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Press release

Osprey® MAR 55: New alloy from Sandvik that delivers ultra-high strength with exceptional weldability

Stockholm, August 13, 2025

Sandvik introduces Osprey® MAR 55, a highly versatile tool steel powder that bridges the gap between maraging steels and tool steels. With this new alloy manufacturers no longer have to choose between good weldability of carbon-free maraging steels and the performance of carbon bearing steels. Osprey® MAR 55 provides good mechanical properties and wear resistance already in the as-built condition.

Osprey® MAR 55 is primarily designed for excellent PBF-LB processability without the need for plate preheating. This makes it ideal for tooling applications that require hardness levels above 50 HRC and wear resistance exceeding that of the 18-Ni class of maraging steels.

The alloy could be considered for general tooling applications. The exceptional fracture toughness at ultrahigh strength levels paves the way for the use of the tool steel in defense and aerospace.

"To me MAR 55 is the material with the most interest and attention today", says Ingemar Bite, R&D manager at Seco, leading global provider of metal cutting solutions. "It has now, after evaluations and extensive testing, been implemented in our production. We have used it both for prototyping and field testing, and products that are running today in our customers' production."

Faraz Deirmina, Principal Metallurgist at Powder Solutions, Sandvik says:

"Before MAR 55, customers had to choose between good weldability and performance. This new alloy bridges the gap between maraging steels and carbon bearing tool steels. It means that the alloy is easily weldable, with exceptional toughness. Also, it can be heat-treated without the need for prior costly solution annealing (austenitization) or cryogenic treatments. At the same time its wear and fatigue resistance are similar to the carbide strengthened tempered martensitic microstructures of medium carbon tool steels."

Osprey® MAR 55 shows enhanced nitriding properties and its hot hardness (up to 600°C) is improved compared to 18Ni300 maraging steel.

Compared to 18Ni300, the content of both nickel and molybdenum is reduced by 50%. The leaner composition in MAR 55 significantly reduces both energy and emission factors.

Using the emission factors and nominal chemistries for both alloys there is a reduction of 21% in embedded CO_2 (emission factor tCo2/t) and a reduction of 26% in embedded energy (KWh/kg) for the raw material make-up in MAR 55 versus 18Ni300. This is based on nominal embedded energy factors for virgin materials. If recycled raw materials are used, then energy and emissions are further reduced.

Moreover, customers (Seco included) are confirming a longer service life using MAR 55 compared to 18Ni300. Higher longevity of the components before repair or replacement is needed to help customers achieve their sustainability goals.

Main characteristics of Osprey® MAR 55:

- **Processability**: Excellent processability by laser powder bed fusion and laser directed energy deposition without the need for plate or platform preheating

- **Chemical composition**: Optimized for excellent weldability similar to maraging steels while showing improved wear and fatigue resistance similar to carbon bearing tool steels
- **Thermal conductivity:** Higher thermal conductivity compared to maraging steels and martensitic stainless steels
- **Hardness and toughness:** Exceptional hardness/toughness combination in as built and heat-treated condition, exceptional toughness at cryogenic temperatures

Osprey® MAR 55 is designed for use within:

- Additive Manufacturing (AM)
- Cold spray
- Hot Isostatic Pressing (HIP)
- Metal Injection Molding (MIM)
- Micro-MIM
- Sintered metal filters and foams

Osprey® MAR 55 is produced in a VIGA atomizer to ensure low oxygen and contamination levels. Sandvik has a patent pending for the alloy.

View Press Kit

Read more about Osprey® MAR 55 metal powder:
https://www.metalpowder.sandvik/en/products/metal-powder-alloys/tool-and-high-speed-steel/osprey-mar-55/

For further information, contact VP Marketing and Communication, Powder Solutions, Sandvik, email: greta.ninova@sandvik.com

About Sandvik

Sandvik is a global, high-tech engineering group providing solutions that enhance productivity, profitability and sustainability for the manufacturing, mining and infrastructure industries. We are at the forefront of digitalization and focus on optimizing our customers' processes. Our world-leading offering includes equipment, tools, services and digital solutions for machining, mining, rock excavation and rock processing. In 2024 the Group had approximately 41,000, sales in more than 150 countries and revenues of about SEK 123 billion.

Sandvik in metal powder – Sandvik is a world-leading developer and manufacturer of gas-atomized metal powder for a range of advanced production technologies, such as Metal Injection Molding (MIM) and Additive Manufacturing (AM). With our Osprey® range of powder alloys, the widest on the market, we can customize materials to fit every need.