

A Trusted Team Relationship Essential along the Prepainted Metal Supply Chain Strategic sourcing and collaboration make for success.

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Beyond the business advantages of coil coating of customer-owned metal, appliance and HVAC designers and engineers are able to simplify and reduce the risks of managing a potentially growingly complex supply chain.

This is especially true when a prepainted metal coater applies an experienced, dedicated supply chain team to identify customer needs, design coating systems that meet specific requirements while closing the loop among the metal source, mills, coil coater and appliance manufacturer and its specifying designers and engineers.

The Global Supply Management practice at research firm Aberdeen Group, Boston, Mass., spotlights the challenges: According to Aberdeen's recent study of chief supply chain officers, the top business pressures are the impact of increasing supply chain complexity as well as rising costs.

Among supply chain survey findings:

81 PERCENT SAY THERE IS MORE complexity in a growing operation;

81 PERCENT ADMIT A NEED TO improve supply chain operational speed and/or accuracy;

81 PERCENT SEE AN INCREASED stakeholder and customer demand for accuracy and timeliness of inbound and outbound shipments; and

81 PERCENT REALIZE THERE IS A NEED to reduce, proactively allocate or manage inventory held at various stages in the supply chain.

Without a doubt, appliance designers and engineers share their enterprise's goal to increase profitability. So it is not surprising that, at its core, supply chain management is about finding ways to increase profitability throughout each segmented player across the entire supply chain. But, points out Aberdeen, one of the most obvious challenges concerning supply chain segmentation is the tendency to develop siloes among the various players.

To avoid those siloes, there is value in strategic sourcing and a positive impact of collaborative solutions.

Gains from Strategic Sourcing

The Aberdeen Group's analysts point out that "strategic sourcing is today, as the future quickly becomes the present. The future is built upon sourcing individuals to implement best-in-class practices that yield the highest of returns with the least amount of risk." And, concerning collaboration, people today, much like any business, value flexibility, quality, service and reliability to get the product when expected. Collaboration takes on many new forms to reach these goals.

As a way to highlight the benefits of prepaint coil coating as well as the advantages of a supply chain team with a fine focus on strategic sourcing and collaboration, this

practical white paper uses, as an example, Metal Coaters with locations in Middletown, Ohio; Marietta, Ga.; Jackson, Miss.; and Rancho Cucamonga, Calif. This white paper is based in part on interviews of Metal Coaters' executives, members of its supply chain team as well as supplemental material from the National Coil Coating Association and other sources.

The bottom line, as discerned by Aberdeen research: The vast majority of business executives involved, one way or another, in supply chain activities indicates that their top business pressure is the corporate mandate to reduce costs and increase savings.

A first way to alleviate that

pressure is to understand the basic advantages of prepaint coil coating. As a thumbnail profile, - **ETAL#CATERS SPECIALIZES IN THE** toll processing or coil coating of customer-owned metal. Continuous manufacturing upgrades to facilities allow Metal Coaters to use state-of-art techniques to clean, pre-treat and roll-apply organic coatings in a continuous process on a full range of commercial steel and aluminum substrates. It offers a complete line of coating finishes including Polyesters, Silicone Modified Polyesters (SMP), Fluorocarbons (PVDF) and Plastisol (PVC). There are coatings for interior or exterior and warranted or non-warranted applications. Additional services include in-house slitting and embossing services which are performed separately from the coil

coating processes on dedicated production lines.

A natural outcome of such an approach: There are efficiencies as well as reduction of some manufacturing risks delivered to appliance makers.

For instance, converting manufacturers from inefficient post-painted processes, a prepainted metal approach is highly efficient and environmentally friendly. A solid supply chain team at the point of conversion to prepainted metal work is exceedingly helpful. And there is substantial cost **SAVINGS NORMALLY REALIZED THROUGH** reductions in or the elimination of work-in-process inventories, material handling, operating costs, warehouse space, environmental

Attention to Detail a Supply Chain Team Task

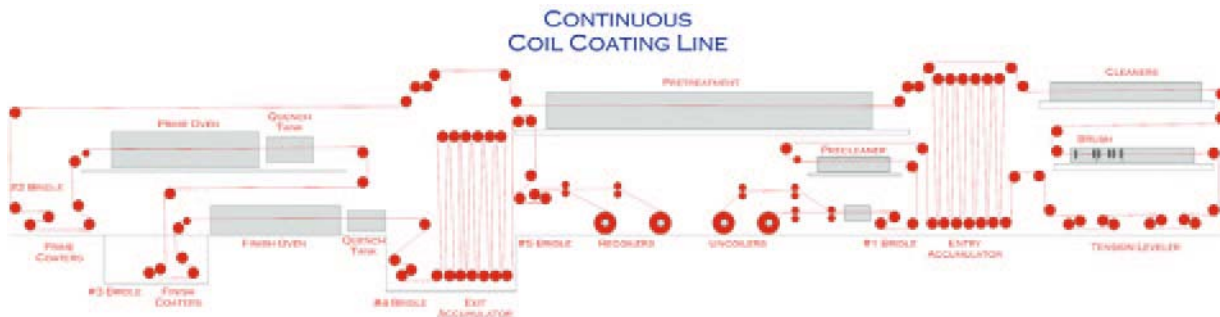
It's a matter of three essential words when it comes to appliance designer reliance on supply chain players—a trusting relationship. And that is particularly apparent when it comes to myriad particulars trusted to a prepainted metal coating service.

Beyond the metal substrate, coil coated metal involves a thorough cleaning and chemical preparation process, and two to four coats of distinct, often high-tech, paint coatings. Because prepainted metal is cleaned, treated and coated when flat – before it is formed – an extremely high level of control is possible, which results in a high level of uniformity across the strip and throughout the coil. The separate layers within the prepainted metal system are specifically designed and approved to work in concert to create a highly durable and robust product to meet virtually any requirement.

Prepainted metal can also provide a highly flexible coating, capable of severe bends, while retaining an excellent degree of hardness and resistance to marking.

The coil coating process allows for distinct coatings on each side of the metal strip, so prepainted metal products can vary greatly. In many cases, the topcoat is specified on one side, with the backside having a simple, low-cost coating.

In many applications, the demands on prepainted metal are extremely rigorous. The finish must maintain its appearance for the life of the product by being able to resist color fade, corrosion, chemical attack, dirt retention, high temperatures, various extreme weather conditions and daily wear and tear. **IAM**



Coil coating is a continuous, automated process for coating metal before fabrication into end products such as components and parts for appliances and HVAC systems. The process covers many steps. *Source: Metal Coaters*

compliance and insurance costs.

Following the Coils

Coil coating is a continuous, automated process for coating metal before fabrication into end products such as components and parts for appliances and HVAC systems. The steel or aluminum substrate is delivered in coil form from the rolling mills. The metal coil is positioned at the beginning of the coating line; and, in one continuous process, coil is unwound, cleaned, treated, primed and painted before being recoiled on the other end and packaged for shipment.

A number of steps take place on a modern coating line, including:

- s 3 TITCHING THE STRIP TO THE PREVIOUS coil
- s # LEANING THE STRIP
- s 0 OVERBRUSHING
- s 0 RE TREATING WITH CHEMICALS
- s \$ RING THE STRIP
- s ! PPLYING PRIMER ON ONE OR BOTH sides
- s # URING
- s # COILING THE STRIP
- s 4CP COATING ON ONE OR BOTH SIDES
- s 3 ECOND CURING
- s # COILING DOWN TO ROOM temperature

s 2 EWINDING OF THE COATED COIL

Traditionally, appliance manufacturers have used powder coatings to paint their products in-house after the product has been formed. But big brands (Whirlpool, Carrier and General Electric, to name a few) find it advantageous to use prepainted metal for some product lines. Thanks to this intelligent extension of the supply chain, appliance and HVAC makers also find it more manageable to add new products when they outsource the metal coating rather than planning and expensing for additional in-house painting processes.

In reference to cost management, appliance designers and engineers have long known that color can add excitement and increase consumer demand for products. But changing colors as consumer tastes change can be a significant expense for manufacturers, and a gamble when adding paint lines or changing colors for short product runs.

An experienced supply chain team can show how prepainted metal offers a broader range of color without the cost.

Any color an appliance designer considers is possible with prepainted steel and aluminum



Metal coils from a supplier come into a metal coater for treatment eliminating more costly appliance manufacturer in-house processing. *Source: Metal Coaters*

Easing the Conversion to Prepainted Metal

An astute and dedicated supply chain team can assist companies and their appliance designers and engineers when it comes to determining what process changes are needed at the plant when using prepainting coils. Also helpful: inside sales of a metal coater with hands on, down the hall assistance for quicker response time and access to materials and samples. A central person with face-to-face contact with appliance designers and engineers can help smooth any conversion.

Obviously, appliance manufacturers turn to prepainted coil for several compelling reasons:

• **OVERCOST SOLUTION**

• **ONE CONSISTENT PRODUCT AND**

• **TEAM APPROACH TO INNOVATION AND PROBLEM SOLVING MANUFACTURER COATER COATING SUPPLIER METAL SUPPLIER MILLS**

Overall, only minor process changes usually are required for specifying, handling, storing and setting up for coated coil processing.

When it comes to specifications, the team can help consider the proposed manufacturing processes, the life cycle of the product and the expectations of the consumer.

In most cases, there is no tooling change, but dies should be polished and die clearances adjusted to fit prepainted metal.

Prepainted coils can ship on flatbeds and moved with forklifts while still retaining a flawless surface.

In the manufacturing plant, solid advice is to make sure forklift masts are padded to protect coil edges. Padding on hooks and other handling devices helps keep coil in great shape. Cushioning materials like feltboard and polyurethane protect coils while they are moved, placed in inventory, or shipped.

When storing, the guidance is to leave stocked coils banded until they are needed for processing, and use care when removing bands so they don't snap back on the coil. If possible, storage in a climate controlled weatherproof building is preferable. In addition, wrapping coils with stretch wrap, coated paper, fiber-based wrap or particleboard helps protect stored coils while avoiding an airtight seal.

When processing, the team advice centers on close attention to gauge when feeding and processing material, as the coating can significantly change material thickness. Remove any burrs that could damage sheets or parts as they flow through the manufacturing cycle.

Considering set-up and cleaning, the prepainted metal supply chain team urges that each point in a coil processing line where finished surfaces touch another surface should be considered and checked for clearances and alignments. In addition: Add padding for extra protection, or bonding strips of rubber to the faces of sheers, press brakes, carry tables or bench tops. Watch out for rough dies that can gouge or scratch the prepainted surface.

Further, use of protective films and papers can significantly decrease any manufacturing damage.

Overall, the key to success is emphasis on quality at the point of prepainting metal – people looking at the systems day to day as well as going forward, people on the line checking quality of the paint and a tech services manager who travels to sites with everyone in the team involved. **IAM**

coils. Coil coaters can even provide stylish options such as the look of brushed steel, polished copper, wood grain and more. The business bottom line: Cost effectively enhancing consumer appeal.

In addition to diverse colors, paint and pretreatment processes used by coil coaters can be a much higher quality than most in-house operations. That's because the coil coating process paints uncoiled steel or aluminum edge to edge, and often on both sides, with a consistent coat thickness.

Logistics Part of Team Approach

Another supply chain challenge involves transporting material among the stakeholders from the source of the metal through prepainted metal treatment to acceptance by an appliance manufacturer. Managing logistics costs can include using a metal coater closer to the other stakeholders as well as one which can provide a variety of additional processes and services on its site.

For example, regional placement of Metal Coaters' facilities with a diversity of capabilities and offerings can manage this cost aspect of the supply chain.

There are other advantages when including prepainted metal within the supply chain and as part of overall appliance and HVAC manufacturing. For example, coil coating can often provide specialty coatings with features like anti-microbial properties and fingerprint resistance.

Anti-microbial coatings kill 99



The coating process can include diverse colors and additional properties based on the specifications of the appliance or HVAC designer or engineer. *Source: Metal Coaters*

percent or more of bacteria that come into contact with the appliance, offering even more protection than other means of application. Unlike post-painting operations, the coil coating process coats the entire surface so that inaccessible areas, such as the interiors, hemmed edges and tubes, are also coated. Additionally, the primer and paint, either of which could contain the antimicrobial additive, are tightly-bonded to the metal and are often applied to both sides of the metal. Some antimicrobial coatings even include metal pigment to improve heat exchange for HVAC applications.

Fingerprint resistant coatings are also in demand and can be applied during the coil coating process, eliminating the need for consumers to continually wipe off appliance smudges. Even popular metallic coatings that give stainless steel and rubbed copper looks

can be applied at a coil coating facility and combined together with antimicrobial and fingerprint proof coatings to add value and differentiate products from competitors.

With the coil coating process, coatings are applied in one continuous process when the metal is flat, before it is cut and formed, enabling every inch of the surface to be cleaned and treated, providing tightly-bonded durable finishes for refrigerators, washers and dryers, HVAC units and more.

Mitigating In-house Environmental Concerns

Using the supply chain's inherent resources to navigate existing and emerging environmental regulations makes business sense, too.

Today's manufacturing may look like it's a balancing act because of continual changes in environmental

regulations. For instance, in recent years, legislation now impacts all aspects of manufacturing; coatings are many times affected as governments become increasingly concerned with protecting the environment. Prepainted metal can help remove some of the burdens of compliance from the manufacturing process as appliance makers and their designers and engineers face the challenge to maintain and grow the business within narrowing confines or changing code compliance.

Coil coaters take the painting process out of the manufacturing plant and into environmentally compliant coil coating facilities.



Quality assurance is part of the process of coil coating of customer-owned metal. A third party, which is quality-focused can better assure the final product. Source: Metal Coaters

The Bottom Line with Coil Coated Metal

Many types of appliances use the approach.

- s , AUNDRY # CONTROL PANELS HAVE LONG BEEN PREPAINED. BUT THOSE NEW, BRIGHTLY COLORED WASHERS, DRYERS AND PEDESTALS can be prepainted, too.
- s 2 REFRIGERATION REFRIGERATOR WRAPPERS, DOORS AND INTERIORS ARE OFTEN MADE USING PREPAINED METAL. ANY COIL COATERS EVEN EMBOSS METAL COILS AFTER PAINTING, ADDING A UNIQUE LOOK TO REFRIGERATORS AND FREEZERS.
- s \$ DISHWASHERS AND SMALL APPLIANCES (HIGH GLOSS BLACK, HEAT RESISTANT WHITE, 2 Q, 3 COMPLIANT COATINGS AND CAN GAIN from prepainting.
- s (6! # 5 SET OF PREPAINED COILS MEANS NOT ONLY A BETTER PRODUCT APPEARANCE, BUT THE BENEFITS OF HIGHER PRODUCT quality and performance, increased productivity and numerous economic advantages through cost eliminations.

Speaking of increase in productivity, products can be completely assembled with prepainted metal, including self-piercing fasteners matched to the color of the end product, eliminating the need for spot welding and post painted systems creating a more efficient manufacturing process.

And, in addressing the conclusion of Aberdeen research on supply chains that the biggest pressure arises from the corporate mandate to reduce costs and increase savings, use of prepainted metal affords economic advantages such as reducing work in-process inventory, reduced manufacturing cycle time, reduced environmental concerns and costs, reduction or elimination of disposable waste, improved metal die life and reduced maintenance costs. By removing the need for in-house paint lines, it not only improves manufacturing space constraints, but mitigates many costs associated with the paint line such as raw materials and labor costs. Additionally, reduction in energy costs and insurance costs can also be achieved. **IAM**



This eliminates a manufacturer's in-house paint shop, which results in reducing waste, lowering energy consumption and minimizing those regulator-induced compliance headaches.

Among the advantages:

- Reducing eliminating waste handling costs;
- Reducing the burden of record keeping, reports and permits;
- Reducing water use and
- Reducing maintenance costs.

As the Metal Coaters supply chain team knows, coil coaters also work to meet ever-evolving regulations while reducing waste and emissions by utilizing the latest technologies and ongoing field research as part of their cost of doing business.

One regulatory specific: The European Union-originated Restriction of Hazardous Substances Directive changed in some ways in January and there is a growing impact in the U.S. market, especially involving California regulations. RoHS II is on the radar for many appliance designers and engineers and also on the radar of supply chain team members at Metal Coaters.

Call this new world RoHS II.

The old directive was repealed this past January and manufacturers with products within the scope need to follow the new directive. Third party metal coating firms such as Metal Coaters offer RoHS compliant, chrome free pretreatments that are applied by either an immersion process or by

a roll application process to meet specific customer requirements. With the recast RoHS, there were requirements for testing during a set period of time as well as CE marking.

The scope of the RoHS recast directive covers large and small household appliances, among other equipment.

The limits of the restricted substances, however, remain the same:

- Lead 0.1 PERCENT
- Mercury 0.1 PERCENT
- Cadmium 0.01 PERCENT
- Hexavalent Chromium 0.1 PERCENT
- Polybrominated Biphenyls (PBB) 0.1 PERCENT
- Polybrominated Diphenyl Ethers (PBDE) 0.1 PERCENT

Thanks in part to the supply chain team, manufacturers and their appliance designers and engineers realize that compliance needs to be shown on homogenous material level. "Homogeneous material" means one material of uniform composition throughout or a material, consisting of a combination of materials, which cannot be disjointed or separated into different materials by mechanical actions such as unscrewing, cutting, crushing, grinding and abrasive processes.

The directive has become a CE-marking directive. That means all manufacturers covered by the scope of the directive need to make a technical file for hazardous substances and update their manufacturer's declaration with the

relevant standards and directives for RoHS.

A supply chain team can also help with expert advice closer to home. For example, in the U.S., California modeled its RoHS law and regulations after the European Union's directive although there are some distinctions. The California Department of Toxic Substances Control (DTSC) from prohibiting the sale of products not prohibited from sale in the EU. Therefore, specific applications of lead, mercury, cadmium and hexavalent chromium that are exempt from the EU RoHS Directive are also exempt from California RoHS regulations. **IAM**