business intelligence — plays a critical role, and their combination delivers exceptional results. By aligning technology, eco-friendly release agent, automated application systems, expertise, and data, we ensure every solution is precisely tailored to each site's needs — driving performance, improving reliability, and achieving extraordinary outcomes.



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