



APPLICATION GUIDES

**MOLD RELEASE, NON-DESTRUCTIVE TESTING,
AGRICULTURE & CONSTRUCTION EQUIPMENT, BACKLIT
DISPLAYS, ELECTRONICS, AUTOMOTIVE COMPONENTS
AND PARTS, WHEELS AND RIMS, AEROSPACE/DEFENSE,
WOOD PRODUCTS AND FURNITURE, INDUSTRIAL COMPONENTS,
ARCHITECTURAL PANELS & EXTRUSIONS, CYLINDERS & TANKS,
COSMETICS, GLASS COATING, COOKWARE, FOOTWARE & APPAREL**

MOLD RELEASE



Description

Manufacturers in the foam molding industry make everything from shoe soles, office furniture, automotive interiors, sound insulation, seat cushions, mattresses, and sporting goods. These products are produced by the RIM (Reaction Injection Molding Process) in which reactive chemicals are injected into mold cavities to make the foam cushion. Once the foam has solidified, the mold is opened and the foam cushion is removed.

Challenge

One of the key steps in this process is the application of a mold release agent. The mold release agent is a liquid material that must be applied evenly to the inside of the mold to ensure the foam part will be easily removed from the mold. It is crucial that the surface finish of the release agent is smooth, as it will impact the smoothness of the foam part. It is also crucial that every surface of the mold is covered or the foam will adhere to the mold and result in tearing of the foam when it is removed. Any overspray that doesn't coat the inside of the mold is considered expensive waste.

Solution

The automatic nature of the mold release application and the requirement the material is applied evenly within the metal mold, makes Graco's ProXpc Auto the ideal solution. Not only does the product provide a uniform and consistent spray atomization for even coating, but the electrostatic charge ensures the particles are uniformly dispersed and that the metal mold is completely covered, even in the toughest to reach spots. This eliminates scrap due to part tearing.

The electrostatic spray pattern also ensures overspray is reduced, and waste is eliminated. By increasing transfer efficiency the customer spends less on material, waste disposal, VOC permitting, booth filters, and any parts and labor associated with maintenance resulting in amazing savings.

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ProMix PD2K Auto

Precision flow rate control to ensure even film thickness



ProXpc Auto

Superior atomization and electrostatic wrap to ensure even and complete coverage



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Ultimate surface finish and transfer efficiency technology

NON-DESTRUCTIVE TESTING



Description

Non-destructive testing is a process used to perform quality control tests without impacting the integrity of the product being tested. This process is very common in the aerospace industry where quality control is crucial in keeping people safe. The process involves applying a dye penetrant material on to products like turbine blades to identify defects like porosity, cracks, fractures, laps, seams, or other flaws.

Challenge

Dye penetrant must be applied evenly to every surface. Any areas that are not covered can lead to missing quality defects and catastrophic failure. Manually applying this material can lead to inconsistencies from part to part, and the possibility of missing defects or wasted material.

Solution

To overcome this challenge, automation not only ensures consistency, but also makes certain that no areas are missed. The right fluid control and atomization are crucial in providing even and complete coverage for 100% testing compliance.

Graco's ProXpc Auto and ProMix PD2K are the ideal solutions for many reasons. For starters, both are designed for automation with easy integration and extensive control options for controlling the process.

The smooth and precise flow control of the PD2K Auto delivers the consistency needed for this demanding process. When paired with the uniform and consistent spray atomization of ProXpc Auto, it makes sure the part is consistently covered.

The addition of electrostatic charges ensure the particles are uniformly dispersed and wrap around to cover even the tough to reach spots. The electrostatic spray pattern also reduces overspray and waste. In a market where lives are on the line and poor quality is not an option, the ProXpc Auto and PD2K Auto will help you be at ease at 30,000 feet.

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AGRICULTURE & CONSTRUCTION EQUIPMENT



Description

Heavy equipment in the agriculture and construction industries must be able to withstand heavy operation and abuse. The welded products will inevitably rust if not properly coated. In addition to protecting the metal surfaces, the paint appearance plays an important role in product branding, especially in an industry where loyalty and brand preference are deeply rooted.

Challenge

Balancing a robust paint coating with a fine appearance is no easy task. In fact, this typically involves several layers of different materials to ensure a protective coating with a tough yet aesthetic appearance. These layers often times require proper mixing of multiple component materials, sometimes involving two different types of non-compatible chemistry.

Solution

Graco's two component proportioners are key in overcoming this challenge. When the customer uses an epoxy primer with a polyurethane top coat, PD2K is perfect for this task. The multiple pump configuration allows the different

chemical families to be mixed and dispensed on the same piece of equipment. The accurate ratio assurance ensure the paint is mixed to specification and will live up to the elements. The integrated flow control supplies the applicator with consistent result even with thick and abrasive materials.

When it comes to applying these materials to metal, the ProXpc Auto is perfect for utilizing electrostatic spraying technology to ensure thorough coating with high transfer efficiency. This reduces overspray, waste, and improved efficiency.

Both products work in conjunction to provide the customer with a durable paint finish in an automated solution that saves the manufacturer money. For customers that demand the ultimate solution, Graco's high performance ProBell rotary atomizer can increase transfer efficiency and surface finish to highest level. This solution will provide the best results in the manufacturing process – ultimately leading to happy and loyal customers.

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BACKLIT DISPLAYS



Description

Backlit displays can be found everywhere from airplane cockpits, automobile dashboard, appliances and electronics. They are so common that often times they go unnoticed or seem simple. In fact, the process and technology required to manufacturing these displays is actually quite demanding.

Challenge

Manufacturing backlit displays is more complicated than it may appear. There is considerable effort and precision needed to ensure the icon on the display is vividly illuminated.

The plastic parts are first coated with a light semi-transparent paint. Next, a darker color is coated over the first light color coat. To create the icon, a laser is used to etch away the black paint in the shape of the icon. This creates the light and dark contrast which creates the backlit display.

In this application the surface finish quality is key, especially in high value luxury cars. In addition to this, the coating thickness is also key.

If the base color is too thick, the light will not properly shine through. If the darker top color paint coat is too thick, the laser will not properly etch the layer to show the lighter undercoat. If the top coat is too thin, the laser will etch both layers creating an inconsistent display.

Solution

Solving this challenge requires the utmost precision. Precision flow rate control, consistent spray gun performance, and fine atomization all work together to ensure an even and uniform surface is created. PD2K closed loop control controls the flow rate, while the superior atomization of AirPro EFX ensures this is accomplished.

This application also requires precise applicator movement typically performed by a robot. The PD2K Applicator Control ensures all paint parameters are managed with one system for easy robotic integration. In applications that require the highest level of performance, Graco's ProBell delivers the finest particle atomization for maximum coating thickness control.

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ProMix PD2K Auto

Precision flow rate control to ensure even film thickness



AirPro EFX

Superior atomization and precision spray pattern control



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ELECTRONICS**Description**

The electronic industry is a large, ever changing, and key manufacturing application. The fast product life cycle and competitive nature requires the constant need for new features and product line changes. Changing product lines quickly to meet the needs of the market requires flexibility and versatile equipment.

Challenge

There are many different coatings that are used in the electronics industry. Different coatings are used for not just painted appearance, but also rubberized soft touch, high gloss, anti-scratch, hydrophobic, even coatings for metallization to deliver a chrome appearance.

This requires a large array of different types of materials and a high level of finish quality. Customers demand a beautiful appearance which requires high precision with the repeatability to manufacture millions of products.

Solution

Solving this challenge requires the utmost precision. Precision flow rate control, consistent spray gun performance, and fine atomization all

work together to ensure an even and uniform surface is created. Any surface defects will be immediately noticed by the customer and are unacceptable. The PD2K closed loop control, manages the flow rate, while the superior atomization of AirPro EFX ensures this is accomplished.

This application also requires precise applicator movement typically performed by a robot. The PD2K Applicator Control links with robots and PLCs to ensure all paint parameters are managed with one system for easy robotic integration.

In addition to an amazing surface finish, the PD2K Auto has the versatility to handle many different types of material chemistries on a single machine. This flexibility allows the customer to immediately switch between different materials and accommodate the ever changing demands of the electronics market.

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Precision flow rate control to ensure even film thickness

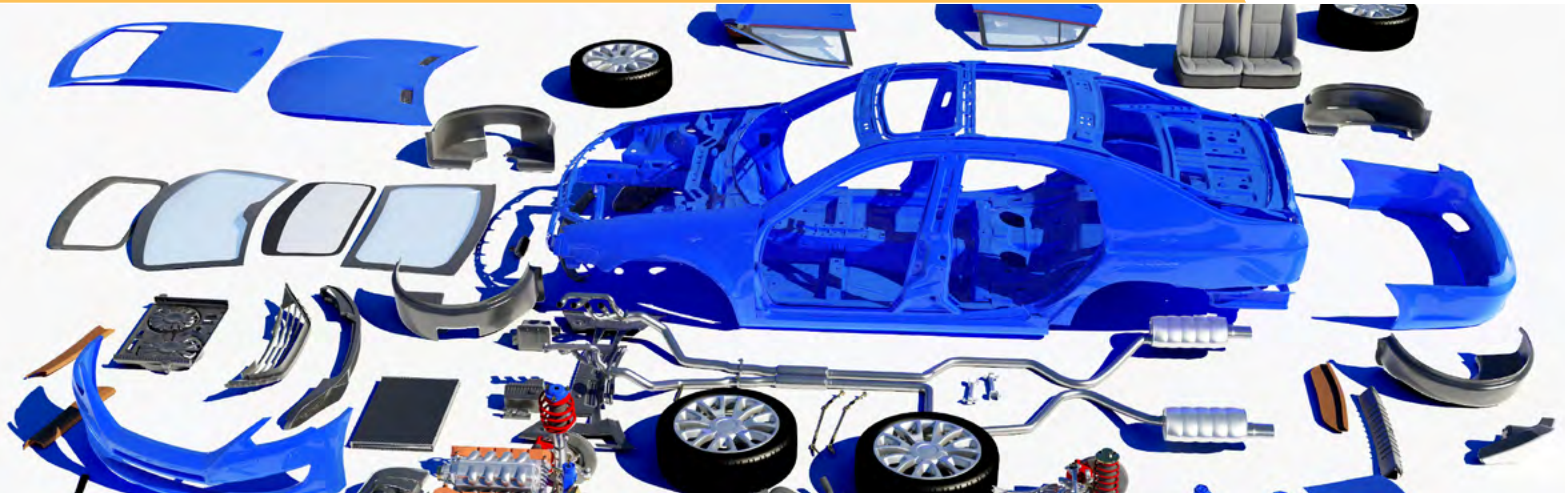
**AirPro EFX**

Superior atomization and precision spray pattern control

**Endura-Flo**

Long lasting durable pump for a reliable fluid supply

AUTOMOTIVE COMPONENTS AND PARTS



Description

Every car has hundreds of painted components that add functionality and aesthetic appearance. Dash boards, instrument panels, headlights, handles, bumpers, and leather are all coated or painted.

Challenge

All of these items have their own unique and demanding challenge. Not only must the components have the coating strength to stand up to the weather elements, and user wear and tear, but it must also maintain its quality appearance. This often requires advanced paint chemistry including adhesion promoters, primers, base coats, clear coats, and even one or two component materials.

Handling these different types of materials, ensuring the accurate ratios for material performance and delivering precision flow rates for uniform finishes is a challenge for most equipment. Even if the flow rates are controlled, fine and consistent atomization also needed to ensure the surface finish is acceptable to demanding customers.

Solution

Graco's automation solutions are up to the challenge. The PD2K Automatic proportioner can handle a wide range of mixing ratios and flow rates, and even handle multiple chemistries on the same system. This allows the customers the flexibility to apply primers, base coats, and top coats with a single machine.

The consistent feed system when paired with our atomization technology is the perfect solution. Whether it is AirPro EFX for air spray, ProXpc Auto for electrostatics, or even our ProBell rotary atomizer, Graco has the atomization technology needed to meet your finish quality needs.

These products integrate seamlessly with automation for a high production solution. In addition, Graco has decades of experience that are needed to serve the customer with the right solution.

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WHEELS AND RIMS



Description

Wheels are used in many different applications including cars, heavy-duty trucks, ATVs, motorcycles, and buses. Wheels are coated with a variety of materials to provide finishes that vary from luxurious metallic chrome for sports cars to matte black for off-road vehicles. No matter what the style, the wheel must have a finish that is visually appealing and tough enough to stand up to the scuffs and scrapes of everyday use.

Challenge

In today's competitive marketplace, wheel manufacturers are always looking for ways to make their products last longer, look better, and meet the stringent requirements of their customers. To do this, the customer needs to be able to handle many different types of coatings.

Customers that have chrome rims often customize the chrome finish with a tinted or even colored clear coat. Customers that manufacture painted wheels need to provide a glossy mirrored finish with the toughness of a protective coating.

Often a metallic flake is used to provide a painted surface with a metallic appearance. The metallic flake can cause issues with the gear pump feed systems and dosing technology used to apply this material.

Solution

Graco's PD2K Auto utilizes a unique technology to overcome these obstacles. The positive displacement dosing technology is an extremely accurate dosing pump that provides consistent flow and ratio control with even the most difficult materials. Whether the material is low or high viscosity, abrasive, or has metallic flakes, the PD2K will deliver consistent and precise control to ensure the necessary product appearance. Pairing this superior dosing technology with

Graco's ProXpc Auto and ProBell electrostatic applicators will provide the correct tools to do the job. Both have excellent atomization and the added value of electrostatics to ensure uniform coverage and low waste transfer efficiency by leveraging the attractive forces of the electrostatically charged paint and the metal wheels.

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AEROSPACE/DEFENSE



Description

Coatings are a key component in the aerospace and defense industry. A variety of coatings are used to protect, decorate, and provide functionality to the aircraft. Coatings not only provide color and gloss but also are used for functions such as erosion resistance, anti-static dissipation or even radar evading stealth.

Challenge

Aerospace applications are some of the most demanding in the entire industry. Every time an aircraft is in the air, human life is at risk and there is no room for error. Aerospace manufacturers are challenged every day to ensure processes are controlled, repeatable, and meet stringent standards. Any variation in these processes can be catastrophic.

Solution

Due to the serious nature of the application, aerospace manufacturers turn to automation to ensure controlled processes and reduction in operator related error. Robotics and automation ensure the applicators that apply the coatings are in the same position every time, but automation goes much further than just robotics.

Automated control of the coating application equipment is the other necessary part of the equation.

Graco's PD2K uses closed loop automated control to ensure the flow rate and ratio of the material is the same every time. Constant data feedback of actual performance is available for the customer to use in monitoring the process.

Smart logic algorithms prevent errors in flow rate values and ratio to shut the system down in the case of any variation. This level of performance is needed for this market, and Graco has developed the technology to meet these needs.

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PD2K Auto

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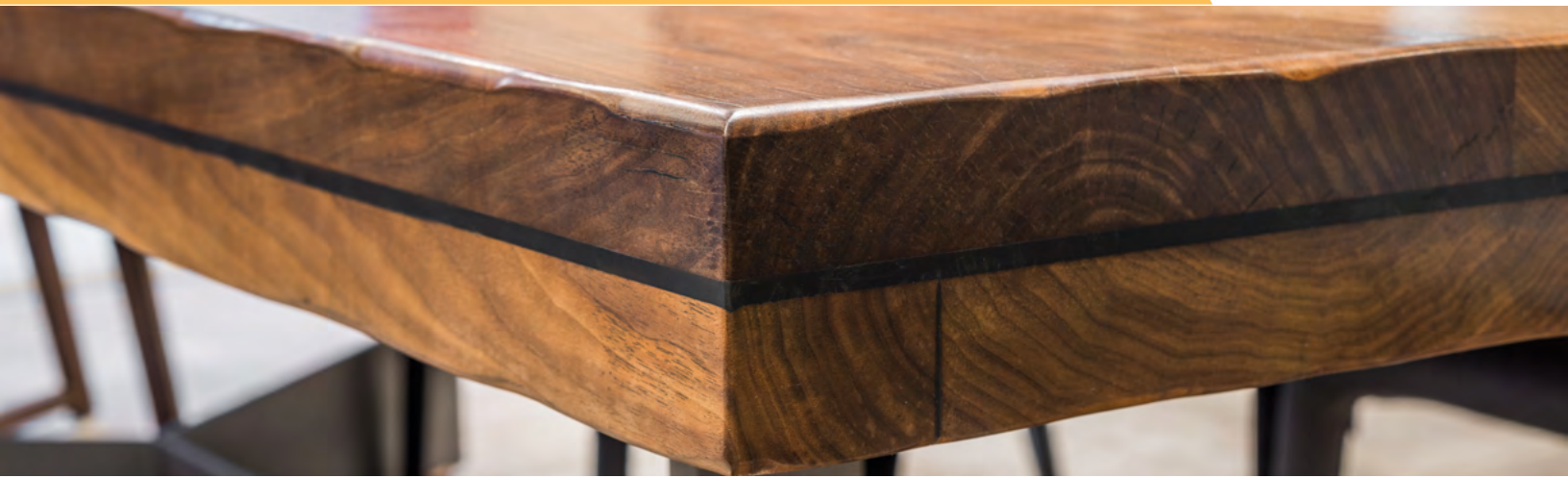
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WOOD PRODUCTS AND FURNITURE



Description

Industrial finishing is an important part of the wood products and furniture industry. Appearance and protection of the wood surfaces is an important feature of the product.

Challenge

Manufacturers in the wood market face many different challenges. High volume production of different types of products with many different types of colors, shades, or finishes can be complicated to manage. Frequent color changes with different materials can often times be wasteful or lead to confusion in the manufacturing process.

In addition, quality is extremely important when managing a complicated production line. Having the correct ratio, flow rate, and surface finish greatly affects the appearance and gloss of the product, and any fluctuation can cause defects resulting in scrapped parts.

Solution

Automation is key for the wood industry for many reasons. The high volume production rates provide for a large labor saving return on investment and it also helps manage production.

With the frequent color changes, Graco's ProMix PD2K Auto is a great solution for reducing waste by placing the color change valves close to the applicator and mix point. The ProMix PD2K Auto also has precision flow control and ratio assurance to ensure a quality product even in complicated production settings.

Graco's high quality applicators provide excellent atomization, resulting in high transfer efficiency to reduce waste and fine particles for a mirror finish. This total package provides the right solution to solve the challenges of the wood industry.

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INDUSTRIAL COMPONENTS



Description

There are numerous different components in the industrial equipment market. Motors, gears, brackets, pumps, attachments and other implements are used to manufacture equipment, and all need to be painted.

Challenge

Manufacturers of industrial components face several challenges. Supplying painted components requires the need for flexibility in not only color, but also product type. It is not uncommon for manufacturers to paint one product in the morning and another by break time.

Some might even supply the same component to multiple customers requiring fast and frequent color changes which use multiple material chemistries. Meeting these demands can often require redundant equipment and increased waste due to setup and change over.

Solution

Graco's ProMix PD2K has the technology to solve these problems. Fast and frequent product change overs are covered with PD2K's remote mixing.

This puts the color change valves and 2K mixing at the robot arm close to the gun to reduce flushing waste and shorten color change time. This not only saves money, but also allows for a more flexible production schedule and eliminates the need to batch paint based on color.

The ProMix PD2K also tackles the problem of needing multiple chemistries by utilizing its mix and match 4 pump system. Manufacturers can paint both epoxy primers and polyurethane top coats using one machine. This also contributes to the flexibility of the paint line and reduces up front equipment costs.

Adding electrostatic applicators to the automated solution increases transfer efficiency and further reduces waste. This combination is just what industrial component manufacturers need to meet their customer's needs.

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ARCHITECTURAL PANELS & EXTRUSIONS



Description

Building panels, metal door and window frames, and structural extrusions are used extensively in the commercial building industry for protecting buildings and making them aesthetically pleasing.

Challenge

Many panel and extrusions manufacturers are faced with fierce competition and pressure to improve quality and reduce cost. At the same time, customers are demanding more and more customization, different types of materials and effects, and shortened lead times. Delivering on all of these demands is extremely difficult because often times they are in contrast with each other.

Solution

Automating the painting process for panels and extrusions is an excellent way to improve quality and decrease cost. Improvements in process control can increase quality, while a decrease in labor expenses can lead to lower cost.

By using ProMix PD2K automatic proportioners, and automatic applicators like ProXpc and ProBell, customers can automate their process and maintain stringent control of all painting variables to ensure consistently high quality.

By removing operator error or unapproved parameter changes, manufacturers can stay in control and streamline their processes.

Graco's technology can also reduce material consumption by reducing flushing waste with ProMix PD2K remote mixing. This also increases throughput by reducing changeover time, so manufacturers can paint more products during their shift.

Implementing electrostatic technology with ProXpc or ProBell will deliver more paint on the part and less in the booth filter thus reducing material consumption and disposal costs.

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CYLINDERS & TANKS



Description

Tanks, cylinders, and other similar products are used to contain and transport several different types of liquids or gasses. These pressure vessels need to stand up to rough handling and resist corrosion to ensure safe transportation.

Challenge

Tanks and cylinders may seem like a simple product to manufacture but due to the pressurized nature of the product. It requires high quality control and precision manufacturing. Complicating this process, is the high volume nature of this product. Ensuring high quality and high volume production rates is a challenge for these manufacturers.

Solution

Delivering high quality at a high production rate is an excellent fit for automation. Graco's automated proportioners and applicators are utilized to ensure the paint process variables are tightly controlled and that the correct material is applied at the right time with the correct process.

Graco's electrostatic technology applies an attractive force to the paint particle and creates better coverage with one pass. This saves time and material usage leading to better productivity and lower costs.

For customers that require multiple materials, Graco's ProMix PD2K automatic proportioners are just the solution. The multiple dosing pump configuration provides the customer with the flexibility to quickly change colors or spray different types of material on the same machine.

The integrated air control feature allows the customer to create a total solution that can control applicators and fluid delivery from one easy to use interface. This plug and play solution is great for reciprocating or robot automation often used in coating tanks and cylinders.

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COSMETICS



Description

There are many different types of containers used in the cosmetics industry including tubes, containers, jars, and vials for lotions and makeup. These products are usually painted with a variety of materials and also given mirror finishes using metalizing process that involves painting the product with a primer and applying metal using plasma vapor deposition. The product is then spray coated with a protective clear coating.

Challenge

In an industry focused on improving your appearance, it is crucial to manufacturers that the packaging appearance is perfect. Any surface imperfections will be rejected and scrapped.

This is extremely challenging as the mirror finish typically magnifies and highlights any defects. The base coating must be applied in a smooth manner with zero variation that can cause runs or air bubbles that cause marks. The flow rates must be extremely controlled and the atomization must be extremely fine with an even distribution.

Solution

To solve this challenge, Graco uses the precision flow control of the ProMix PD2K Auto and uniform atomization of our ProBell rotary atomizer. Controlling the flow rate and droplet size of the particles ensures the desired result is accomplished. PD2K Auto's dual panel feature can supply both the primer and top coat with a single machine simultaneously, resulting in less upfront equipment cost and lower cost of ownership.

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GLASS COATING



Description

Whether it is applying the latest coating to keep ketchup from sticking or decorating glass beverage and perfume bottles, glass coating is a key application in the finishing industry.

Challenge

Appearance is extremely important to consumer packaging companies. It is the key to their branding and often used to stand out amongst a sea of competitors on the shelf. It is for that reason that so much effort is used to create high quality and new container coatings.

Manufacturers of these products have high standards and frequently need to implement changes to stay current in the market. This puts pressure on the manufacturer to have flexible equipment capable of applying multiple types of materials at stringent standards at a moments notice.

Solution

Graco's ProMix PD2K automatic proportioner is just the right tool for this job. The flexibility of PD2K provides the customer with the ability to change colors quickly and even provide multiple material chemistries like epoxies, polyurethanes,

waterborne, and solvent borne materials on the same machine. This eliminates the need for changeovers or multiple pieces of equipment and greatly simplify the process.

The integrated flow control ensures closed loop control of material delivery resulting in a consistent spray pattern and smooth surface finish. The built-in smart controls monitor the process and signal any deviations. This is extremely important in the fast paced, high volume production lines for a consumer product.

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COOKWARE



Description

It would be difficult to find someone that doesn't use cookware. Frying pans, muffin tins, and even waffle irons are an important part of everyday life and modern day survival. Cookware technology has come a long way since the days of cast iron skillets and often times these products incorporate a number of high performance coatings to meet the needs of chefs everywhere.

Challenge

Cookware has a number of different performance requirements. It needs to be able to evenly conduct heat, resist abrasion and impact due to repeated abuse from utensils, have a non-stick coating to allow for hassle free cooking and maximum clean ability, and on top of that, it has to look and feel stylish. To accomplish all of these requirements often demands several different material coatings working together. The same pan might be coated in ceramic material followed by another coating with non-stick properties, followed by yet another coating with a high gloss colorful appearance. The handle might even be sprayed with a soft touch coating for a rubberized feel. All of these coatings are spray applied and each requires a different approach.

Solution

Different materials require different equipment solutions as each material has its own specific challenge. Ceramic materials typically require spray guns designed specifically to withstand the abrasive characteristics of the material. Graco's Air Pro High Wear applicator was designed and tested to standup to these types of high wear materials. Graco ProBell rotary atomizer technology delivers the extremely consistent fine atomization required for the smooth surface needed when applying non-stick coatings. In addition to the smooth surface, the thickness is typically built up with several thin layers. This thin film build must be closely controlled utilizing precision flow control. PD2K

Auto utilizes positive displacement pumps to accurately control flow rates with thin non-stick coatings and even thick soft touch rubberized coatings.

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FOOTWEAR & APPAREL**Description**

Shoes and other apparel are as much about comfort and performance as they are about style and durability. Footwear and apparel must not only look good, but it also has to perform and last. Every season brings a new design to keep up with the fashion trends, but also the improvements in technology. This fast design cycle means manufacturers have to be flexible in their process in order to be responsive to the changing market.

Challenge

Most shoes typically have two main parts. The bottom sole of the shoe is made of molded foam, and the upper is made of a variety of materials ranging from leather to synthetic fabric to even plastic. To assist the molding process, mold release needs to be precisely applied to the mold, to enable the foam sole to be easily removed without defect. The upper materials are often painted to meet the appearance needs of customers. For any given shoe model, several different colors or designs need to be applied in a precise and stringent manner. Once these operations are complete, a spray adhesive is applied to adhere the upper and sole. A precise amount of adhesive needs to be applied to ensure durability of the shoe, but applying too

much will result in quality defects and overspray waste. In order to manufacture shoes at the demanded high production rate, each process is usually automated and strictly controlled. Mastering these operations is the key to making good footwear in a demanding market.

Solution

Graco's ProBell rotary atomizer utilizes fine atomization and electrostatic technology to ensure a thin layer of mold release is coated completely and evenly onto foam molds ensuring each sole is removed easily with no defects. AirPro spray guns precisely control the adhesive spray application to provide a

uniform adhesive layer, keeping the shoe intact while reducing overspray waste. PD2K Auto utilizes multiple positive displacement pumps for quick and low waste color changes to allow for flexibility when changing between multiple product colors and styles.

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