



How paint booth cleaning contributes to a quality finish



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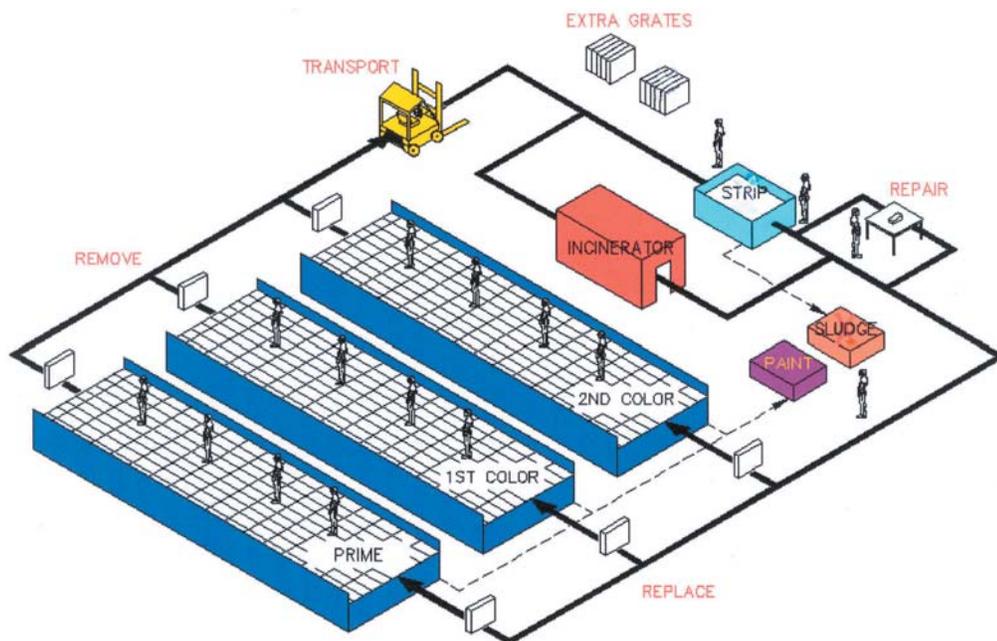
The need for effective paint booth cleaning is well-documented. High-volume painting operations inevitably leave overspray on walls, conveyors, carriers, skids, and floor grates, as well as spray guns and related equipment. When dirt and paint flakes fall into a fresh paint job, the finish is spoiled and expensive repainting is required. Also, paint build-up over time adversely affects precision (keeping hooks, chains, latches, etc. from moving smoothly) and forces motors to work harder, which can lead to overloads.

To be competitive today, manufacturers must deliver a top-quality finish while meeting demanding production schedules and tight operating budgets. This has led to significant growth in the use of high-pressure water jetting as an alternative to the traditional methods of chemical stripping and incineration, or burn-off.

Many automotive companies and other high-volume manufacturers depend on high-pressure or ultra-high pressure water jetting (typically 10,000 to 40,000 psi) because it quickly and thoroughly removes paint build-up while minimizing downtime and operating costs. The operating pressure is provided by a dedicated pump unit, and the water is delivered through specially-designed nozzles. Water jet equipment can be manual, semi-automated or fully automated, to suit application requirements; some operations use it in-line and others off-line. The process eliminates a number of common steps, as shown in the following illustration.



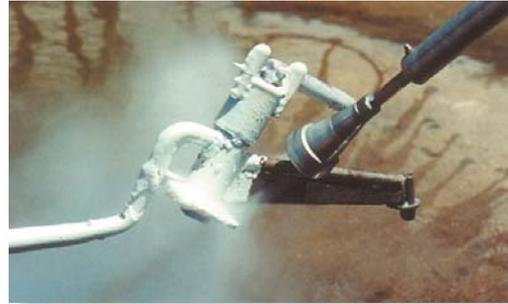
Water jets thoroughly clean the top and sides of grates, in-place.



There are six major reasons to consider water jet paint removal.

Thorough cleaning

The process quickly cleans down to bare metal, yet does no damage to painted parts. Fast cleaning of carriers and grates shortens maintenance cycles and increases uptime. Also, removing build-up from spray booth equipment (conveyors, robots, etc.) helps keep it in good working order.



Versatility

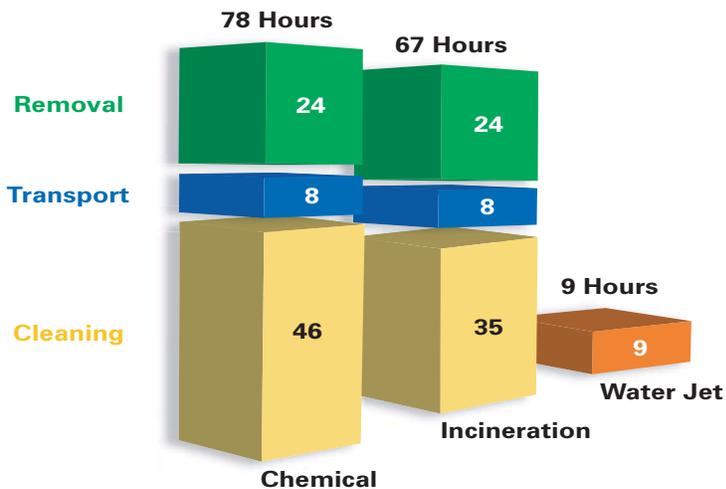
Water jets remove virtually any type of finish, including E-coat, primers, high solids, isocyanates, enamels, and clearcoats. In other industries, water jets are commonly used to remove hardened resins, unclog heat exchangers, and even cut through concrete.



Labor-saving

Paint booth cleaning has traditionally been a very labor-intensive job, partly because grates must be removed from the booth and carried to a chemical bath or burn-off unit. Water jets clean grates in place, typically reducing man-hours by at least 25 percent and often by 70-to-80 percent (*see chart*). This is accomplished either with hand-held lances or with rotating jets mounted in semi-automated "lawn mower" style units. The best-known example of this is the SPIN JET[®], patented by NLB Corp. in 1977 and widely used in automotive paint facilities around the world.

Grate Cleaning Labor Comparison



Water jet grate cleaning has proven so effective that a 1995 study sponsored by the American Automobile Manufacturers Association and the National Pollution Prevention Center recommended that it be a weekly practice. The rotating jets can also be directed robotically or mounted in cabinets to clean hooks, chains or carriers as they return from discharging freshly-painted components. *(See Automated Systems, next page.)*

Environmentally responsible

Since water jets use no chemicals or solvents, disposal is greatly simplified. Also, the process produces no VOC (Volatile Organic Compounds) emissions, eliminating the time and expense involved in complying with various regulations.

People-friendly

When grates are cleaned with caustics, operating personnel are exposed to chemicals. In burn-off operations, people are exposed to very high heat. Both can be hazardous. Also, both require that the heavy grates be lifted, transported out of the spray booth and replaced with a spare set. This work is very time-consuming, as previously noted, and not ergonomic. Finally, frequent burning can cause grates to warp, leading to tripping accidents and lost-time injuries.



Low operating costs

Energy costs are far lower for water jetting than for burn-off or chemical cleaning, and there are no chemicals to buy. The capital cost of the high-pressure pump unit and related equipment is quickly recovered, and the process becomes even more cost-effective over time. The investment in grates is also much lower, since clean-in-place eliminates the need for extra sets and replacement is less frequent without heat-induced metal fatigue.

The benefits of water jetting are equally applicable to grates, hooks, carriers, or any other paint booth equipment. It is simply a matter of matching the application with the proper operating pressure and the best equipment to deliver the high-pressure (or ultra-high pressure) water. The equipment can be generally grouped into three categories: manual, semi-automated and automated.

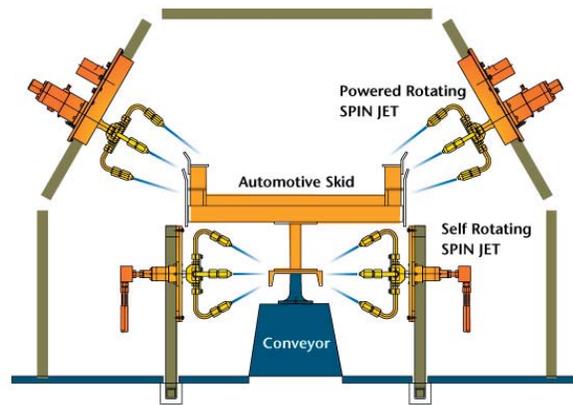
Manual accessories include hand lances and foot control valves that let an operator control water flow and direct the jets where needed. A variety of nozzles are available, including multi-nozzle heads that rotate to produce more force. Lances are handy for small areas that automated water jets cannot reach. Water jet lances deliver considerable thrust, so the best ones are fairly lightweight, with handles and shoulder supports that are adjustable for operator comfort. Safety latches are an important feature, and some models let operators relieve pressure at any time.





Semi-automated equipment often features rotating water jet nozzles (e.g., NLB's patented SPIN JET®) to maximize cleaning power. These are commonly mounted in a lawnmower-style unit that an operator can easily maneuver over a floor or grate. They are not pushed, but guided... a task that is even easier with NLB's lightweight aluminum models. Adjustable spray patterns (two or four nozzles, variable angles) allow users to use a single unit for different applications.

Automated systems are usually custom-designed to suit application requirements. A common arrangement is to strategically mount multiple SPIN JET® heads in a sound-attenuated cabinet to clean carriers, hooks and chains as they travel. Examples are shown below. Automated water jet systems are also used in automotive body wash operations, to remove welding residue, dust, drawing compounds, and other contamination before the application of phosphate. SPIN JET® heads can also be attached to robots, so that water jets can be directed to touch up a critical area (e.g., mounting details) or cover an entire carrier with a simple programming change.



Pump units

NLB application engineers meet customer requirements with a variety of high-pressure pump units, either diesel or electric. These units can be skid-mounted or carried on trailers for portability. Typical water jet pressures for cleaning paint booths range from 8,000 psi to 40,000 psi (550 to 2,800 bar) and flows from 6 to 50 gpm (11 to 189 lpm). Higher pressures (and lower flows) are more effective on newer, hard-to-remove paints. Multiple accessories can be run from a single pump unit, which will operate for many years if properly maintained.

Conclusion

High-pressure water jetting is a powerful, efficient product removal process that has proven particularly effective for paint shop cleaning. It enables users to achieve the highest levels of product quality and productivity, with dramatic reductions in manual labor. At the same time, water jetting makes it easier to comply with environmental regulations and maintain an ergonomic working environment. The end results are greater customer satisfaction and higher profitability.



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