



Surface Finisher Adds Thermal Spray Facility to Stay ‘Hot’

Continuing to grow its capabilities, this finishing company, which operates a 14-building campus, adds yet another service to its already long list of offerings.

BY LORI BECKMAN SENIOR EDITOR

When Mark Simpson was hired by Techmetals in January 2023, he was tasked with setting up the metal finisher’s thermal spray facility, utilizing his more than 25 years of experience in the thermal spray industry. Now, the 50-plus-year-old Dayton, Ohio, company offers high-velocity oxy fuel (HVOF), air plasma and twin-wire arc spray in addition to its more than 60 existing metal plating, metal finishing and industrial coatings capabilities. The new thermal spray capabilities support OEM and Tier 1 companies that service SpaceX, General Electric, Raytheon Technologies, Lockheed, Siemens, Airbus and many other businesses.

Techmetals’ new thermal spray department houses an Oerlikon Metco atmospheric plasma spray system, a Thermach twin wire arc system and Linde/Praxair HVOF equipment. The department has extra floor space for additional equipment, anticipating future thermal spray process expansion. Source (all): Techmetals

By providing these specialized sprays, the company is responding to growing customer needs for repair and restoration as well as new large parts most common in the aerospace, oil and gas and power generation markets. Spray coating types include metals, ceramics, ceramets and different combinations of each to meet customer needs.

“Thermal sprayed coatings are used across the industries Techmetals supports,” says Simpson, operations manager, special processes. “We want to be able to provide all our current and future customers with their surface treatment needs.”

As the volume increases for these specialty processes, Simpson plans to add the necessary equipment, including more booths and sprayers. He intentionally left space in the department for additional equipment.

Fourteen buildings, over 60 processes

While visiting the 14-building campus that Techmetals encompasses, the saying “it takes a village” really hits home. Every

way you turn is a building owned by the company, like its own small town. Several buildings were recently acquired for process expansions as well as one newly constructed building that was erected to support the company's new 20-ft. nickel plating line and the 12.5-ft.-long silver plating lines, which can handle parts up to 20 tons.

The new building specifically services defense, power generation, EV and space customers. The large process tank adds capacity to run certain industry specifications and customer OEM specs such as Boeing BAC5715. Techmetals small silver lines can run additional industry specifications as well as other customer specifications. Some of the applications driving the larger needs for silver plating are replacing coatings such as cadmium, gold, tin or nickel alloys. Silver and nickel plating are not only lubricious but they have great electrical, corrosion resistance, IR reflectivity and anti-galling properties.

In addition to three different thermal spray coating technologies, the finisher provides more than 60 processes including anodizing, plating, hard chrome, grinding, diamondize, electropolishing, laser marking, passivation, physical vapor deposition, nondestructive testing, optical coatings and much more.

With its 200,000-plus square feet of combined space, the business runs the gamut for metal plating, finishing and industrial coatings services for many industries such as aerospace, automotive, defense, heavy equipment, agriculture and medical.

Compliance with the industry's most stringent testing facilities and process regulations will always be the company's priority. Therefore, the fact that it has earned three Nadcap certifications, AS9100 Rev D, FAA Repair Station, ISO 9001:2015, medical ISO 13485 2016, security clearance type work, nuclear approvals, DRG3 Certification, ITAR and many others, is not surprising.

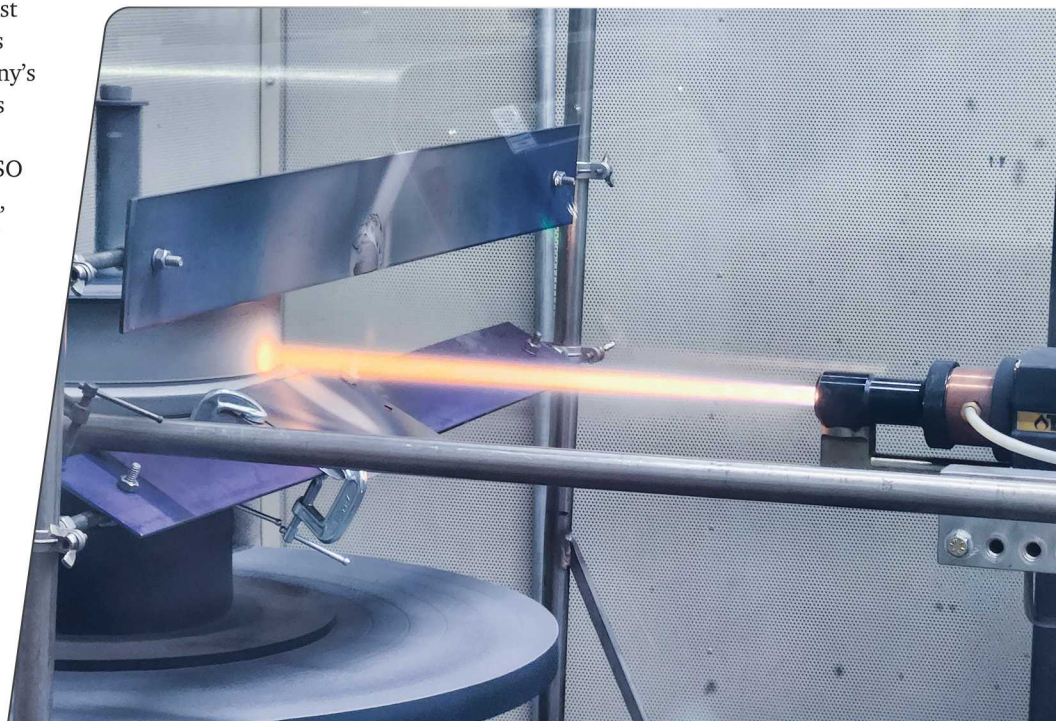
New specialty process department

With his knowledge of the thermal spray process, Simpson ordered what he understands is the most reliable, efficient and appropriate equipment for Techmetals customer applications. The first purchase order for equipment was placed in March 2023, and in December the department completed its first job. It currently houses an Oerlikon

HVOF sprays tungsten carbide blends that are mostly implemented to improve wear resistance but also erosion and corrosion resistance. All three thermal spray coatings processes at Techmetals can be used with the FANUC six-axis robot.



For this HVOF coating process as well as other thermal spray processes, operators of this equipment are skilled professionals who must attend Techmetals' training and testing prior to working any equipment within the department.



Metco atmospheric plasma spray system, a Thermach twin-wire arc system and Linde/Praxair HVOF equipment.

Thermal spray coatings are often implemented to help prevent problems that occur in integral parts that demand flawless function and reliability such as wear, erosion, abrasion and corrosion. These thermal spray processes are sometimes the sole requirement of a customer's part; however, some parts require multiple processes, according to Simpson.

"They could need grinding before or after coating, maybe a non-destructive testing process or one of our other surface treatments," he explains. A pregrinding or postgrinding process might also be necessary, which is why the company owns several grinding machines.

Thermal spray offerings at Techmetals in its one-booth department include these processes:

- **High-velocity oxy fuel (HVOF):** This method provides the highest bond strength and coating density, the smoothest surface finish in an "as spread" condition and high hardness. HVOF sprays tungsten carbide blends that are mostly implemented to improve wear resistance but also erosion and corrosion resistance. Aerospace landing gear components and mud pumps for gas and oil drilling are common applications for this thermal spray type.

- **Air-plasma coatings:** These sprays are the most versatile of the sprayed coatings with a high-flame temperature, which makes them especially useful for sprayable ceramics and virtually any type of metal. Typical applications consist of nickel-based alloys and tungsten carbides, but other materials are also available, such as aluminum oxide, zirconium oxide, titanium dioxide and chromium oxide. These versatile coatings are often applied to engine components and airframe components in the aerospace industry, as well as numerous commercial and industrial industries.
- **Twin-wire arc (TWA) spray:** This spray process is especially useful for part restoration in the power generation sector. Worn areas can be built up and machined or ground back to the original dimensions, all without any part distortion. TWA coatings can also be used to increase electrical conductivity, for corrosion protection and on bearing surfaces. Common materials can include nickel alloys, stainless steel, moly, nickel/chrome/aluminum/yttrium and aluminum.

These processes are run by Simpson and four full-time employees, trained to create thermal coating combinations to meet customer requirements.

It's not a replacement, It's an improvement.

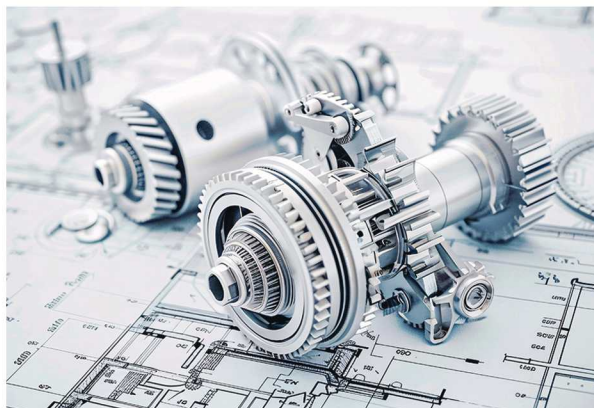
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In-house training program

To ensure that employees who work in the thermal spray department thoroughly understand the process and safety stipulations, Techmetals has developed its own training. The program consists of hands-on, in-booth training; safety training; and a requirement for a practical spray test for each thermal spray process.

The spray test can be completed in a couple of ways according to Simpson, who heads up the thermal spray training program. “One could spray some lab samples to comply with an industry standard, like an ASTM, SAE or AMS standard, and then send it out to a lab and have it evaluated according to those standards,” he explains.

There’s also a Nadcap requirement that involves a practical spray test where trainees are evaluated on their spray skills and knowledge, he continues.

A required written test is also incorporated that asks important questions to ensure the trainee understands the processes. Simpson describes this portion of the test. “Questions help trainees understand why you do and don’t do

certain things during the process. And if you were to change a value, what happens to the coating.”

Thermal spray industry trends

The increasing demand for corrosion resistance that thermal spray coatings provide is a key driving force for growth in many industries across the world, especially in the aerospace and oil and gas industries. Techmetals does a significant amount of work in these industries, which is why it has invested in thermal spray coatings recently.

According to Fortune Business Insights, a global market research firm, North America is dominating the thermal spray coatings market and is likely to maintain the trend through 2027. The range of applications demanding this process continues to expand to include automotive, aviation, biomedicine, food processing, semiconductors, electronics and energy fields, which will continue to provide opportunities for customer growth in this area for Techmetals. ■■

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