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Paint Booth Maintenance Guide

Introduction

Today's exotic and improved paints, spray equipment and booth design have made paint equipment maintenance especially important.

The quality of a paint finish depends greatly on the condition and performance of the equipment used. Appropriate maintenance procedures and schedules must be established *and followed* to achieve the best results. Poor maintenance can cause production line delays and costly down time.

Attention should be given to all spray booth components. Periodic inspection for damage, wear and improper maintenance will decrease the cost of equipment repair and replacement.

This guidebook contains information on spray booth design and economical maintenance practices. It is intended to help save you money and extend the life of your spray booth equipment.

Paint Overspray

The paint spray booth is designed primarily to contain paint overspray. Overspray results when paint spray misses its target. Fine particles are suspended in the air—and if they are not controlled, they can cause damage. Overspray creates three main hazards which can be avoided if the paint booth is working correctly.

Hazards from overspray

Fall-out soiling—If overspray is not contained, it may land on nearby equipment. In spray operations with ventilating systems, overspray may spot cars, homes, or objects near the outside exhaust vents if it is not trapped before being expelled.

Health—Many paint formulations are poisonous if inhaled in sufficient quantity. Other paints cause irritation to the skin. Paint and sludge accumulations foster the growth of harmful bacteria. Bacteria cause unpleasant odors that are a major source of irritation in many industrial plants.

Fire and explosion—A large amount of overspray in the air is highly combustible and can be ignited easily. Paint build-up on the walls, floor and ceiling of a spray booth is flammable and presents a real fire danger.

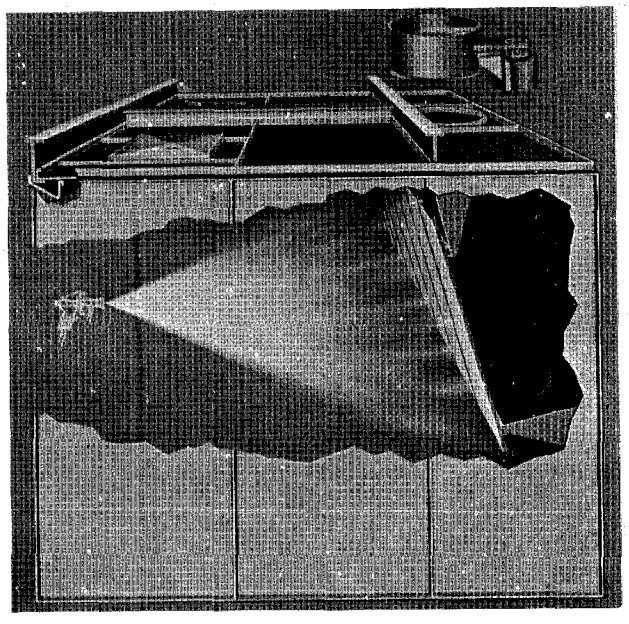
Types of Spray Booths

A paint spray booth must be designed to accommodate the size, shape and number of objects to be sprayed. Spray booths are classified into two basic categories: Dry booths and wet booths.

The dry booth

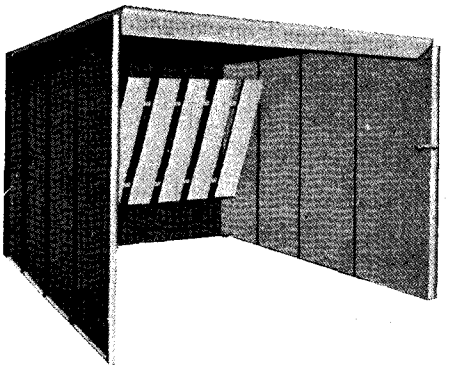
This type of booth removes overspray through forced ventilation, dry wall coatings and a filter system. In some applications, dry booths are more economical to operate than wet booths because the expense of sustaining a constant water wash curtain and pump maintenance is avoided.

The dry booth is ideal for small operations where it is used only once in a while. Spraying small parts, decorating and stencilling with



quick-drying paints is generally done in floor, bench and standing dry booths. A single large baffle or multiple baffles are used to trap overspray, provide uniform air flow and easier cleaning.

One problem with dry booths is the removal of paint accumulations from walls, floor, vent pipes and fan blades. For years, manual chipping and scraping seemed to be the only method of removing this paint build-up.

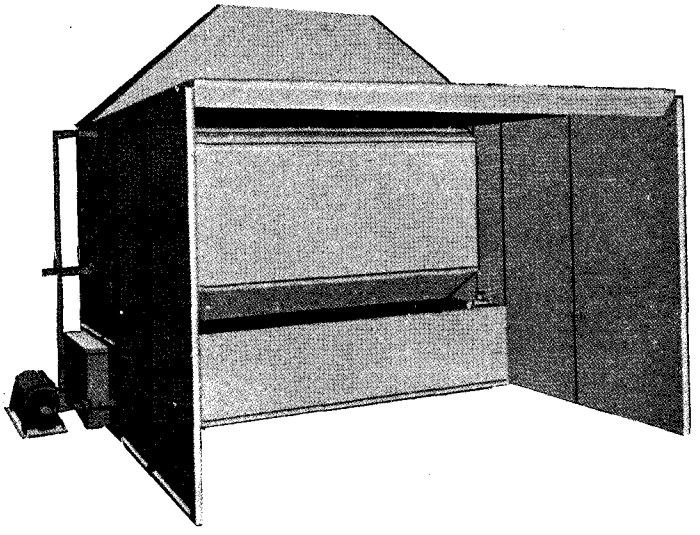


Dry baffle type booth

A solution to the problem of paint build-up is specially formulated chemical strippers and protective booth wall coatings. Peelable plastic coatings like Fremont 58H and 59L are recommended for inexpensive dry booth maintenance.

The wet booth

Water wash spray booths are used in production line spray painting. This type of booth uses a curtain of water as a screen to trap and remove overspray before it can stick to the booth walls or escape into the ventilation system.



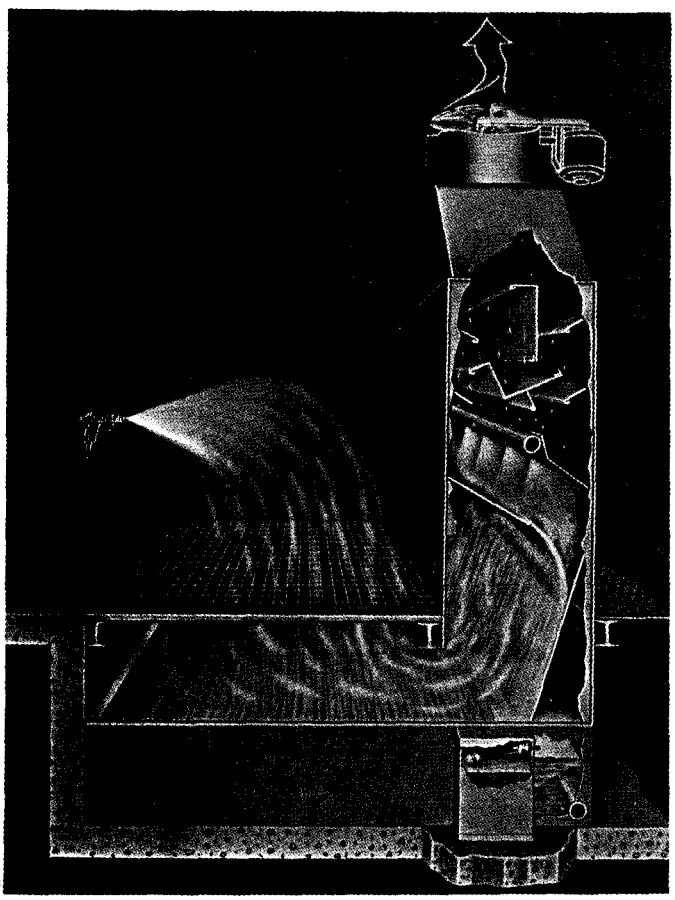
Typical water wash spray booth

Using a constantly falling curtain of water, a properly functioning wet booth will absorb approximately 95% of the overspray and reduce fumes from paint evaporation, thus minimizing odor and toxicity.

Three stages of trapping overspray in a water wash booth—1. Overspray strikes the water curtain and is trapped in the water. 2. Overspray that is not trapped by the water curtain is caught in the upper sections of the booth. 3. Overspray which avoids stages one and two is eliminated by a series of baffles, over which air passes before it is exhausted outside.

Water wash spray booths can be divided into two major types: The **down draft** booth and the **side draft** booth.

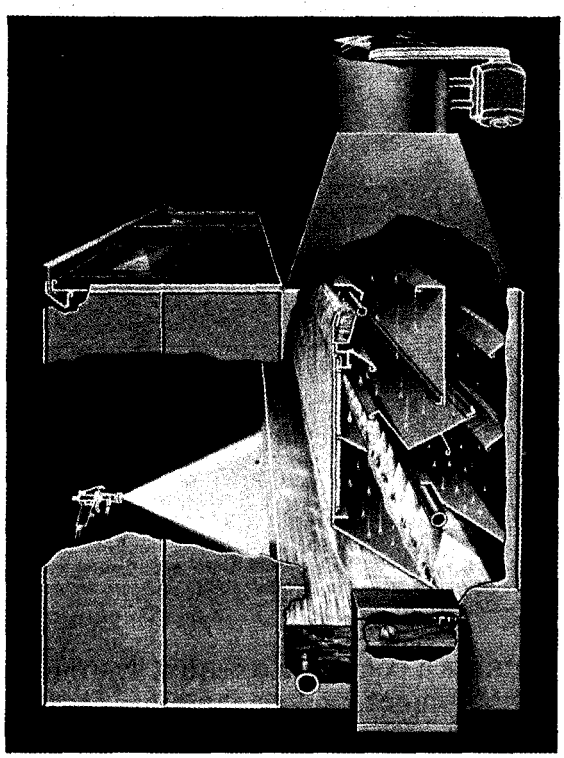
The down draft spray booth—This type of booth has all the advantages of a wet booth, plus the ability to handle a variety of large products. The operator (or operators) can work around the product, painting the top and all sides. The down draft system offers better working conditions for the operator as well as a highly efficient means of drawing overspray into the water wash chamber. Grillwork for a down draft booth is arranged in a floor pattern that conforms to the shape of the part to be painted for more effective removal of overspray and vapors from the work area.



Three Paint Trapping Areas: 1. The tank of water below the grilled floor; 2. the water that cascades down the spill sheet of the chamber and; 3. the dense water spray formed of overlapping spray cones.

The side draft booth—There are two kinds of side draft booths: Elevated and low style. Elevated booths are used when you have a work area with high ceilings. Low style booths are used when overhead space is limited.

Both of these booths draw paint overspray into the water curtain, where the particles are trapped in the water. Overspray that is not caught in the water curtain is pulled over a series of baffles by a fan. The baffles prevent the overspray from being vented outside. A tank and recirculating pump provide water to the curtain in front and to the "spill



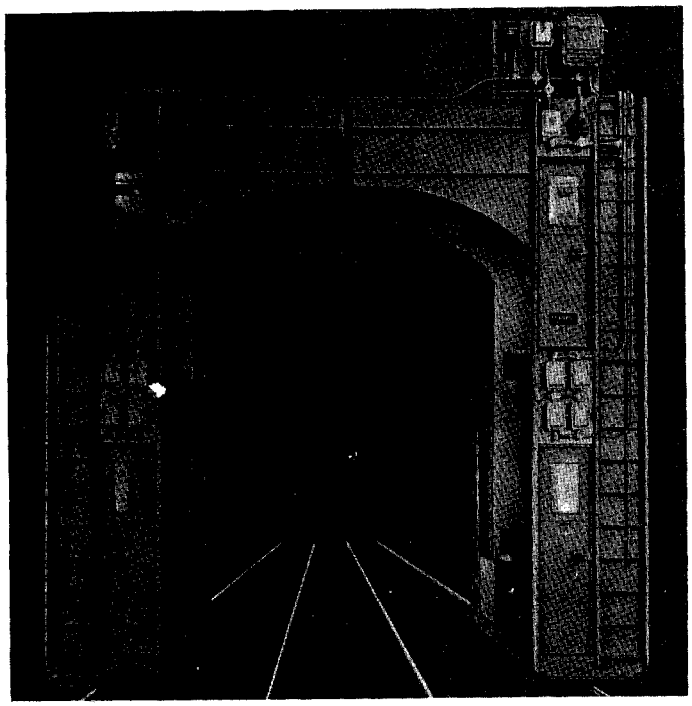
Side draft booth

baffles" inside the exhaust system of the booth.

Custom spray systems: The traveling spray booth

This type of booth is designed for spray finishing large equipment, such as locomotives, railway cars, buses, aircraft and other bulky assemblies.

This compact, self-contained unit travels on rails over the length of the object to be painted. It contains a complete exhaust system, all painting equipment, power elevators for spray operators, air compressors and other self-sufficient features.



Many traveling booths incorporate transverse-type automatic spray equipment to provide the maximum in economical, high-volume production finishing. In these booths, automatic spray guns travel back and forth or up and down to give the object uniform coverage as the booth moves along.

When compared with many stationary installations for painting large equipment, the traveling booth requires only 1/5 of the floor space and removes only 1/8 as much air and heat from the building. Spray booth space is not tied up by jobs drying or by waiting for finished work to be moved. The traveling booth moves on to the next unit and keeps working.

Paint Booth Design

The design and construction of paint booths varies tremendously. Usually booths are designed for painting specific parts, and changes in their use are not expected. Often a booth is used without modification, even when the material to be painted and/or production line modifications change. This can result in a drastic loss of efficiency.

For example, if the products being sprayed increase in size until they are too large for the booth, the booth should be re-designed or replaced.

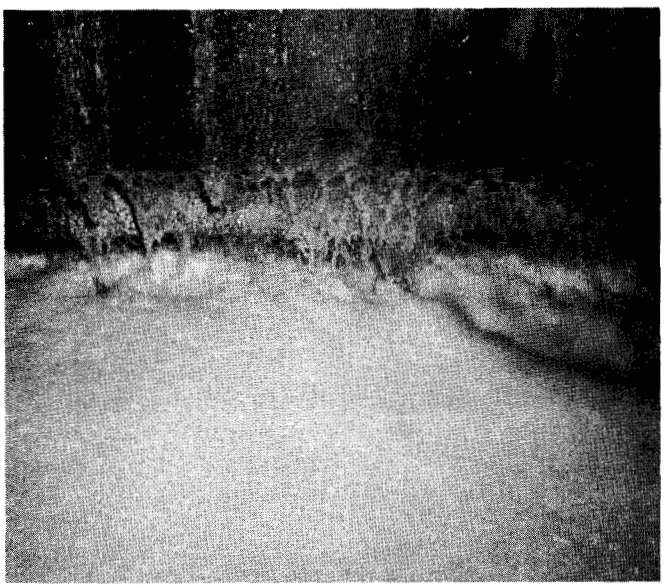
Some changes in paint booth usage are not always so apparent. If the production rate should increase to the point that the water volume being circulated is insufficient, paint will accumulate too rapidly. This condition may lead to plugged nozzles, overflowing troughs, poor pump circulation, paint accumulation or the most common problem—excessive foaming.

Water wash booths are most effective when they utilize a large volume of water in a large reservoir. When the rate of circulation is increased beyond the capacity of the booth, a turbulent condition is created in the reservoir, causing foaming to occur.

Excessive foaming will not allow paint particles to settle or float out. Instead, they are recirculated to the water curtain spray nozzles where clogging is inevitable. An attempt to solve this problem is often made by increasing the water level within the reservoir; but, under normal operating conditions, a degree of foaming should be expected and a leeway depth should be provided between the surface of the liquid and the rim of the reservoir.

Another common maintenance problem found in improper water wash booth designs is **incomplete drainage.** Unless the drain is located at the lowest point in the reservoir, several inches of sludge will remain after draining. If this sludge is allowed to lay stagnant for a lengthy period, strong odors from bacteria will permeate the work area. If a new solution is charged into the system without thorough cleaning, the solution will be contaminated.

Occasionally, industrial plants will decide to convert from a dry booth to a water wash booth. Increased painting frequency in a dry booth causes an excessive buildup of overspray. This presents a number of problems (toxic fumes, explosion and damage to nearby equipment) and increases maintenance costs (chipping, scraping, chiseling or even sandblasting) and indicates that a change in booth design is needed.



Foaming

Spray Booth Maintenance

Protecting booth surfaces

In busy paint spray booth areas there is the problem of overspray, dripping, and spilling—causing unwanted paint accumulations. Floors, walls, ceiling, lights and jig equipment all need protection to minimize maintenance labor costs and down time.

One method of avoiding the time-consuming and tedious removal of paint accumulation from spray booths is to apply a protective booth coating which keeps paint overspray from clinging to the surfaces of the booth and can be removed with a minimum of effort.

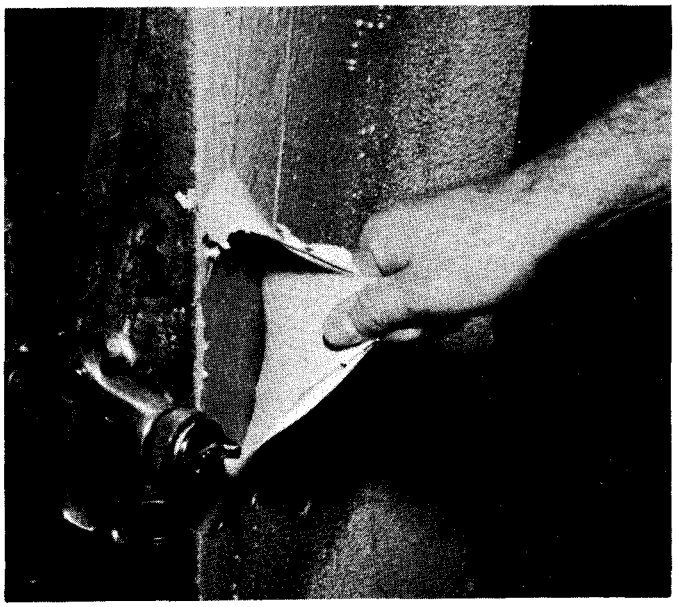
Baffle coatings—A baffle coating like Fremont 59L is recommended to form a protective barrier between booth baffle plates and overspray buildup. A thick coat is applied with a scraper for maximum coverage.

Fremont 60 Sprayable Coating is especially effective for hard-to-reach exhaust stacks and fan blades. It consists of petroleum solvent "film formers" that can be sprayed easily, and will instantly gel or thicken when the product hits a surface. Both products remain firm, but do not dry out and harden like grease.

Peelable booth coatings—Plastic-based peelable booth coatings like Fremont 58H have proven to be the most economical means to protect against booth wall, floor and ceiling overspray build-up.

Plastic peel coatings are applied to clean surfaces of the spray booth. Fremont 58H is a liquid that can be brushed, sprayed or rolled on. It dries to a tough, flexible coat in ten to twenty minutes, giving you excellent vertical cling, even with a build-up of overspray on its surface. Peelable booth coatings like Fremont 58H can cut your normal maintenance time between 60-70%.

The illustration below shows a paint booth protected with Fremont 58H. The coating has been scored to show how easily this product can be removed simply by cutting and peeling it off in large sheets.



Peelable booth coatings

Fremont 58H is designed primarily for use on non-porous surfaces, but it may be used on porous concrete floors if a layer of used oil is spread on the concrete with a squeegee prior to application of Fremont 58H.

Note: Heavy objects like equipment carts and dollies should not be rolled across the coating because it will deteriorate under massive pressure.

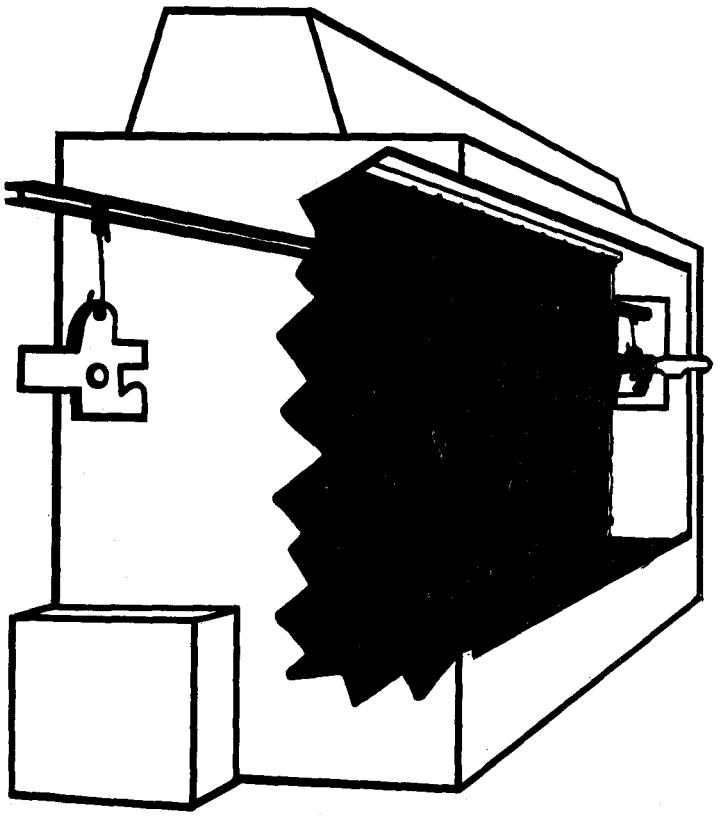
Water wash compounds—If a water wash spray booth were operated with water only, paint particles trapped by the water curtain would cling to the interior of the system and the walls of the water reservoir, clogging the circulation system.

To prevent this, water wash compounds have been developed to deactivate paint overspray and prevent damage to the booth.

Good water wash compounds like Fremont

54ST, 54DDST, 3065STM and 532ST condition the accumulated paint particles so they will not cause clogging—and so deactivated paint may be skimmed from the surface.

These compounds also have a self-titrating feature which allows the operator to deter-



mine the concentration levels visually by checking the color intensity of the water curtain.

Stripping booth floors

The ideal stripper should be able to strip any paint finish and be safe for use on conventional metal surfaces. Strippers are generally applied to large areas and allowed to react with paint overspray. After a relatively short period of time, the softened paint is scraped off or rinsed off with water.

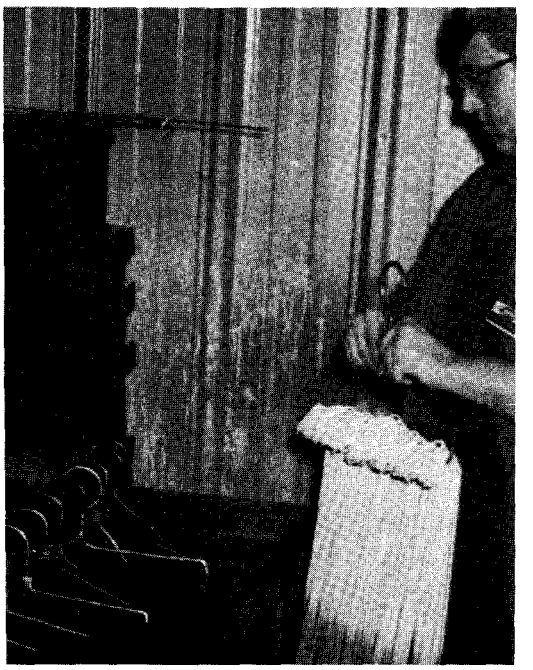
Fremont 56 was especially developed to meet industry stripping requirements. It can be brushed, sprayed or poured and spread on booth floors. This product works quickly, usually in 15 to 60 minutes. It can be used on metal surfaces and concrete floors.

Exhaust stacks

Exhaust stack overspray can easily be removed with a hand scraper if Fremont 59L or Fremont 60 have been applied to the stacks. In addition to their use on baffle plates and exhaust stacks, Fremont 59L and 60 can be used to coat the walls of spray booth reservoirs for easier sludge disposal. On exhaust stacks, and other surfaces, maintenance time can be cut 60-70%.

Stripping paint hooks

During production line spray painting, the parts to be sprayed are suspended from hooks and transported through the spray booth. Overspray that misses the parts will coat the



hooks. The paint must be stripped from the hooks for smooth production line operation.

In order to reduce stripping time and keep the production line moving on schedule, use a paint stripper additive like Fremont 319PF.

319PF loosens paint from the hooks in approximately 8 to 10 minutes. The paint overspray can then be flushed from the hooks and blown dry. Fremont 319PF removes varnishes, enamels, vinyls, epoxies, acrylics and palmethane coatings. A stripping additive like Fremont 319PF is suggested if stripping time is a major concern.

Filter screen holders

In dry booths, wire screens are used to hold fiber filters in place. The filters trap the paint and eventually become clogged and must be discarded. The screens, however, are used over and over again—and paint build-up must be stripped.

Fremont 3060 Hot Stripper will strip most organic finishes from steel filter holders and also remove light rust deposits. It removes most paint types in 15-20 minutes when 1½ lbs. are added to one gallon of water and brought to a rolling boil. Heavy paint build-up is rinsed away, and the filter screen holders are ready for use again.

Daily and weekly maintenance

Skimming—As stated earlier, the importance of skimming cannot be understated. Water wash reservoirs should be skimmed daily—or hourly, if possible, to assure continued operation without down time.

Water wash compounds neutralize the overspray, causing it to congeal and float to the surface. This sludge should be skimmed from the surface. Never permit paint sludge to stand overnight, or it will become waterlogged and sink, creating more maintenance problems.

Tanks—Clean the water reservoir once a week—or more, if the production schedule is heavy. Drain the water from the tank and remove the residue from the walls and bottom of the tank. Follow this cleaning with a booth purging compound like Fremont 3009M to help eliminate the formation of scale.

An inadequate amount of water in the reservoir of the booth can create problems. Foaming, caused by a high concentration of water wash compound and excessive turbulence, can easily occur. A systematic check of the water level should eliminate this problem. If the water level appears to be too low, the trouble can often be traced to the automatic control unit which keeps the reservoir at an operational level. Normally, a slight adjustment is all that is needed.

Purging—Weekly cleaning and purging of the water wash system is essential for proper operation even under the best maintenance schedule. In neglected booths, where excessive overspray is damaging the system, purging prior to initiating better maintenance procedures is a necessity.

Fremont 3009M water wash booth purging compound is designed for this purpose. 3009M should be used in a fresh charge of water when the booth is shut down. It is completely soluble and leaves no residue. Fremont 3009M dislodges paint overspray from booth components, removes light rust deposits, limits

scale formation and keeps water lines open and flowing.

Once the system is completely cleaned the reservoir is flushed, re-filled with water and the proper amount of water wash compound added.

Strainers, baffle plates and side walls—Each time the water wash booth is purged, baffles and side walls should be inspected for paint accumulation. If heavy build-up appears, these areas should be cleaned. If a proper purging schedule is followed, strainers and baffles should be cleaned automatically with a product like Fremont 3009M. Side walls in dry booths should also be checked for excess overspray build-up to minimize fire hazards.

Nozzles—Nozzles should remain unclogged if the booth is purged weekly. If a nozzle does become clogged, overspray will be vented into the baffles, fan and stack. If a nozzle is clogged, remove it and clean it manually to avoid further complications. If nozzles continually clog, the entire system should be checked to determine the source of this problem.

Main header—Always remove the end cap and check for sludge build-up. A weekly purging should keep the header free of sludge. If the concentration of Fremont water wash compounds is carefully monitored, sludge will not form. Maintaining proper concentrations and periodic purging should keep your booth running smoothly.

Chemical concentration—The solution in the reservoir tank should be maintained at the proper concentration. As mentioned previously, self-titrating water wash compounds like Fremont 3065STM, 54ST and 54DDST allow the operator to determine concentration levels visually.

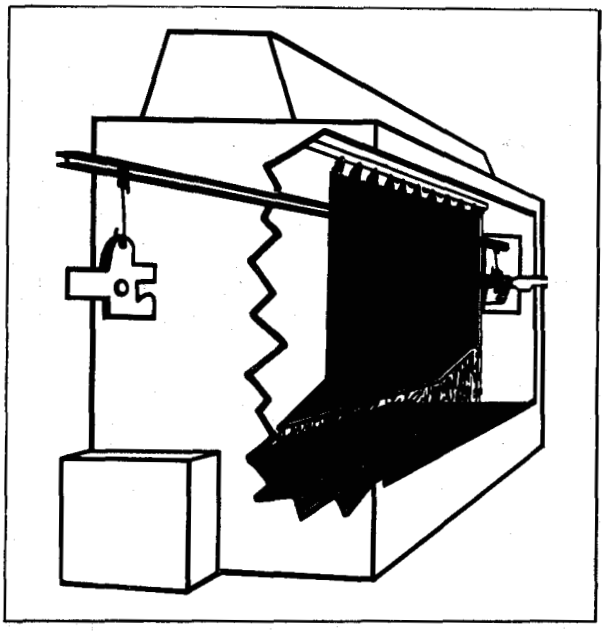
A reservoir tank that is not kept at the proper concentration allows sludge to circulate throughout the system. Check concentrations daily.

Safety Precautions

Always follow safety instructions on material bulletins and observe special precautions when they are noted. Most paint booth maintenance products require no unique safety procedures. Containers should be sealed when not in use, and appropriate protective equipment should be employed if there is a chance the product will come in contact with the skin. In case of an accident, consult a physician immediately.

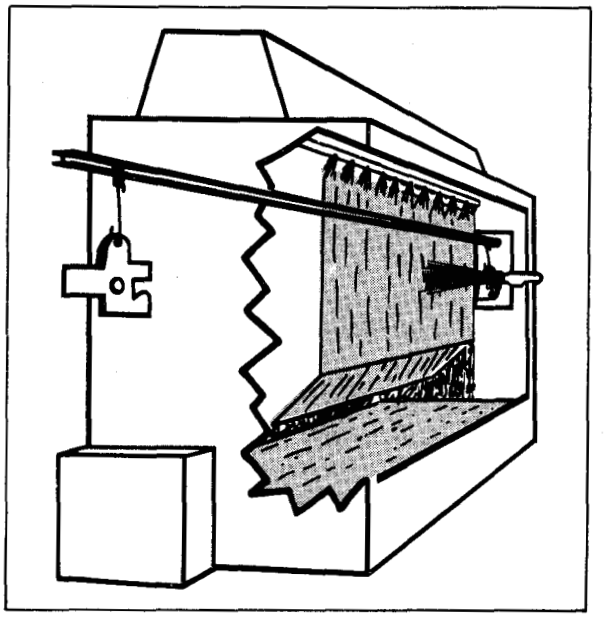
Adequate ventilation should be provided when working with paint strippers, and all protective garments should be used.

How the Fremont Self-Titrating Color Indicator Works



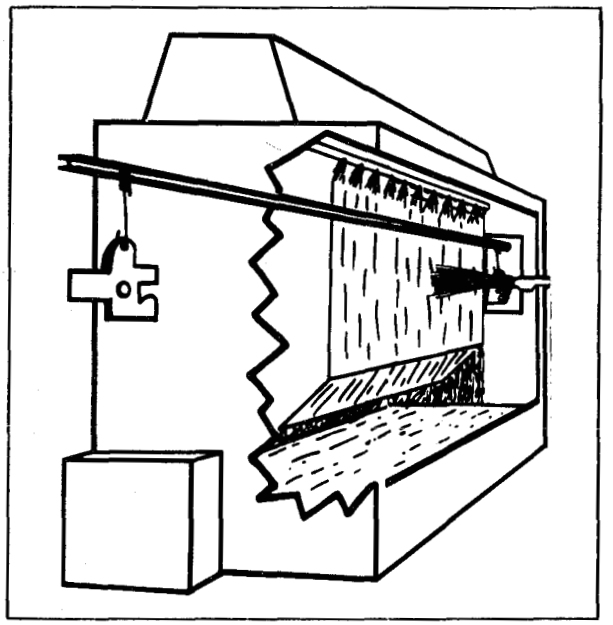
Correct Level of Concentration

A glance at the waterfall curtain shows the exact state of concentration. When the waterfall is magenta (a purplish shade of red), the proper concentration has been reached.



Add Fremont Self-Titrating Water Wash Compound Immediately

As the waterfall fades in color, more compound should be added.



Do Not Let Waterfall Lose its Red Color

No color at all indicates the absence of Fremont Self-Titrating Water Wash Compound. The immediate addition of this compound is necessary to keep paint particles trapped by the water curtain from clinging to the parts of the paint spray booth system.

Fremont Self-Titrating Water Wash Compounds

[redacted]

FREMONT INDUSTRIES, INC.
VALLEY INDUSTRIAL PARK
SHAKOPEE, MN 55379

Fremont Paint Booth Maintenance Products

Water Wash Compounds

Product	Color	Form	Primary Chemical Type	Concentration	Paint Sinking	Deactivates these Paint Types: Oil-Based	Water-Based	Combined Water and Solvent-Based	Polyester	Alkyds	Acrylics	Phenolics	Epoxies	Vinyls	Elastomers	Urethanes	Special Features
54ST Water Wash Compound	Purple	Powder	Alkaline Caustic Soda	1/8-1/2 oz. per gal. 1/2-2 oz. per gal. (sinking)	Sink or float; High Conc. to sink	●			●	●	●			●	●		Self-titrating; handles large volume of overspray.
54DDST Water Wash Compound	Purple	Powder	Alkaline Caustic Soda	1/8-1/2 oz. per gal. 1/2-2 oz. per gal. (sinking)	Sink or float; High Conc. to sink	●			●	●	●	●		●			Self-titrating. Extra defoaming ability for high-foam paints.
531 Water Wash Compound	Off-white	Powder	Alkaline Calcium Hydroxide Minerals	1/8-1/2 oz. per gal.	Floats only	●		●	●	●	●		●	●	●	●	Handles most industrial paints. Effective on high solid paints. Floats water base when used with 3014. Controls sludge.
3014 Water Wash Additive	Hazy	Liquid	Moderately Acidic	1 gal. per 1000 gal. water	Floats only		●	●									Additive for 531X. Designed to float water-borne and solvent-base paints.
3015 Water Wash Compound	Amber	Liquid	Alkaline Caustic Soda	4 oz. per gal.	Sink or float; High Conc. to sink	●			●	●	●						For use in air-water flow paint booths. Approved by Binks.
3065STM Water Wash Compound	Purple	Powder	Moderately Alkaline	1/8-1/2 oz. per gal.	Floats only				●	●	●		●	●			Self-titrating. No phosphates. Non-caustic water conditioners. Floats epoxies.
204 Defoamer	Amber	Liquid	Petroleum Distillates	1 pt. - 1 gal. per day per 1000 gal. water	NA	●	●	●	●	●	●	●	●	●	●	●	Can be used in conjunction with most paints to control foam. Low odor. Does not plug lines.
532ST (Patented) Water Wash Compound	Purple	Powder	Alkaline Calcium Hydroxide Minerals	1/8 - 1/2 oz. per gal. 1/2 - 2 oz. per gal. (sinking)	Sink or float; High Conc. to sink	●		●	●	●	●		●	●	●	●	Specially designed for use with water recirculating equipment. Suitable for automatic skimmer systems.

Water Wash Compounds deactivate most coatings within 1 to 15 minutes.

Booth Coatings

Product	Color	Form	Primary Chemical Type	Flammability	Concentration	Time	pH	Applied	Removed	Surfaces: For	Surfaces: Not For	Special Features
58H Peelable Booth Coat	White	Liquid	Solvent Base Vinyl Resin Solution	Flammable	Straight	Dries 10-15 min.	Neutral	Roll or spray (25-40 psi) 1 gal./mil 250 sq. ft. Use 2-3 mils	Score and peel	Steel, glass, stainless steel. Hard, non-porous surfaces	Plastic, rubber, fiberglass, porous surfaces	Resists water and solvent coatings. Flexible, non-porous.
59L Baffle Coating	Brown	Paste	Petroleum Wax	Open Flame Combustible	Straight	Immediate use	Neutral	Scraper or trowel coverage varies	Scraper (solvent)	Steel, Hard, non-porous surfaces	Porous surfaces	Water, solvent, alkali and acid resistant. Corrosion resistant.
60 Baffle Coating	Brown	Semi-viscous liquid	Petroleum Wax, Solvent	Open Flame Combustible	Straight	Immediate use	Neutral	Spray (40-100 psi; 35-45 psi preferred) 1 gal. - 150 sq. ft.	Scraper (solvent)	Steel, Hard, non-porous surfaces	Porous surfaces	Water, solvent, alkali and acid resistant. Low odor, sprayable. Corrosion protection.

Additional Products

56 Paint Stripper	Amber	Liquid	MC	Non-Flammable	Straight	Strips 15-60 min.	Slightly alkaline	Pour, spread evenly	Scrape off softened paint. Re-apply if necessary.	Steel, glass, concrete, brick	Plastic, rubber, fiberglass	Slow evaporation rate. Removes paint from floors, removes adhesive plastic tape.
3009M Booth Purging Compound	Off-white	Powder	Alkaline Caustic Soda	Non-Flammable	2 - 8 oz. per gal.	2-24 hrs.	Highly alkaline	Add manually to booth tank	NA	Steel, stainless steel	Aluminum, zinc, galvanized steel	Removes light rust, limits scale. Keeps water lines open. In-place cleaning.

Water Wash Compounds Basic Make-Up and Functions

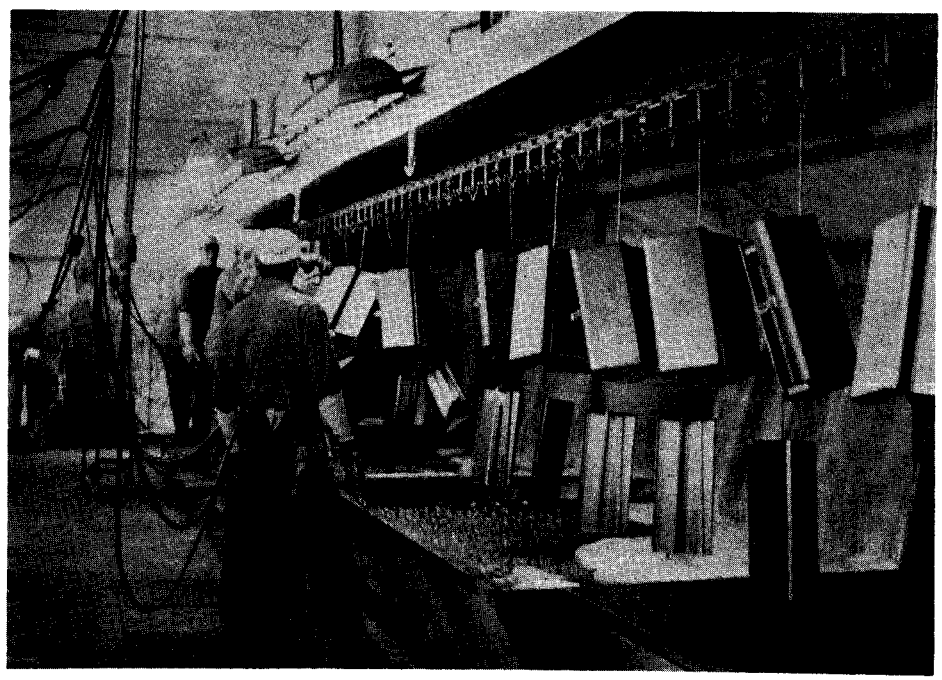
Alkaline Base
Reacts with resins to deactivate paint. Alkalinity breaks up molecular structure of resins through saponification or other digestive processes. Alkaline pH helps prevent rusting.

Alkaline Reserve
Maintains alkaline pH at low concentration. Inhibits rusting.

Dispersing Agents
Disperse paint droplets. Accelerate paint deactivation. Keep paint in a soft form for easier removal.

Defoamers
Increase surface tension of water to suppress foam. Provide good contact between water wash compound and paint.

Anti-Scale Agents
Minimize scale build-up in lines, headers and pumps.



FREMONT INDUSTRIES, INC.

Spray booth Maintenance Chart

Booth No. _____ Month _____

EACH DAY	1st Week	2nd Week	3rd Week	4th Week	5th Week	6th Week
1. Test Solution						
2. Skim Tanks						
3. Check Nozzles						
4. Check Flood Sheet						
5. Check Float Box						
6. Check and Clean Lights						
EACH WEEK						
1. Drain and Recharge Tanks*						
2. Clean Dry Sections						
3. Apply *Fremont* Strip Coat						
4. Check Motors and Pumps						
EACH MONTH						
1. Purge Water System**						

*Use FREMONT Water Wash # _____ as follows: _____

_____

**Use FREMONT Purgant # _____ as follows: _____

_____

For service, call: _____ Telephone: _____

Note: Your maintenance schedule may vary, depending upon type(s) of paint used and amount of overspray.

FREMONT INDUSTRIES, INC.

VALLEY INDUSTRIAL PARK
SHAKOPEE, MN 55379 • (612) 445-4121

Function of Paint Booth Maintenance Products:

- Prevent paint overspray from building up and being exhausted outside
- Keep paint booth clean and running efficiently
- Minimize fire hazard

What Water Wash Compounds Do:

- Entrap and deactivate paint overspray
- Keep deactivated paint from hardening
- Float or sink deactivated paint for easy removal
- Suppress foam level
- Prevent booth equipment from fouling and scaling
- Keep booth clean and prevent rusting

What Booth Coatings Do:

- Minimize fire hazard
- Provide an economical and easy way to remove paint build-up
- Provide better illumination