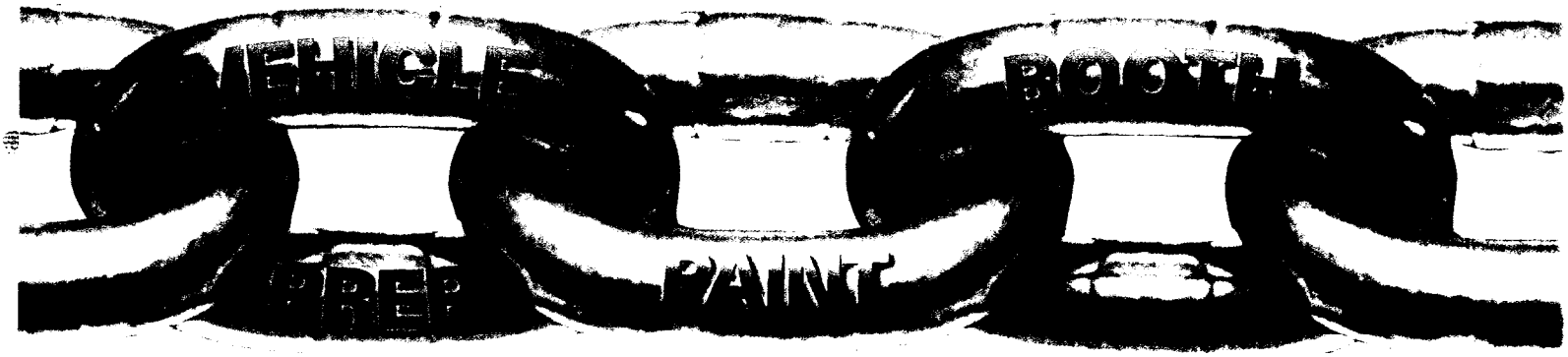
Get into the ZONE

Controlling the Refinish Process



NO WEAK LINKS!

DEVILBISS

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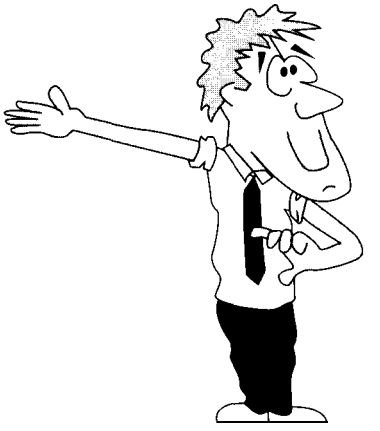
DEVILBISS

DeVilbiss Overview

Mission Statement

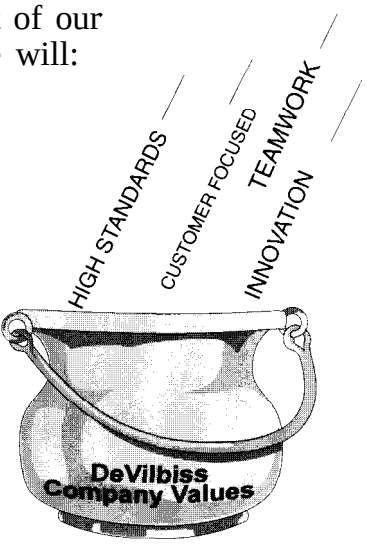
To provide finishing and refinishing spray booth systems that allow owner/operators the capability of achieving high quality OEM (original equipment manufactured) type finishes.



Company Values

The values are the guiding principles in support of our mission statement. In order to accomplish this, we will:

- Set high standards
- Be customer focused
- Take responsibility and authority
- Be innovative, flexible and responsive
- Work together
- Emphasize innovation and vision
- Strive for continuous improvement



Company History

Doctor DeVilbiss invented the atomizer during the Civil War for medical purposes. His son, Tom DeVilbiss adapted the atomizer for the application of perfumes. In 1907, Tom DeVilbiss experimented with a spray gun for spraying paint. The first application was in the furniture industry and reached an early plateau with its application of lacquer coating on the 1923 Oakland automobile. The reduced drying time and ease of application revolutionized finishing.

After the first spraygun, DeVilbiss developed the natural product additions to fill the needs of the expanding finishing industry: exhaust canopies (now known as spray booths), rubber hose for air and paint, air compressors, air control components, etc. The rest is history. ITW DeVilbiss is a world leader in finishing and refinishing products.

FIRST IN
FINISHING
SINCE
1907

Refinishing Experts

DeVilbiss, the originator of spray finishing, has over 90 years in the development and research of high quality finishing. This includes the high production OEM's, high production refinishers (auto auctions), the lower production small operators, paint manufacturer's R & D Centers and Training Centers. DeVilbiss has taken this knowledge, along with the positions on NFPA-33 committee (spray Application Using Flammable and Combustible Materials) and IES (Institute of Environmental Sciences), WG-29 Group (Committee Developing National Recommended Practices for Contamination Control in Spray Finishing Applications) plus associations with I-CAR, Automobile Manufacturers, ETL Testing Laboratories and Paint Companies, to develop an organization on the forefront of finishing and refinishing technology.

90 YEARS EXPERIENCE

Value Added Services

- Professional Sales and Quotation
- Professional Bodyshop Layouts
- Certified Start-up
- Certified Training
- Certified Service
- ETL (Third Party) Certified Products
- Environmental Knowledge
- Contamination Analysis Service
  - Certified Installations
  - Equipment
  - Lab
- Code Expertise
- OSHA Regulations

WE hope you will find this helpful in improving your refinishing operations. Contamination and Its management are the keys to providing consistent profitable efficiency. We want OUT current and future customers to know that DeVilbiss wants each and everyone to succeed in today's competitive climate. In order to do this we will not only provide the latest, state of the art equipment, but information and service that will help control and maintain the entire refinishing process. the end result should de improvement to the bottom line.

We see this avenue as a key to todays and tomorrows competitive advantage for our customers Why you ask?

a) With advancing paint formulation technology, waterborne and high solids, the sophistication of the equipment and process intensifies. The ability to "Control the Process", becomes even more critical. Those that have, understand and use the knowledge will be in the best position to satisfy customers.

b) Customer expectations are increasing at an extremely rapid rate.e quality revolution demand s refinishes improve or not survive. "Controlling the Process", will ensure the ability to meet those expectations.

c) In order for your shop to be productive and profitable in today's market, elevation to the operation and its standards must be made. The OEM's faced this fact in the 80's and 90's. Targeting better process design and control as the key to success. We need to advance our industry in the same fashion providing;

Increased production "Jobs Out the Door"'

Increased Quality

Increased Profitability

CONTAMINA
FA

FACT: A DOWNDRAFT SPRAY BOOTH ALONE WILL NOT PRODUCE QUALITY PAINT JOBS

FACT: A DOWNDRAFT SPRAY BOOTH IS JUST ONE PART OF THE TOTAL SYSTEM.

FACT: YOU MUST CONTROL THE ENTIRE PROCESS TO GET CONTAMINATION FREE REFINISHES EQUAL TO OEM LEVELS.

CTS:

FACT: **THE MAJORITY OF CONTAMINATION COMES ROM POOR PREPARATION OF THE VEHICLE AND FROM THE PAINTER.**

FACT: **PARTICULATE 10 MICRONS (SMALLER THAN THE TIP OF A PIN) OR LARGER CAN CAUSE A DEFECT IN TODAYS FINISHES.**

The Refinish Chain

Never before in the history of automotive refinishing has change in technology taken place at such a rapid rate. What was unthinkable a decade ago in paint technology, its application and the average productivity of a shop, is today quite commonplace.

Across North America we encounter paint shops utilizing the latest base/coat, clear/coat formulations, applying the coatings with state of the art equipment. Each are attempting to finish even more vehicles per day with new advanced paint formulations and doing all this in a spray booth environment which is not at all compatible with the new processes.

Paint shops are now relying on productivity and quality refinish to remain profitable and competitive in this new environment of technological advancements. So the critical question that we continue to hear is "how do I get more jobs out of my operation?" The answer we found is to 'Design the Process' and 'Control the Process'. The process is defined at the moment the vehicle enters the refinish department- from cleaning and preparation to the end coating and detailing with all the steps that are needed in between.

- DESIGN THE PROCESS
- CONTROL THE PROCESS

Design the Process

In order to control the process, the process must be capable of being controlled. That is why great emphasis is placed on "Designing the Process"- to make sure the equipment in the refinish system addresses all the factors that need to be controlled in the process. Some of the factors that need to be examined and designed in the refinish process are:

#1 LIGHTING

#2 FILTRATION

#3 AIR FLOW

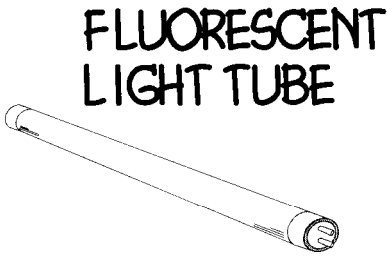
#4 TEMPERATURE

#5 SOUND

#6 CODES

1 Lighting

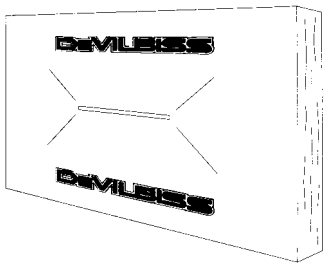
All factors in providing the painter an atmosphere enabling them to match and blend colors.



- Color Corrected Bulbs
- Light Quality and Eveness
- Color Rendering Index
- Light Fixture Orientation

2 Filtration

This combination assures the maximum life and efficiency of the entire system, assuring a painter of continuous quality.



- Number of Filter Stages
- Filter Efficiency @ 10 Microns
- Type of Filter Media Used
- Systems Approach
- Timely Filter Replacement

3 Air Flow

Proper balanced air during the life of the filtration will assure the painter of effective removal of overspray and consistent curing of the finish.

- Balanced Air Envelope Around Vehicle
- Appropriate CFM and Air Velocity
- Laminar Air Flow
- Single Pit Design

4 Temperature

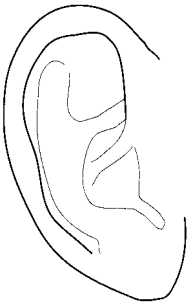
Engineered design provides maximum efficiency (cost) while producing tight temperature control.

- Temperature Rise
- Turndown Ratio - 30: 1
- Appropriate Burner BTU (BTU Output Does Not Necessarily Mean Better)
- Energy Cost

5 Sound

Normal conversation can take place at any point in a location that is engineered to provide such a result.

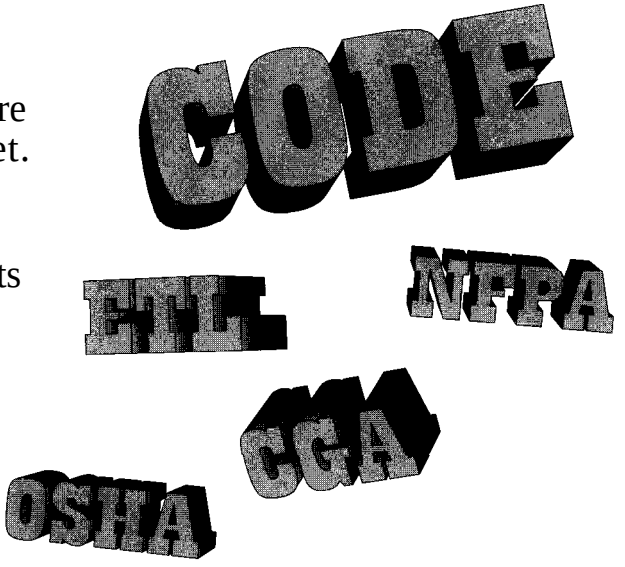
- Noise Level
- Equipment Placement for Noise Attenuation



6 Codes

Proper code compliance requires the involvement in education of the manufacturer, installer and user to assure that the code requirements are met. Issues to be considered are:

- Meets NFPA and UFC Requirements
- ETL Listed and CGA Approved
- Explosion Relief
- Fire Suppresion System
- Means of Egress
- Operator Training



Control the Process

After Designing the Process, you must continue the Refinish Chain by Controlling the Process.

In the following sections we will target the five major sources of contamination.

#1 VEHICLE PREPARATION

#2 PAINTER PREPARATION

#3 COMPRESSED AIR SYSTEM

#4 BOOTH

#5 PAINT

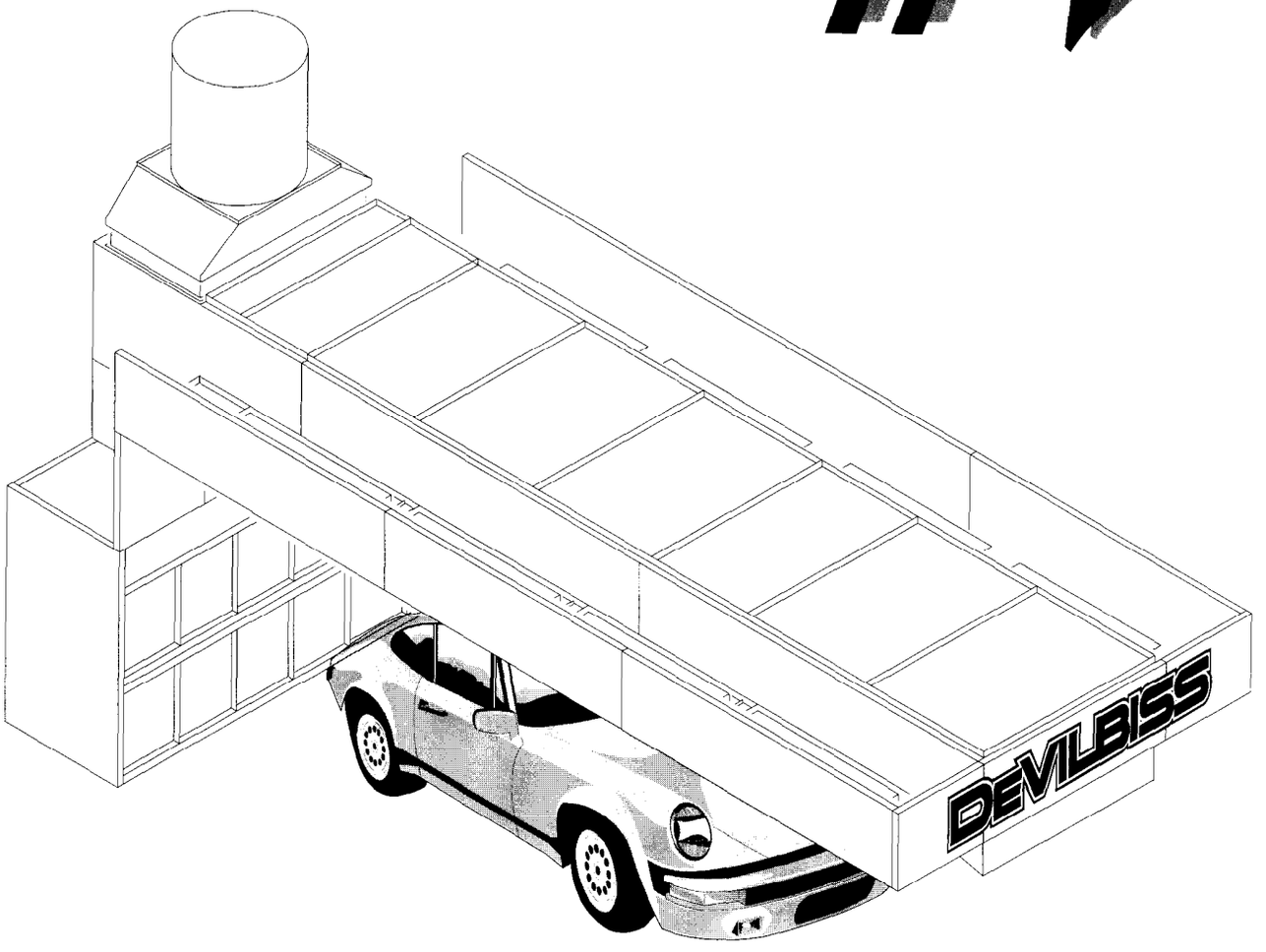
Items #l and #2 listed tend to account for 80% of all contamination issues.

By following the guidelines in each section, we will find improvements in;

- Quality
- Productivity
- Profitability

DeVilbiss has experienced professionals that can assist any refinish operation and help assess the needs in “Designing a Process” or “Controlling a Process”. If you would like for us to work together, please call the number found at the end of this document.

#1

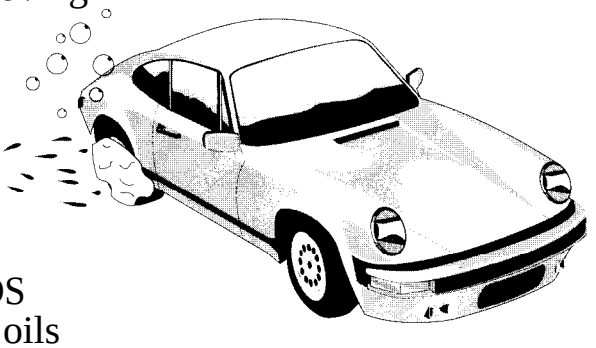


VEHICLE PREPARATION

Vehicle preparation is the #1 area found to cause contamination in refinish jobs. A properly prepared vehicle will save many hours of rework.

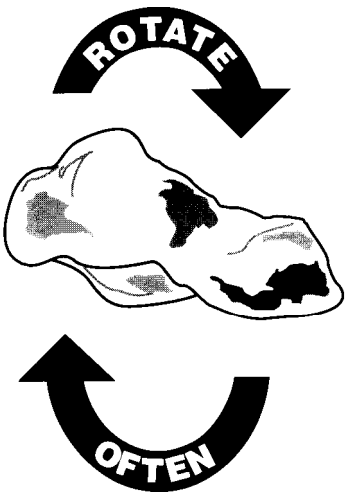
1 Pressure Wash the Vehicle.

- If tree sap, insects or bird droppings contaminate the surface, begin by removing them with soap and warm water.
- Use at least 1000- 1500 PSI pressure. Wash the under side of vehicle and wheel openings to remove general road residue.



2 Chemical Wash the Vehicle.

- Use resistant gloves (refer to product MSDS for specific type) to eliminate transferring oils from hands onto the vehicle.
- Use of cloth shop towels to wipe down a vehicle is not recommended, fibres will separate and remain on the vehicle.
- Use high quality lint-free wipes designed for this process.
- Use one wipe for applying material and a separate wipe for drying.
- NOTE: Be aware that strong solvents will break down wipes leaving fibers in the finish.
- Wipe on wax and grease remover. (Make sure you do not contaminate the solvent container while applying fresh solvent to a contaminated rag.) This will lift all waxes and tars to the surface and into the solution, where they can be removed with a clean dry rag. Be sure not to wet too large an area, or the contaminants will harden back into the surface before they can be wiped off.
- Turn the rag frequently remembering that it is becoming contaminated and will have to be discarded.

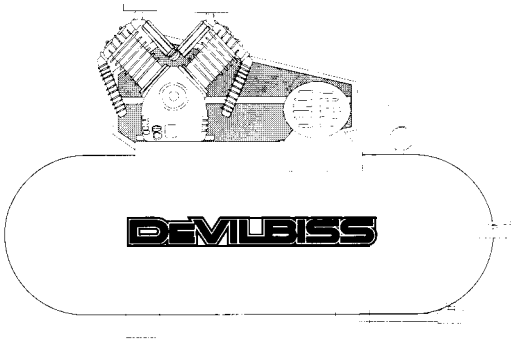


3 Sanding.

- Use resistant gloves. Make sure uncovered hands do not touch vehicle.
- Follow the sanding material and paint manufacturer's recommendations on process and technique.

4 Blow off the Vehicle.

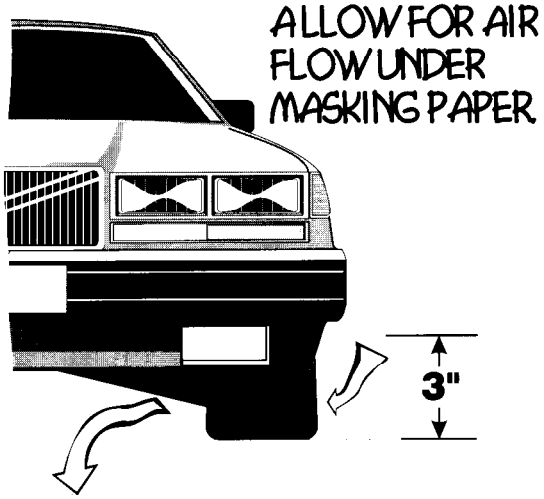
- After sanding, blow off the car. First open all doors, hood and trunk, and blow out the door jambs, engine compartment, underside of hood, trunk and underside of the trunk lid. Also get up under the wheel openings and use a higher air pressure.



- Close everything, then use a dry rag and a lower pressure. Start on the roof and work down, blowing and wiping the entire vehicle using no more than 20 PSI. This should remove the majority of sanding residue.

5 Masking the Vehicle.

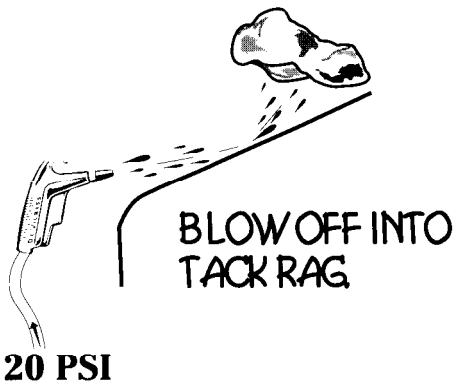
- Use high quality masking paper and tape. Lower quality papers will release fibers during painting and curing.



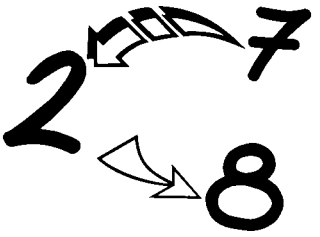
- Use high quality masking paper around any area to be sprayed. Low quality paper will introduce fibers into the environment.
- Eliminate all wrinkles when masking. These are collection points for dirt and overspray.
- Do not skirt vehicle with paper more than 3 inches. Paper dragging the floor causes poor air flow.
- Never block wheel wells 100% - open areas help booth air flow.

6 Blow off the Vehicle.

Blow off vehicle again, (using no more than 20 PSI) paying close attention to all areas that may harbour dirt- panel separation, behind emblems, mouldings, wheel openings and particularly the facia area. This removes the residues from the masking process. DO NOT BLOW OFF IN SPRAY BOOTH.

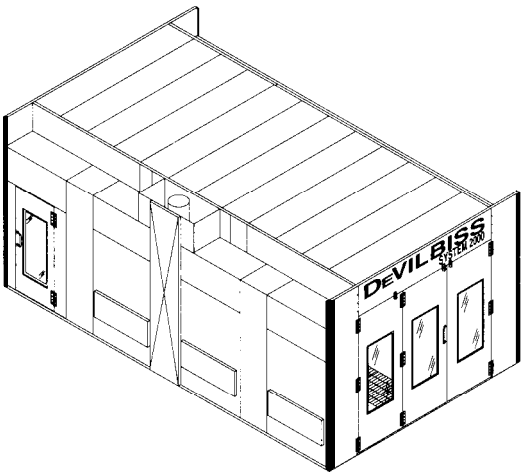


7 Chemical Wash in Booth Before Final Tack.



- DO NOT BLOW OFF IN SPRAY BOOTH. Air blasts can blow dirt to another area and/or into the booth environment.
- Repeat the chemical wash procedure in number 2. This removes any contaminants deposited on the vehicle from the previous parts of the process.

8 Final Tack Inside the Booth.



- DO NOT BLOW OFF IN SPRAY BOOTH. Air blasts can blow dirt to another area and/or into the booth environment.
- We recommend tacking two times, including the masking paper and tape.
- Clean joints by pressing the tack cloth into door jambs, seams and facias where dirt or lint can accumulate from the wipes.
- Grounding the vehicle and disconnecting the battery will reduce electric and static charges. These charges will pull dust and dirt onto the prepared vehicles surface.
- Use disposable paper or plastic wheel covers that can be thrown away after every use. Reused covers contain residue that can be dislodged during spraying and contaminate the finish.

#2

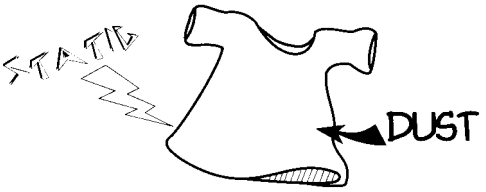
OPERATOR PREPARATION

This is the #2 area found to cause contamination in refinish jobs. A properly prepared operator can save many hours of buffing.

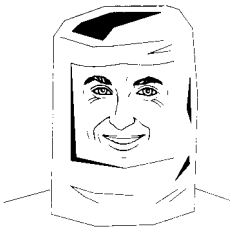
1 Operator Clothing.

- When in the spray booth wear a lint-free paint suit. This work clothing should be worn exclusively inside the spray booth and should be kept in a dust-free place.

- T-shirts are possibly one of the greatest sources of contamination. The cotton material is full of fibers and creates a static charge that will hold dust.



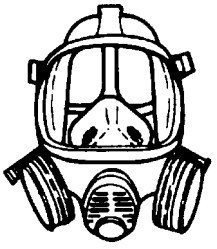
- Lint-free head covers should be worn by authorized personnel in the booth. An uncovered head can cause defects if hair, sweat or dandruff drops onto the finish.



- Wear resistant gloves, (refer to MSDS sheet). Gloves will protect both the hands and the finish.

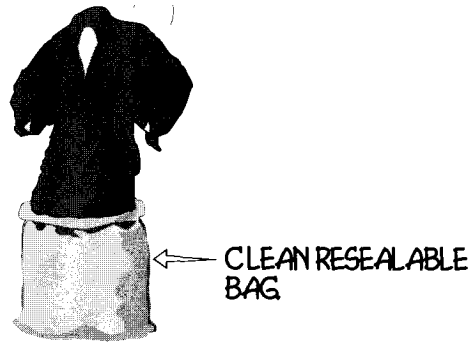
- Respirators or a fresh-air system must be used by authorized personnel in the booth when painting. Safety is the foremost in any operation.

- OSHA Regulations for respirator programs (29CFR19l0-134) must be followed, including fitting an employee with a respirator and medically determining the fitness to wear it.



Operator Procedures.

- Store paint suits and respirators in separate airtight plastic bags. To assure cleanliness they should be worn only in the paint mix room, vestibule and spray booth.

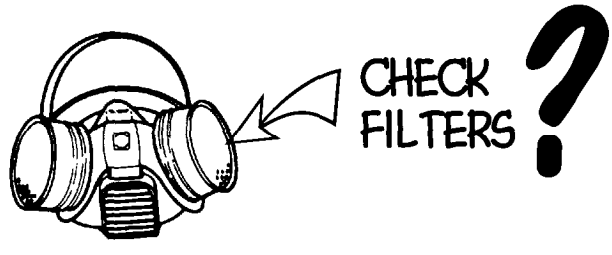


- Wash hands thoroughly in soap and water before putting on gloves. This helps keep the skin oils and dirt off the gloves, which protects contamination of the vehicle.

- In order to reduce the risk of contaminants in your booth, limit the booth to authorized personnel that are trained in proper procedures. DO NOT ALLOW VISITORS IN THE BOOTH.

AUTHORIZED PERSONNEL ONLY.

- DeVilbiss recommends using air supplied respirators. Non-supplied air respirators do not provide safe purification in all conditions. Check with health and safety experts for further details.

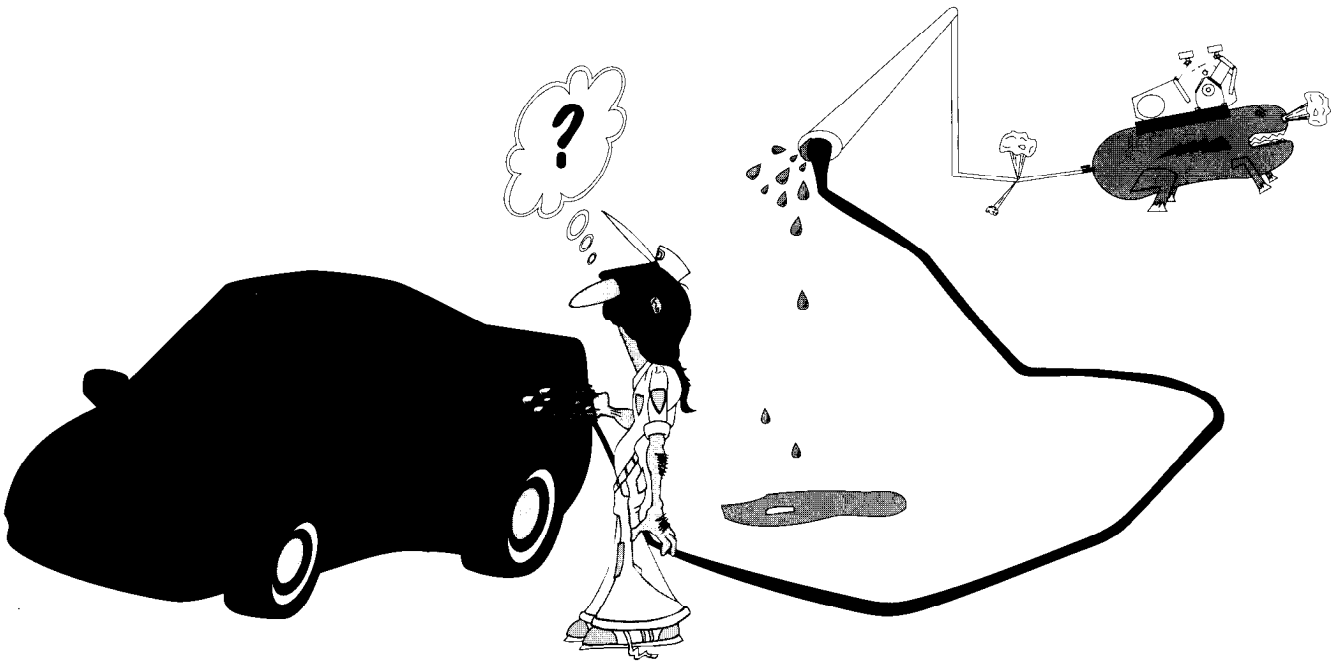


- If you have a large shop, limit the painter's duties to only painting. A painter increases the risk of contaminating the refinish job, when general shop contamination collects on clothing, hair, hands, shoes, etc.

THE BEST PAINTER IS NOT ALWAYS THE FASTEST,

CLEANLINESS IS A VIRTUE!

#3



COMPRESSED AIR SYSTEM

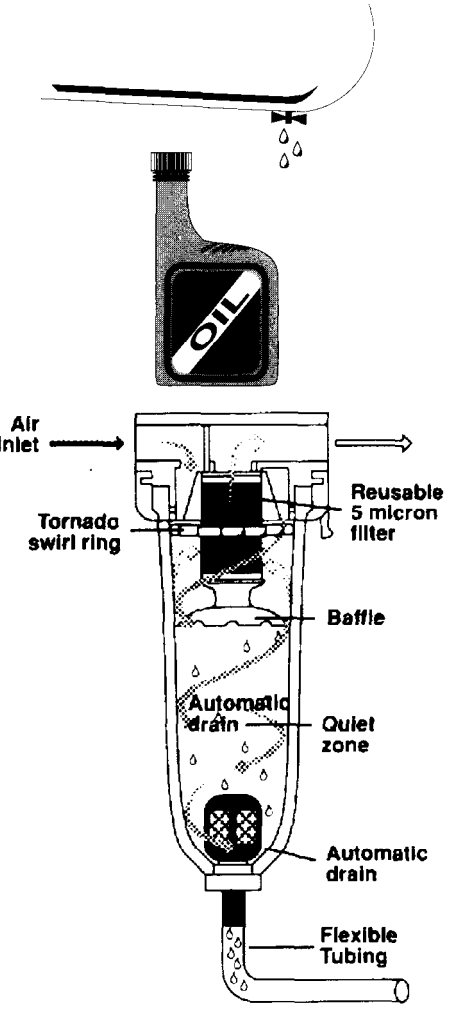
Air contains contaminants that are drawn into the compressor. These contaminants become compressed, intensified and eventually find their way into the compressed air system. Installed components within the compressed air system such as the compressor tank and piping can introduce contaminants into the system.

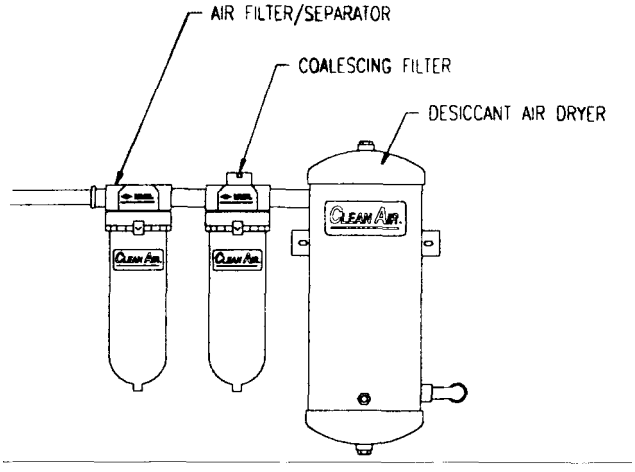
Remember, a pressure drop in the system can result in lower air pressure at the gun which may produce “orange peel” in the finish.

The key to a successful compressed air system is to filter often and reduce pressure drop across the system.

System Maintenance.

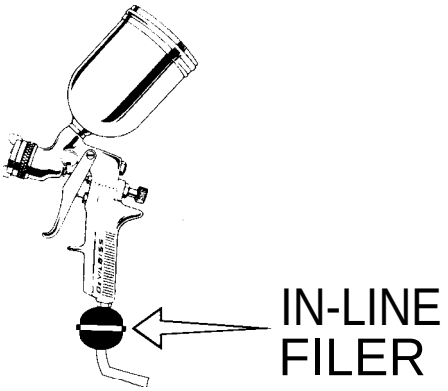
- **Drain air compressor tank** daily or use an automatic drain. Under average conditions, every 100 CFM of compressed air to 100 PSIG, produces 20 gallons of condensate a day.
- Change compressor oil and filters at factory recommended intervals. This will vary based on usage, hours and local conditions. Maintaining the compressor will result in less oil carryover in the system.
- Pre-filters located before the refrigerant dryer can increase life and effectiveness of the dryer.
- Use a refrigerant dryer in addition to a desiccant drier. The refrigerant dryer should be in proximity to the compressor and the desiccant should be at the point of use (booth, prep-station, etc.).
- Mount filters and desiccant dryers, outside of the spray booth. This will keep contaminants out of the booth during maintenance





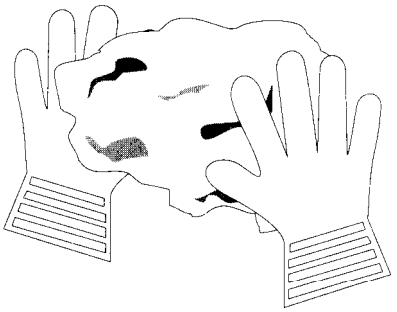
- Inline air filters should be utilized in the compressed air system and changed at factory recommended intervals. Inline filters will capture any particulate as the final defense in the system.

- Inspect all gravity feed cup filters for contamination. Replace after each metallic job and every other solid job.



2 Operator Procedures.

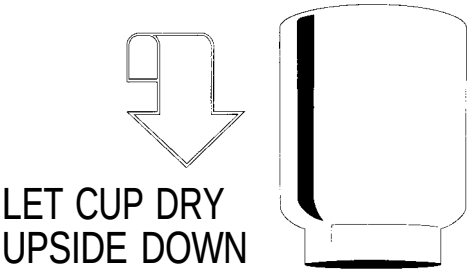
- Ensure that all equipment (hands, hose and spray gun) is wiped with a tack cloth before starting to paint. This will remove any dirt collected on the surface.



- Avoid whipping the hose around on the booth floor. This will stir up dirt. Avoid contacting the hose which has been in contact with the floor.

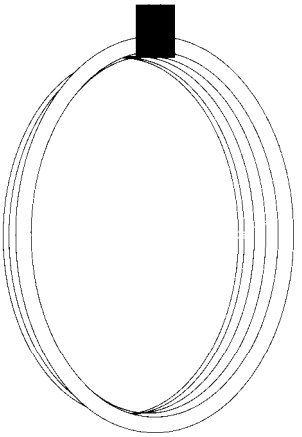
- Always clean guns immediately after spraying is complete. (Use of gun cleaners are required in many states.) Follow manufacturers recommendations for changing solvent.

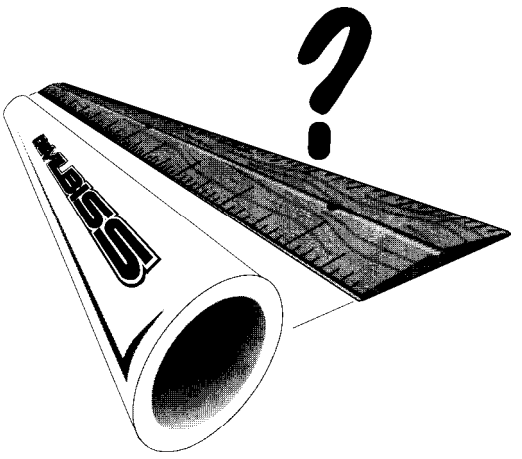
- Instead of wiping the paint cup, try placing the cup upside down to dry. This will eliminate the lint introduced from a cloth.

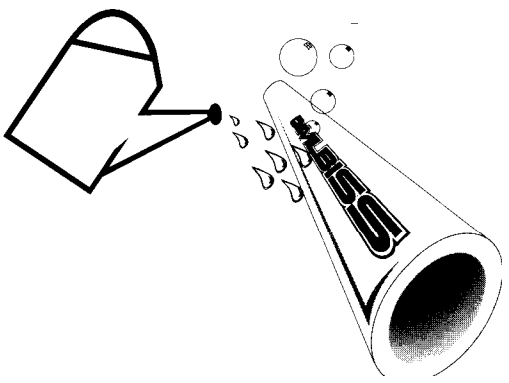


3 Hose Maintenance.

- Designate the spray booth hose for use inside the spray booth only.
- Ensure that both the size of the fluid and air hose are the correct diameter. Remember that elements added to any hose, (elbows, connectors, etc.) will cause a pressure drop.
- Use a heat resistant hose that will not break down in the booth during cure.
- Store spray booth air hose off the booth floor when not in use. This will prevent the hose from being run over and breaking down inside the hose wall, releasing particles. (Another good reason for in-line filters on the gun.)
- Utilize a hose length that reaches all areas of the vehicle. We have found the rear of the spray booth to be the best. For drive thru booths, use a central location on the side(s). This will reduce whipping and contamination.
- The outside of both air and fluid hose should be wiped down with cleaner or soap and water, at the end of each paint job.

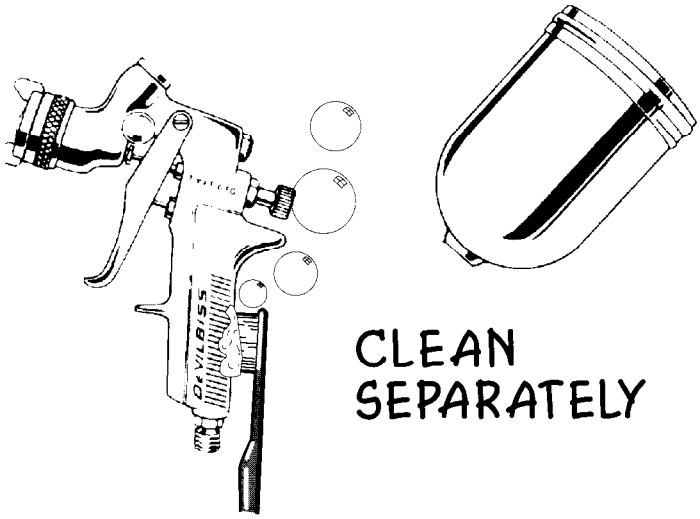






4 Spray Gun Maintenance.

- Clean the spray gun immediately after use. If it dries, the gun will be extremely hard to clean.
- Clean gun and cup separately.
- To clean the gun, use a gun cleaning machine or follow the care and maintenance instructions supplied. This will help eliminate paint spits in the finish.
- Rinse fluid passage with virgin cleaning solution after each gun washing. This will remove any remaining residue.
- Never soak the entire gun in cleaning solution. This will damage the gun's seals.
- Soak air cap in cleaning solution and use a soft bristled brush to remove remaining residue.
- Always use a separate spray gun for primer, color and clear coats. This will prevent cross contamination from each step of the process.
- Lubricate moving parts with a spray gun lube. Other materials could contain contaminants which could cause "fish-eye".
- Check the specification requirements of the spray gun to ensure adequate air. New HVLP spray equipment generally requires more volume of air than conventional spray equipment.



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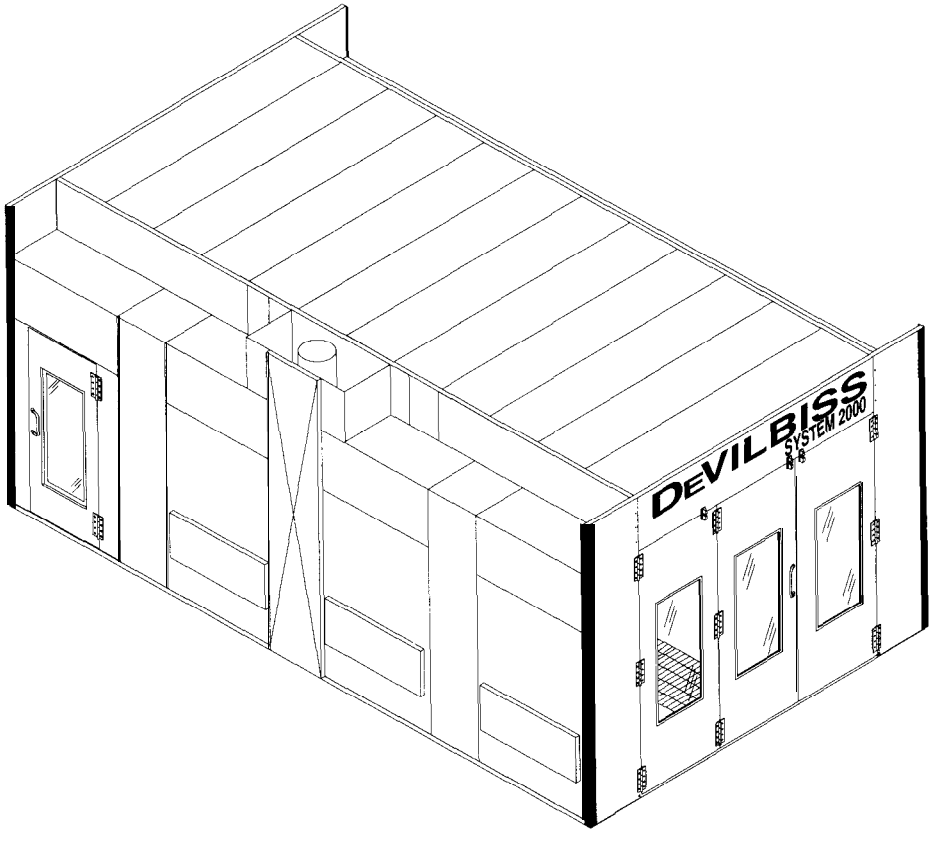
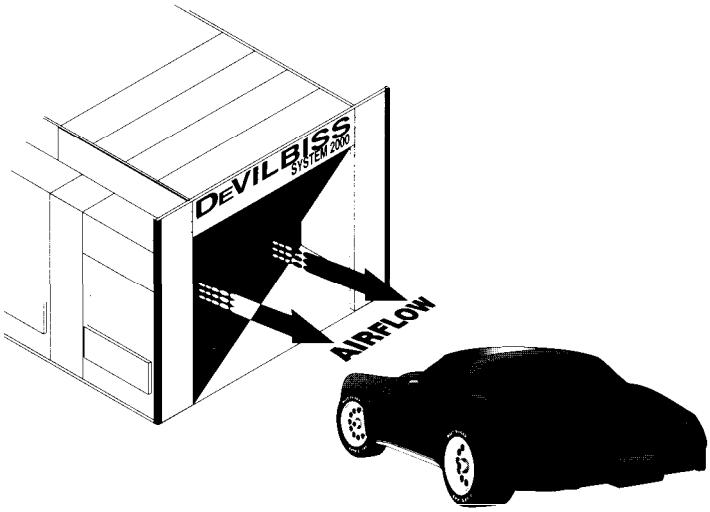


PAINT BOOTH

Shop owners often blame booth filters for finish contamination. Most filters have synthetic textile fibers, but high quality filter fibers are firmly bound together with synthetic resin. The downstream side is covered and the surface is bonded with a woven material constructed out of continuous filaments. The chances of a filter fiber migrating through the system and landing on the finish is remote.

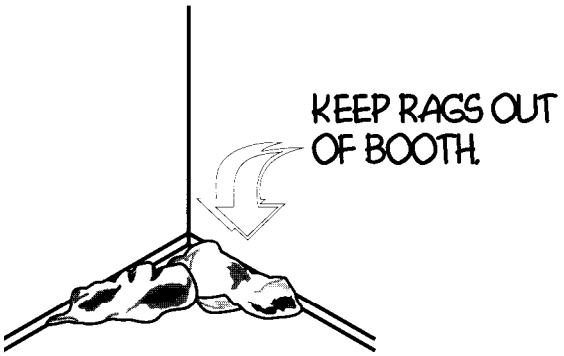
1 Operating Procedures.

- Keep the booth free from any items such as: cans, shelves, tools, paper, etc. They collect dirt that can be released during painting.



- When moving a car in or out of the downdraft booth keep the booth running. The slight over pressurization will keep contaminants from coming into the booth.

- Sanding or blowing off should never be done inside the spray booth.

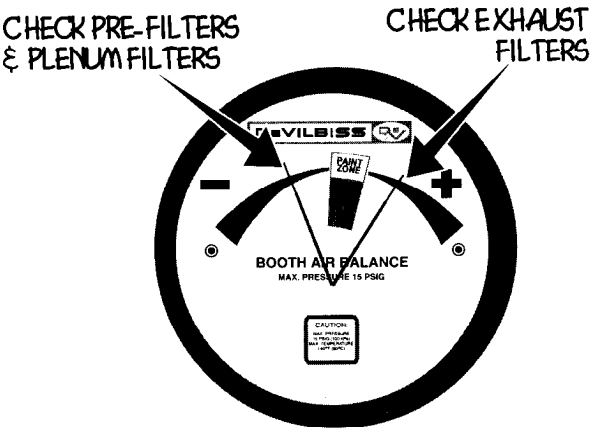


- Remove all cloths and rags from the spray booth. Oils and resins will be released from inside the spray booth during the curing cycle. This can cause “fish-eye” and “loss of gloss”.

- Check the booth pressurization before each job. Making sure the needle is in the paint zone. This will provide the best results, maintaining a slightly pressurized environment.

2 Filtration Maintenance.

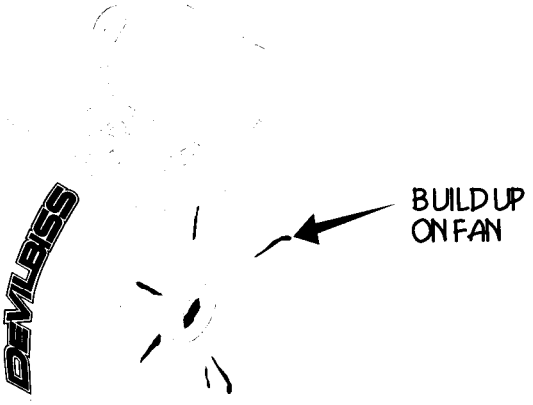
. ALWAYS FOLLOW THE MANUFACTURERS RECOMMENDED REPLACEMENT PROGRAM FOR FILTERS. Utilize high quality OEM replacement filters for the plenum, the burner and the pit. High quality filters are designed to provide high efficiency and long life as a system. These filters are designed to maintain a proper balanced air envelope from day one until replacement.



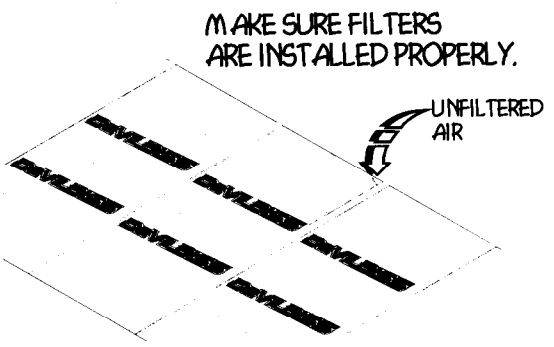
- When filter media has become so contaminated that an unacceptable resistance (specified by spray booth manufacturer) has been attained, it is time for them to be changed.

- Pre-filters should be changed at factory recommended intervals. Pre-filters are the final defense against contamination before the plenum filter, which is the most expensive in the system.

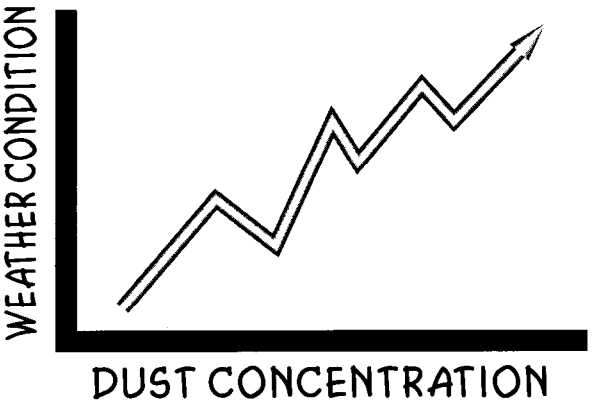
- Change paint arrestor (pit) filter once a week, or at a minimum once every two weeks depending on activity. A loaded filter throws the balance of the paint booth off and allows build up of overspray on walls, exhaust fans and duct. The result is poor finishes, contamination, premature cleaning and maintenance of the equipment.



- All filters should lit tightly in filter frames. If filters do not make a proper seal with the filter frames, unfiltered air will pass to the next part of the system. Take extreme care to make sure plenum filters are installed properly.



- Various weather conditions (smog, fog and frost), produce atmospheric dust concentrations that are often ten times higher than during normal weather conditions. Pre-filters and plenum filters may become filled in a short time. Keep a set of replacement filters on hand.



- To ensure correct maintenance is being followed have your local authorized and factory trained service company maintain your refinish system. Always follow factory recommended maintenance procedures.

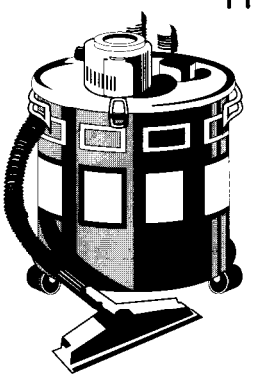
3 Booth Maintenance.

- Clean the spray booth at factory recommended intervals. Make sure plenum, air ducts and exhaust areas are all cleaned. The spray booth is a complete system and should be cleaned accordingly.

- Vacuuming is the best practice. Brooms and mops do not collect all the dirt. Make sure to use a length of hose which allows the vacuum to remain outside the booth. This will stop contaminants from re-entering the environment.

VACUUM AND WASH BOOTH FREQUENTLY

- Vacuum out dirt deposited in the pit below the paint arrestor filters when they are being changed.



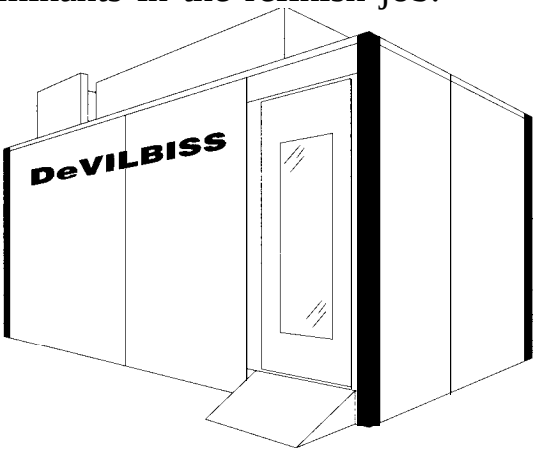
- Grating should be removed and pressure washed at regular intervals.

#5

The Refinish Chain

Upon reaching the refinish process, paint purchased from the manufacturer is almost entirely free from contaminants. Once involved in the refinish process paint can become contaminated through storage, mixing and handling. Every precaution needs to be taken to avoid contaminants in the refinish job.

1 Paint Mix Room.

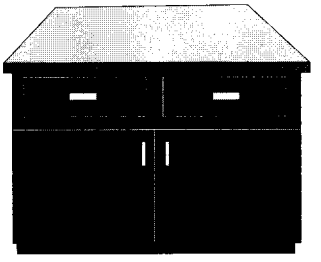


- Paint mixing rooms are designed to provide a contaminant free mixing and safe working environment. Light fixtures should be equipped with 'color corrected' tubes to aid in maintaining high levels of color accuracy and consistency. DeVilbiss recommends wearing an air respirator in the paint mix room.

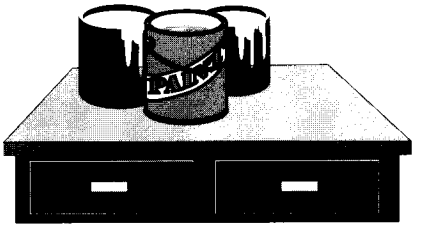
UNLESS YOU WANT 'FISH-EYE' KEEP THESE PRODUCTS OUT OF MIX ROOM!

- Change filters at factory recommended intervals. Ensure proper ventilation is maintained to provide a clean environment. Keep all silicone based products out of the paint mix room. They will cause "fish-eye" in the refinish job.

2 Paint Mixing Table.

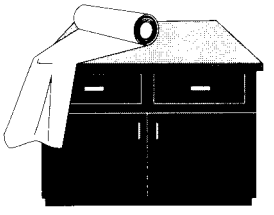


- The mixing table should only be used to mix paint.

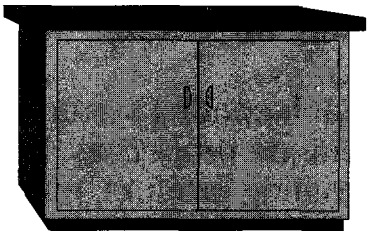


- The mixing table should be cleaned after every use. Never store materials on the table.

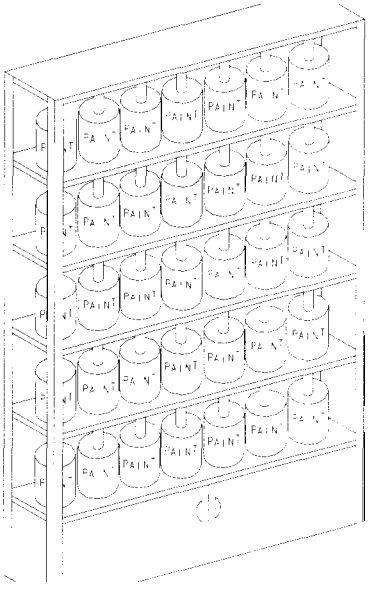
- Use a plastic covering on mixing table. Avoid using paper coverings. Paper could allow fibers to contaminate the refinish job.



3 Color Mixing System.



- The color mixing system is used not only to mix paint but to store materials not being used. Close attention to this area will produce a higher quality refinish job and working environment.

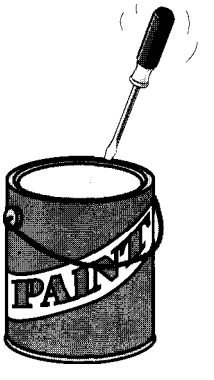


- Ensure the mixing machine is clean at all times. If dust, lint or paint is covering the mixing machine contaminants may enter the refinish job.

- Periodically check and lubricate (non-silicone based) agitating machine components.

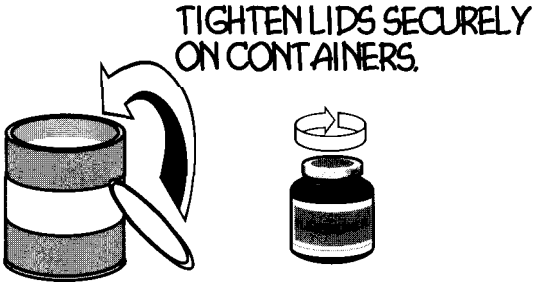
- Consult the MSDS for handling and storage precautions.

- Consult the product's technical bulletin for best storage temperatures.

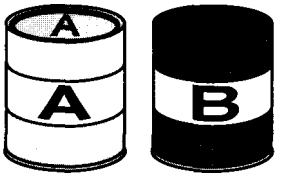


Paint Containers.

- Using proper openers to remove lids is critical. Damage to the container seals can lead to contamination.



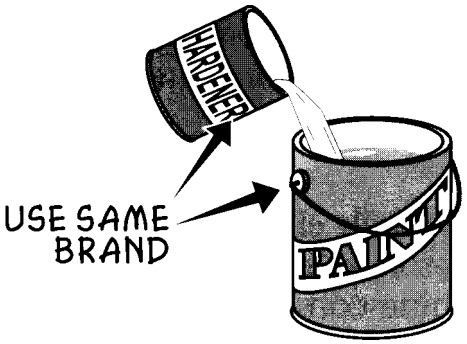
- Ensure ALL LIDS (agitator, hardener, solvent, etc.) are replaced immediately using correct lid. Make sure lid is correctly secured. Following the above will reduce potential contamination.



5 Mixing the Paint.

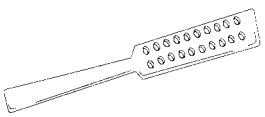
- Each coating system has its own unique properties. Before using a coating product, read the entire MSDS. This way, you will know what you are working with and how to safely handle the product.

- Refer to mixing instructions provided by manufacturer for correct proportions.



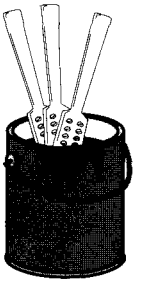
- Predetermine the sequence that paints will be mixed in and place them in order to avoid mistakes.
- Follow the paint manufactures recommendation for any additives.
- To achieve the best finish, use the same brand and line of hardeners and reducers as the paint being used.
- Mixing materials in a separate container before straining the paint mixture into the gun cup or pot will avoid unnecessary damage to refinish equipment.

- Use synthetic plastic paint stirrers. Wooden paint stirrers break down and leave wood resin and fiber in the paint. Metal measuring sticks are made of a soft alloy that may leave a metallic residue in the paint.



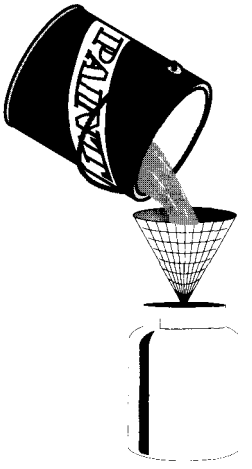
- Throw away plastic paint stirrers after use. Plastic may break down and cause chemical deposits in the paint.

- Paint stirrers left in a can of used solvents creates a hazardous condition.



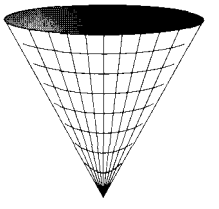
6 Straining the Paint.

- Pour paint through a strainer just before placing into a gun cup or pot. This will remove contaminants in the paint used for refinishing.

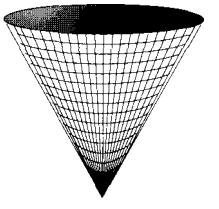


- Different quality strainers are available. They can be classified as either good, better or best. Always use the best quality.

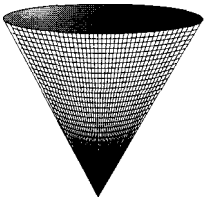
- Choose the right strainer for the job you are going to perform.



GOOD



BETTER



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