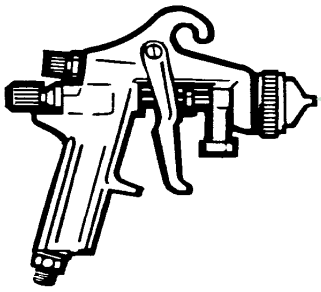
Proper Spray Equipment Maintenance Saves Money



A routine preventive maintenance program can prevent rejects, reduce downtime, extend equipment life and save money . . .

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Anyone responsible for a spray finishing operation, large or small, will agree that spray finishing equipment maintenance never ends. For many end users, maintenance occurs only when the spray equipment fails. Some like to brag about how long they used something before it required service. Since time is money, it would be wise to invest time and effort to properly maintain spray finishing equipment.

Despite the variety of parts, all finishers have one thing in common. They want to deliver the best finish possible at the most economical price. This requires cooperation from three groups: coating suppliers, spray operators and equipment suppliers. All three must work as a team. An unacceptable finish, resulting from improper maintenance, could lead to costly down time, excessive waste and rejects.

Materials. The coating supplier must be knowledgeable, reliable and available to answer questions. The cost of coatings has risen in the last ten years, thus it is important to try to

make every drop of the material work. Suppliers can recommend the right material for the job.

Coating materials must provide the necessary protection and decoration. Also, consideration must be given to how the coating will be applied and the desired finish appearance. Consider material characteristics such as pot life, corrosiveness, flow, consistency, pigmentation and electrical properties, if spraying electrostatically.

Always follow recommendations regarding the proper use of solvents. Remember, use the recommended solvent system for the coating used. Low-cost solvent blends may lead to finish problems. Some inexpensive materials may contain fillers that will not mix readily. Lumps, skins and dried particles, especially with water-borne coatings, must be strained out of the paint.

When filtering, filter out only the contaminants, not the pigments or other vital ingredients. Material suppliers can recommend the proper filter mesh size for the coatings used.

Even though coatings are usually packaged in clean containers, they will not always remain that way, particularly if part of the material is used one day and the rest used a month later. Rust and other contaminants may form on the container walls or lid and possibly enter the coating. Urethane coatings begin to cure once the container is opened. Do not expect to reuse part of these coatings several months later.

It is also important to have an understanding of paint viscosity. With spray finishing viscosity is a great concern. Although it is not the only consideration, viscosity is usually one of the initial factors in spray equipment selection. Maintain viscosity cups by cleaning immediately after each use. Never tamper with the cup's orifice. Doing so will lead to incorrect viscosity measurements.

How do we maintain the recommended viscosity of our materials? There are usually two ways of maintaining viscosity levels: solvents and paint heaters. Recent environmental laws limit the use of solvents. Paint heaters will become more important as water-borne, high-solids and UV coatings gain acceptance. Failure to control viscosity will ultimately lead to improper pressures, which could lead to reduced transfer efficiencies. This means higher material and maintenance costs.

Operators. Proper operator control should be a team effort. Often, spray operators receive little or no supervised training. The attitude of "watch Joe and learn from him" often is the extent of training. However, Joe was never taught how to properly spray coatings, and for the last ten years has acquired many costly habits.

For many years, industry has failed to realize the importance of the spray operator. A good sprayer should be recognized as an artisan just like a veteran tool maker or carpenter. Those who supervise spray operators should also be knowledgeable about the finishing process and provide guidance, leadership and training for these sprayers.

The key to finishing success can be described in one word — Control. Constant monitoring of air and fluid pressure, line speeds, surface prepa-

ration and operator spraying techniques provide cost-effective results. Why is it that one always finds the time to do something over, but never seems to want to devote enough time to do it right the first time?

Applying a fundamental rule for setting spray pressures (use the lowest pressure that will provide a satisfactory spray pattern) will save money. Reducing paint flow from the spray gun by as little as one fluid oz per min can add up to significant savings. For example, using nitrocellulose lacquer at $20.00 per gallon:

one fluid oz/ min = 0.5 gal per hr
= three gpd (spraying time, 75 pct)
= $ 60.00 per day (assuming $10.00/gal cost)
= $300.00 per week
= $15,000 per year, per gun!

This figure could grow even more with the addition of multiple spray stations or higher paint costs. So whether it is the sprayer, supervisor responsible for setting and maintaining pressures, or management involved in training, all three can be classified as operators and must be held responsible for what they do.

Equipment. Evaluate spray equipment performance. A spray gun should never be fully submerged in a bucket of solvent or strip tank for cleaning. Doing so will fill the gun's air passageways with dirty solvent and paint particles. Later, when the gun is sprayed, these foreign particles will ultimately dislodge and find their way into the finish, causing rejects. Rather than soaking, try submerging the air and fluid nozzle area. Later, if necessary, the fluid needle, air nozzle and fluid nozzle can be removed for soaking. Wipe the gun with a solvent rag and flush all fluid passageways out with a clean solvent before putting the gun away.

Remember, never use anything harder than brass to unplug clogged air passageways (or holes) of the air nozzle. Doing so will damage the air nozzle beyond repair. Most spray guns can be repaired by the maintenance department if they have instructional part sheets and gun repair kits, which are available from equipment suppliers. Always use the proper tools to service a spray gun. Many equipment suppliers provide special wrenches or tools to service spray guns. Avoid tooth pliers and other destructive tools.

Spray guns must have clean, dry compressed air with adequate pressure and volume to produce a quality finish. Check the air pressure at the spray gun by installing an air pressure gage at the gun handle. Allowing for a few pounds of pressure loss through the gun, pull the trigger on the gun to check if adequate spraying pressures are available. Increasing the air hose from $^{1}/_{4}$- to $^{5}/_{16}$-inch ID will mean less pressure loss and improve the performance of all equipment, especially HVLP spray guns.

Even a simple air leak in a compressed air system can cost money. Table I shows the extent of waste. This figure could be reduced significantly by eliminating loose air connections, faulty regulators, leaky extractors, worn gaskets on pressure tanks, agitators running to fast and other factors.

Inspect the cleanliness of the compressed air. With the air nozzle removed and the fluid supply turned off, hold a white cloth or handkerchief tightly over the front end of the spray gun. (Never attempt this test on an airless spray gun.) Pull the trigger for a minute or so. If contaminants appear on the cloth, the air filtration system needs attention. Most plant air systems employ black iron pipe and fittings to distribute compressed air to spray booths. As the compressor pistons wear out, oil may find its way into the pipes. In addition, condensation will also develop inside the pipe and travel through the system. To help combat oil, water and rust in the compressed air piping systems, there are components called oil and water extractors, or separators, to help filter out these contaminants.

Have the maintenance department regularly inspect air regulators and oil and water extractors. Many people may not know that they need such care. Oil and water extractors should be drained daily when used in high humidity. Again, repair kits are available and present a low-cost alternative to costly rejects. The secret of success with any air system is routine maintenance. Encourage your maintenance department to establish a periodic schedule for checking the filters and extractors. Depending on your shop conditions, it may require daily, weekly or monthly inspections.

The cleanliness of the spray booth can also affect the finish. Good housekeeping is essential for a dirt-free finish. Remove dust accumulations from walls, floors and ceiling. Wet down these areas periodically to keep dust under control. Do not grind, sand or polish in or near the spray area. Air intake and exhaust filters in the spray booth must be replaced when contaminated. This will also ensure proper air movement through the booth and a dust- and dirt-free environment. An easy inspection of the air make-up filters can be done by holding a freshly sprayed panel close to running air make-up filters. After one minute, inspect the finish for dirt and other foreign matter. If contamination is present, replace the filters. Also, do not overlook the conveyors and bake ovens. Often, these become a primary source of contamination.

Materials must be properly selected, mixed, reduced and strained. Also, train operating personnel how to properly spray with their equipment and encourage them to become the true artisans they really should be. It is also important to impart to the sprayers responsibility for equipment care. Finally, the maintenance department must be informed of the impor-

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TABLE I—How Much Does An Air Leak Cost?

LEAK (hole diameter inch)	SCFM	HP	KWH	$/DAY	$/MONTH	$/YEAR
.1/64	0.36	0.09	0.07	0.09	1.95	23.40
-1/32	1.47	0.37	0.30	0.38	8.23	98.76
3/64	3.28	0.82	0.66	0.85	18.42	221.00
1/16	5.87	1.47	1.18	1.51	32.72	393.00
3/32	13.10	3.28	2.62	3.35	72.58	871.00
1/8	25.80	6.45	5.16	6.60	143.00	1,716.00
3/16	58.30	14.58	11.66	14.92	323.00	3,876.00
1/4	103.00	25.75	20.68	26.47	574.00	6,888.00

Based on 90 psi, $.08 per kwh, 2-8 hour shifts, 5 days per week.

tance of cleaning and/or repairing the spray finishing equipment, including filters, pumps and spray booths. A routine preventive maintenance program, possibly the last twenty minutes before or after each shift, can help save money. This should reduce down time, extend equipment life and result in a higher return on your investment.

As you can imagine, there are many other ways to save money through proper maintenance. Try having an informal discussion between suppliers, painters, supervisors and managers to identify other sources of cost savings. Remember, cost savings only come to those who take the time and effort to seek them out. **PF**