

***A paint stripping and metals  
cleaning job shop relies on uncon-  
ventional means to remove coat-  
ings, regardless of thickness  
or chemical composition.***

**A**PPPLIED TECHNOLOGY

# Salt Bath Streamlines Metals Stripping

BY JERRY DICKSON

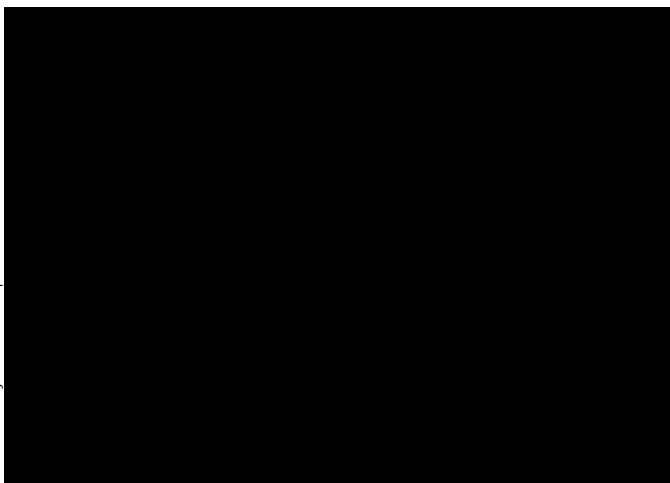
**A**ssociated Engineering is a finishing and stripping job shop with a solid customer base and 16 years of experience at coating "everything metal" — from the seats at Orchestra Hall to trolling motors used in the hundreds of lakes that surround the company's central Minnesota plant.

The application of powder coating is a major — and growing — part of Associated's finishing business. Reasons include powder's overall performance and longevity, application techniques which reduce overspray, and elimination of the need for solvent carriers along with their attendant environmental problems.

Powder's growing popularity, from the standpoint of both Associated and its customers, is also due in part to two factors which appear contradictory: powder's superior adherence to a wide variety of substrates, and a cost-effective technology that allows even the most tenacious powders to be removed from fixtures or ware.

A molten salt system removes coatings from off-highway components prior to repainting. Steel and aluminum parts can be stripped simultaneously, and bath temperature will not distort thin section parts.

Photos courtesy of Kolene Corp.



## Stripped Clean

Associated Engineering is divided into finishing and stripping divisions.

On the finishing side, the company is distinguished by its diversity. Within the powder product line, the facility applies a wide range of materials: polyesters, urethanes, polyurethanes, TIG, epoxies, acrylics. Parts range from fasteners to lawn mowers to motorcycles. Production runs span from single units to million-plus part runs for the U.S. military.

On the stripping side, homogeneity reigns. A single molten salt paint stripping system from Kolene Corp. (Detroit, MI) removes all coatings, regardless of thickness or chemical composition.

The single-bath system, with a work area that's 3 feet wide and 4 feet long and deep, holds 6400 pounds of a molten salt blend. Originally formulated to quickly strip aluminum and other thin-gauge parts, the current system was purchased by Associated after ovens, hot caustics, chlorinated strippers, and fluidized beds all had proven problematic.

Ovens required long cycles and extensive housekeeping; caustics demanded even longer cycles. Chlorinated strippers demanded long (one- to eight-hour) cycle times, could not accommodate all the paint types Associated uses simultaneously, and created problems with emissions and disposal.

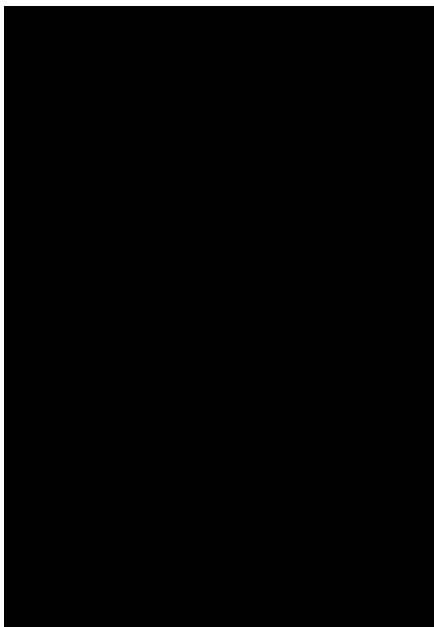
The fluidized bed caused labor costs to skyrocket, due to the post-process handwork. At present, the molten salt system is used for about 80 percent of Associated's stripping work with the remainder going to the fluidized bed.

## Process Recipe

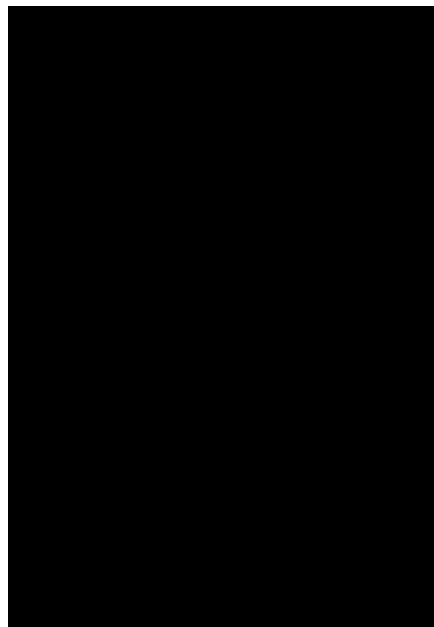
Because the molten salt digests any organic, all coatings can be stripped together without compromising the bath's chemistry or effectiveness. Cycle time is generally an even two minutes, at 650°F, a specification that will remove "10 mils of nylon from a knife handle or 10 mils of epoxy from a dishwasher rack," according to Chuck Klammer, president of Associated Engineering.

In rare instances, such as a paint thickness over 12 mils or a specialty coating such as CARC (the military's Chemical Agent Resistant Coating), process time could reach four minutes.

"The point here," says Klammer, "is that the added two minutes won't adversely affect other parts in the bath that



"Before and after" representations illustrate the impact of Associated Engineering's molten salt cleaning to remove coatings from NordicTrack exercise machine components prior to repainting.



were cleaned in the first two minutes."

Unlike ovens, for example, which concentrate heat in spots and can cause significant distortion, the molten salt functions as a heat sink, evenly distributing heat around the part. Gentle turbulence from mechanical agitation further insures even heat distribution and process effectiveness, regardless of the part's shape.

Associated also finds turbulence — this time of the bath's surface — to be helpful in another regard. As parts are lowered into the bath, a slight surface action results from contact between the powder and the salt. When this turbulence stops, Associated found stripping to be complete. The surface turbulence literally functions

as a "timer," allowing users to write a process recipe to fit their specific needs.

#### **Recycled Success**

Perhaps most importantly, in light of today's focus on the environment, the salt bath system does not create toxic ash, beads, or solvent waste. Once installed with an initial "charge" of salt, the bath is usable indefinitely, never having to be discarded.

Used salt is automatically deposited in a side sludge pan; small additions of fresh material are made periodically to maintain bath levels. As with the initial charge, the material consists of dry flakes, which facilitate easy handling. (It becomes "molten" only at temperatures above 400°F.)

"Powder and salt are a natural combination for a job shop hoping to do well in the mid-1990s and beyond," Klammer asserts. Those orchestra seats mentioned earlier are just one example he offers. "They were beautiful, with very intricate metal work. Were they worth saving? The hall's owner thought so and certainly the philosophical argument for recycling was a good one. But, it had to make sense financially.

"The stripping was the first step; we were down to base metal in two minutes flat, no hand cleaning. A high-performance, long-life powder clinched the project." The result: "Thirty dollars per seat versus an estimated \$200 for new," says Klammer.

#### **On Track**

Associated also has an ongoing contract with NordicTrack, a leading manufacturer of home exercise equipment, to strip and re-coat all cosmetically-rejected parts.

"One of the advantages of stripping quickly," suggests Klammer, "particularly in a complex, multi-line facility such as ours, is the ability to fully manage the job. A stripping cycle that lasts only two minutes means you can isolate your rejects, strip, and re-coat in one continuous operation.

"What we're really doing here," Klammer continues, "is streamlining — simplifying — our operation. We think it's an indication of the plant's efficiency that a substantial number of local competitors on the finishing side use our salt bath to clean their rejects." **PC**

#### **About the Author**

*Jerry Dickson has more than 20 years experience in the parts cleaning industry. His specialty with Kolene Corp. (Detroit, MI) is the application of molten salt cleaning and descaling technologies for metalworking manufacturing.*

Reprinted from *Precision Cleaning* magazine April 1994  
© 1994 Witter Publishing Co., Inc.