FINISHING EDUCATION UNIVERSITY

CARLISLE FLUID TECHNOLOGIES

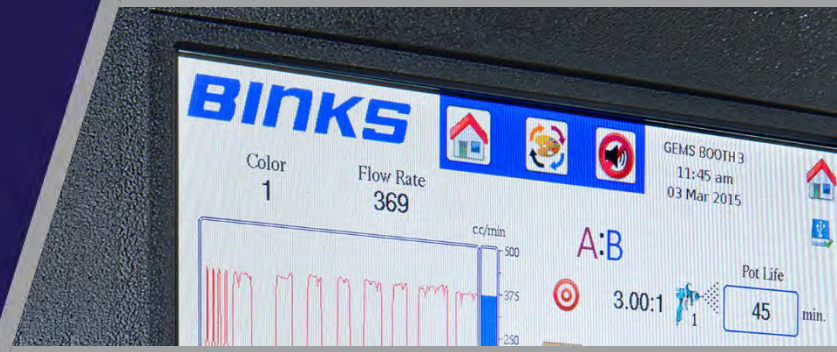
Knowledge is Power

Contamination Control Solutions
Air Filtration & Surface Preparation

Jim Cardosi - Presenter

Judy Lietzke – Panelist / Organizer

John Owed - Panelist

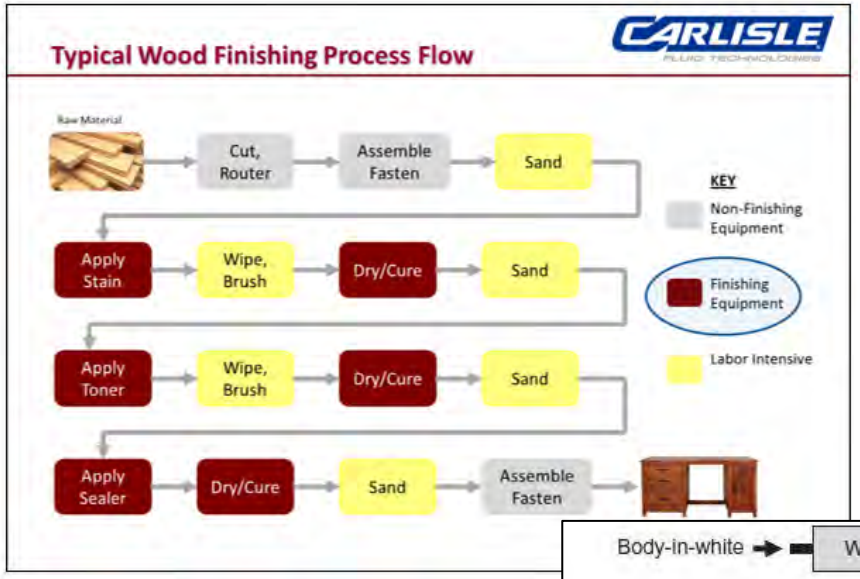


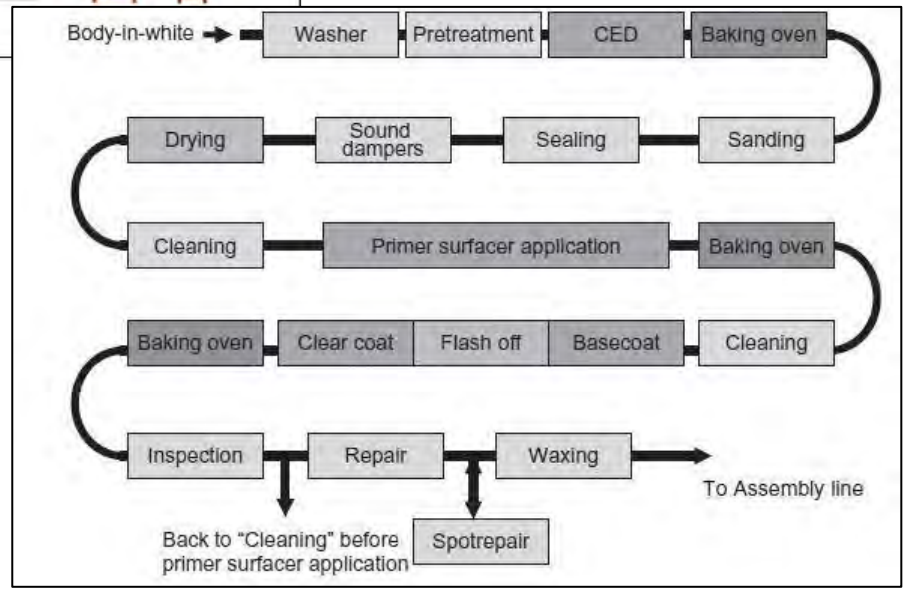
CARLISLE FLUID TECHNOLOGIES

Contamination Control Solutions

Presentation Overview:

- Objectives
- General Overall Finishing Process
- Substrate Preparation
- Compressed Air
- Paint Kitchen / Spray Applicator
- Booth / Oven
- Operator
- Basic Check List





Objectives

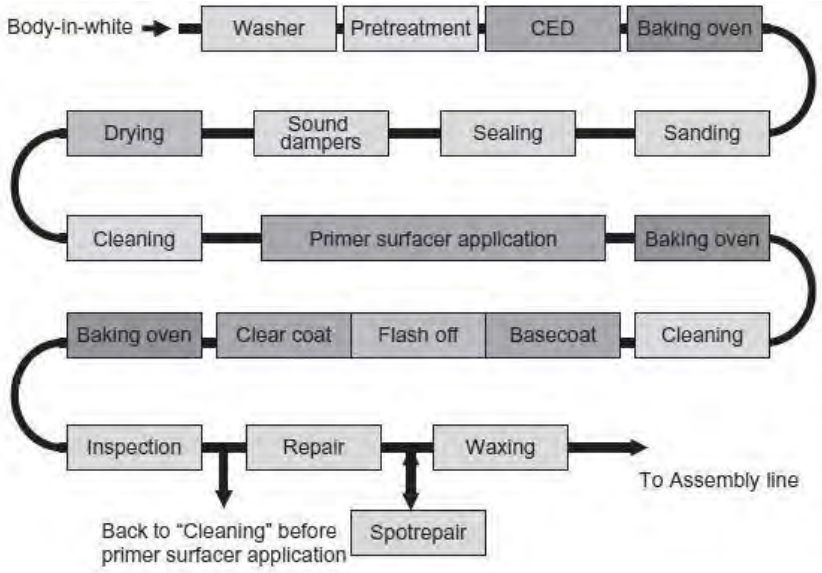
- Coatings / finishes are applied for
  - Appearance
  - Protection
- Finish standards are set by product type, market sold and desired performance characteristics.
  - OEM auto manufactures, Motorcycle, Caskets
  - Wooden furniture, cabinets, instruments
  - Infrastructure: Bridges, Dumpsters
    - Corrosion resistance (Looks good at 10 feet away)

Objectives

- Usually if you can Reduce reworks
- and Insure repeatability
- you can Increase productivity
- which leads to Reduce waste disposal
- The savings is seen in reduction of shop materials, coatings, labor hours, energy, etc.
- Increase your bottom line !

General Overall Finishing Process

- Prep – prepare the substrate for coating
- Dry - fans, towel, wipes, evaporation, drying tunnel
- Prime – is the substrate clean to accept the primer ?
- Dry or cure – air movement, heat lamps, dry-off ovens
- Topcoat (s) – is the topcoat adhering to the primer ?
- Touch-up – is the touch up intensifying the defects ?
- Final dry / cure - ovens
- Inspection / packaging / shipping – are non-cured products causing issues



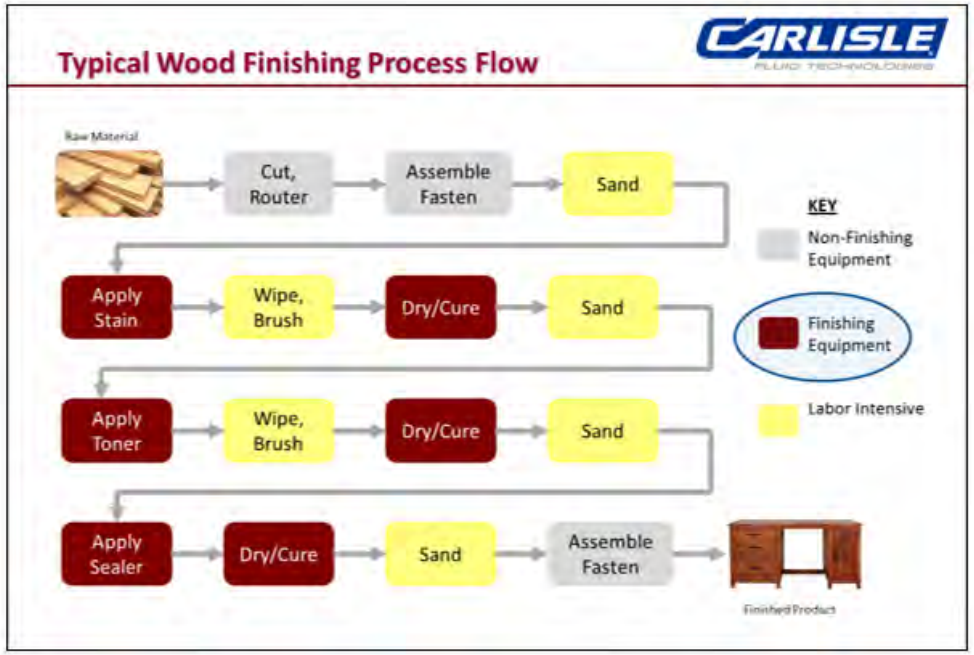
Note: Each process above can compound or contribute to contamination issues

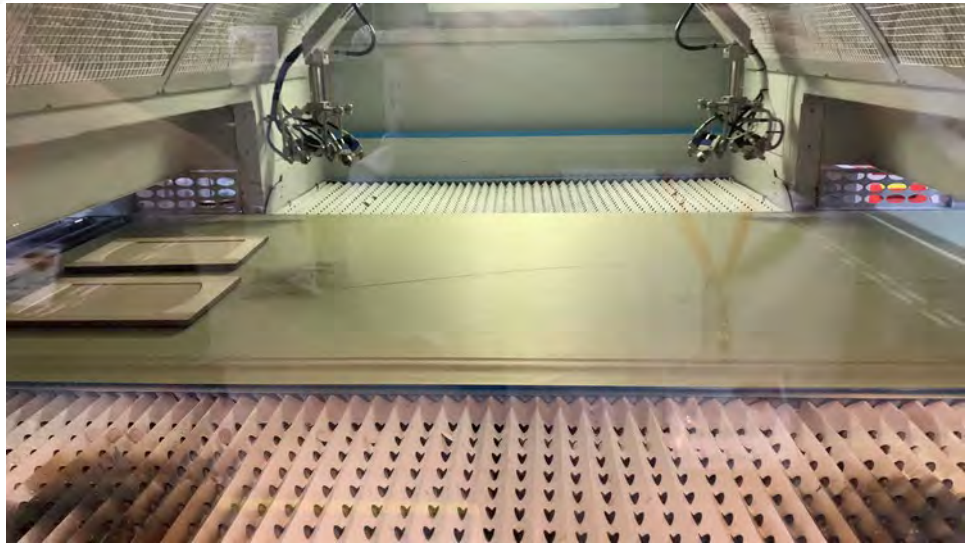
Substrate Preparation - Metal

- Metal Prep: remove surface rust, oils, degrease or recondition
- Final Grinding, adding components, installing plugs, etc.
- Be mindful of welds, cavities
- Basic power washers & stream cleaners
- Multi-Stage Pretreatment Washers, ensure:
  - PH / chemical concentrations, contaminates, clogged nozzles
- Submerge: Hot tank 200 degrees in Chemicals / High pressure power washer to clean / Acid tank – treads rust / HP Clean again / Apply coating against Flash rusting / Air dry
- Common shop materials used - tack rags, wipes, towels, etc.

Substrate Preparation - Wood

- Substrates: the key is to understand the substrates properties and characteristics. In this case, there are many types of woods and laminates. Be aware of moisture content, grain, absorption, other factors.
- Wood preparation: sanding with the grain, (starting around 120 grit, ending around 220) to remove flaws. Wipe with tack cloth
- Staining: evenly apply the stain, dry
- Finishing: finish with a clear for protection
- The process can be more involved for higher end applications





Compressed Air

- A few items to consider before selecting a compressor. What equipment will be running off the compressor?
- Compressor Size
  - Knowing your compressor's limitations on air volume @ identified pressure ratings can influence equipment selection
  - Pneumatic tools such as drills, sanders, and wrenches certainly need higher air pressures (70-90psi) to operate properly but they usually only consume 5-15 cfm to function
  - Spray guns function at much lower pressures (20-35 psi) but can consume 10-25 cfm depending on the gun.
  - Most shops do not have air constraints as they have large horsepower piston or screw compressor units
  - *Note: We always recommend air filtration units to remove dirt, oil, & moisture from compressed air supplying the applicator as these contaminates can influence finish quality*

30-40 cfm @ 50 psi

18 cfm @ 50 psi

Compressed Air

Change/Clean Filters Regularly

- Inspect and replace filter, desiccant systematically (weekly or monthly)
  - o Filters add to your pressure drop challenge
  - o Stop piping being contaminated, which may be cause of new leaks in pipes or damaged equipment
- Do not overlook air compressor filters and compressor room filters.
- Moisture and dirt in the air lines will cause defects in the paint application

Compressed Air

Check Piping / Prevent New Leaks

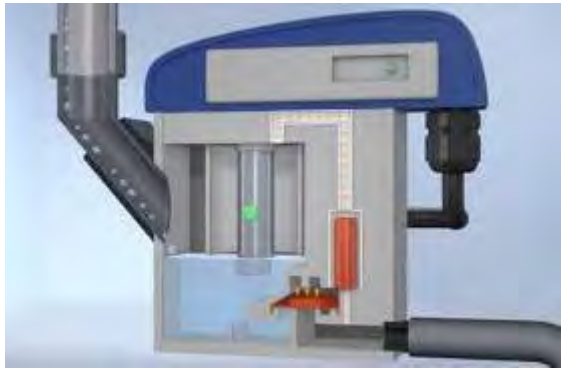
- Regularly check for new leaks
- Clean, dry pipes indicates good quality air and no corrosion issues
- Dust in the pipe is caused by particles in the compressed air. If compressed air is not filtered, or if the filter is clogged, pressure drops will occur and the risk of end product contamination will increase.
- Sludge in the pipe is bad news and must be fixed immediately. Dust and sludge in a compressed air piping system will cause corrosion very quickly and will greatly increase the number of leaks. Dried and filtered compressed air keeps piping clean.

Compressed Air

Check Auto Drains

- Make sure auto drains are not stuck open
  - Compressed air is continually leaking from your system
- Drains on timers should be adjusted periodically to ensure they open as intended
  - If the compressor is inactive when it opens, the motor will have to start up for a short period of time (excess energy, wear and tear)
- Or replace timer drains with zero-loss drains (no air leakage) to stop wasting compressed air

Timer Based Electronic drain



Zero Loss Condensate Drain

Paint Kitchen / Spray Applicators

- Understand your coatings & solvents characteristics / material data sheets
- Common coatings: epoxy, polyurethane, acrylic, stain, etc.
- Be aware of viscosity / temperature / evaporation
- Fluid pump filters / strainers
- Circulating vs. non-circulating – settling?
- Heaters
- Lubrication use on pumps and agitators
- Pumps- air, electric, hydraulic

SAFETY DATA SHEET

B58V600

Section 1. Identification

Product name : MACROPOXY B646 Fast Cure Epoxy Coating (Part B) Hardener

Product code : B58V600

Other means of identification : Not available.

Product type : Liquid.

Relevant identified uses of the substance or mixture and uses advised against

Not applicable.

Manufacturer : THE SHERWIN-WILLIAMS COMPANY 101 W. Prospect Avenue Cleveland, OH 44115

Emergency telephone number of the company : (216) 566-2917

Product Information Telephone Number : (800) 524-5979

Regulatory Information Telephone Number : (216) 566-2902

Transportation Emergency Telephone Number : (800) 424-9300

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : FLAMMABLE LIQUIDS - Category 2
ACUTE TOXICITY (inhalation) - Category 4
SKIN CORROSION/IRRITATION - Category 2
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2A
SKIN SENSITIZATION - Category 1
CARCINOGENICITY - Category 2
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 2
Percentage of the mixture consisting of ingredient(s) of unknown toxicity: 85.3%

GHS label elements

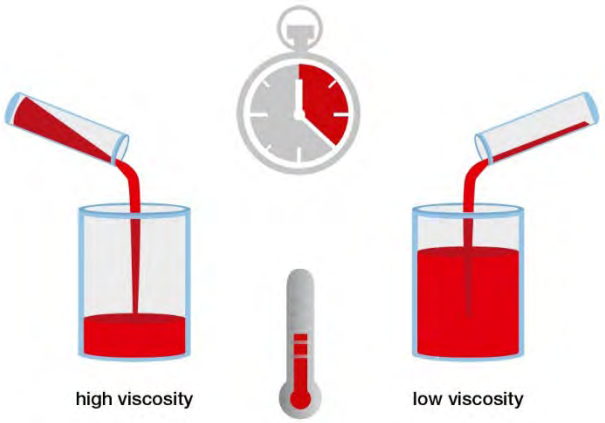
Hazard pictograms :

Signal word : Danger

Hazard statements : Highly flammable liquid and vapor.
Harmful if inhaled.
Causes serious eye irritation.
Causes skin irritation.
May cause an allergic skin reaction.
Suspected of causing cancer.
May cause damage to organs through prolonged or repeated exposure.

Precautionary statements

Date of issue/Date of revision : 9/16/2016 Date of previous issue : 9/4/2016 Version : 3.01 1/13



Protective & Marine Coatings

SHERFLEX™ ELASTOMERIC POLYURETHANE

PRODUCT INFORMATION

PRODUCT DESCRIPTION

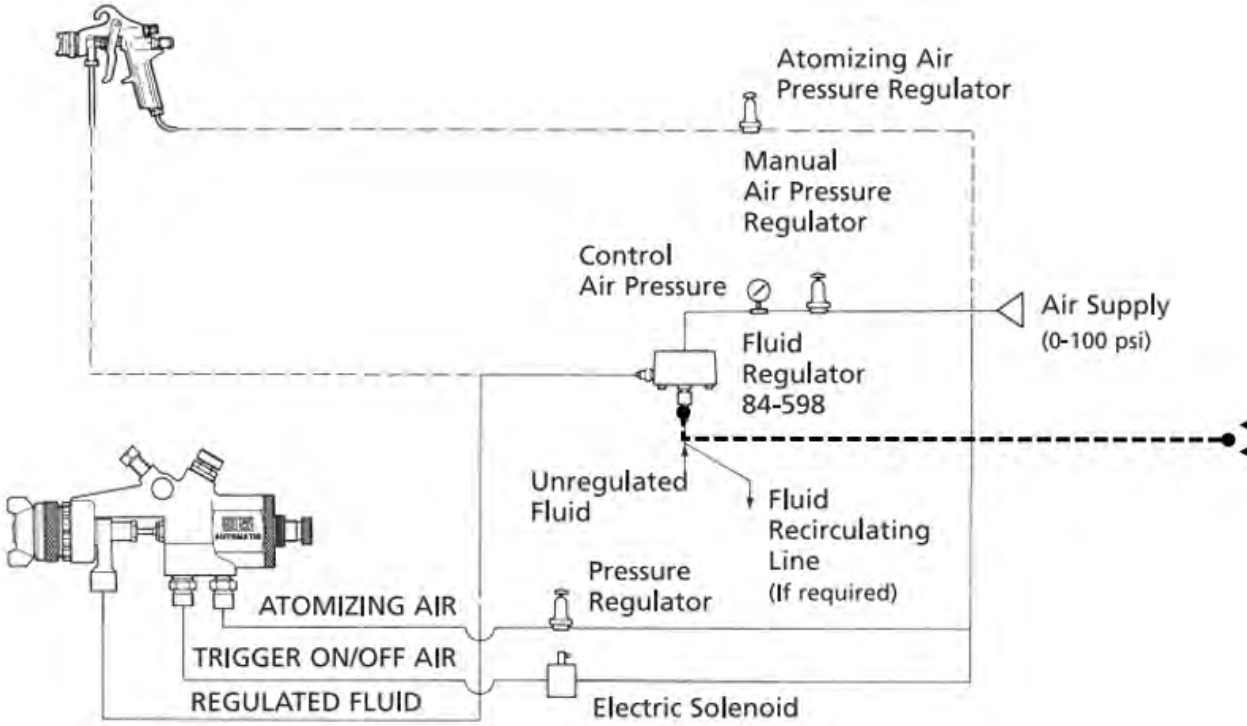
RECOMMENDED USES

PRODUCT CHARACTERISTICS

PERFORMANCE CHARACTERISTICS

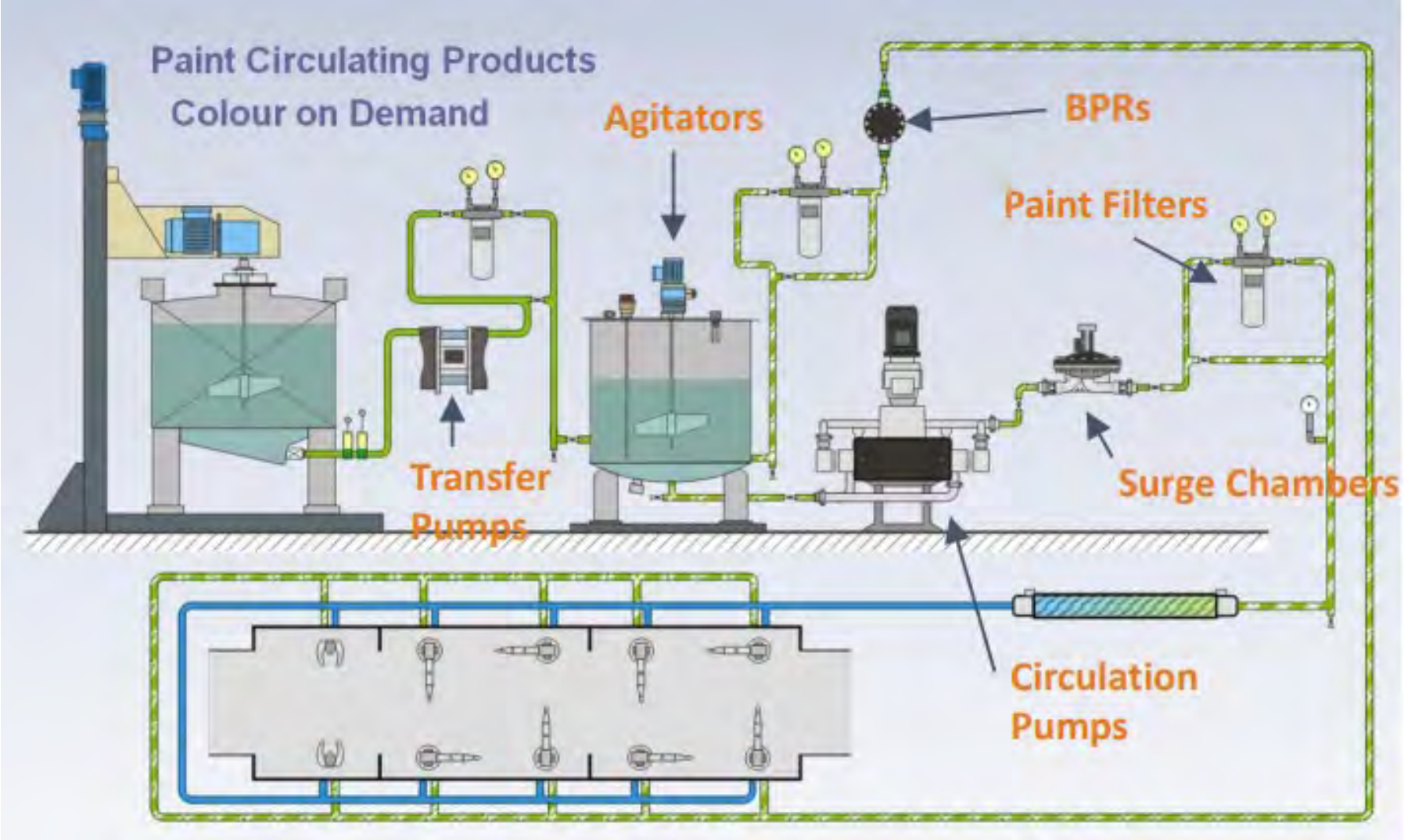
Paint Kitchen / Spray Applicators

Basic Spray System



Paint Kitchen / Spray Applicators

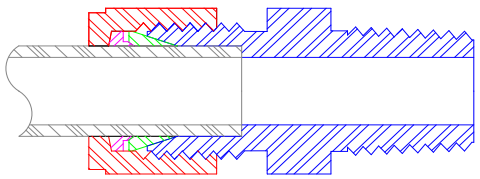
Advanced Spray System



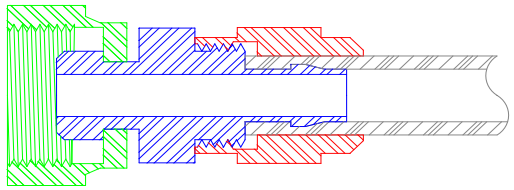
Paint Kitchen / Spray Applicators

Fluid Fittings

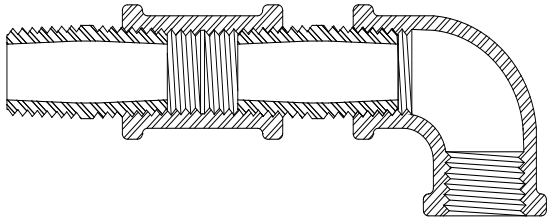
- ✓ Use Nylon or stainless-steel fittings.
- ✓ Use fittings without internal restriction
- ✓ Do not use pipe fittings
  - ✓ Rough interior surfaces cause contamination (dirt) and resistance.
  - ✓ Prone to rusting and scaling.



No internal restrictions

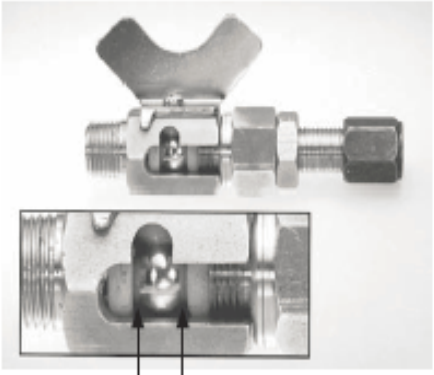


Internal restrictions

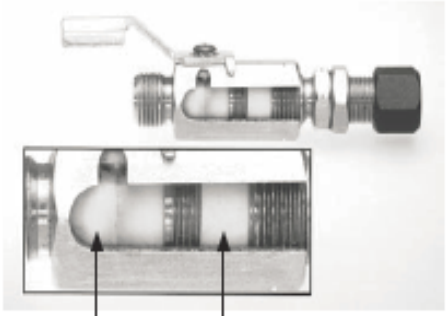


Avoid pipe style fittings

Conventional Ball Valve
(cut-a-way)



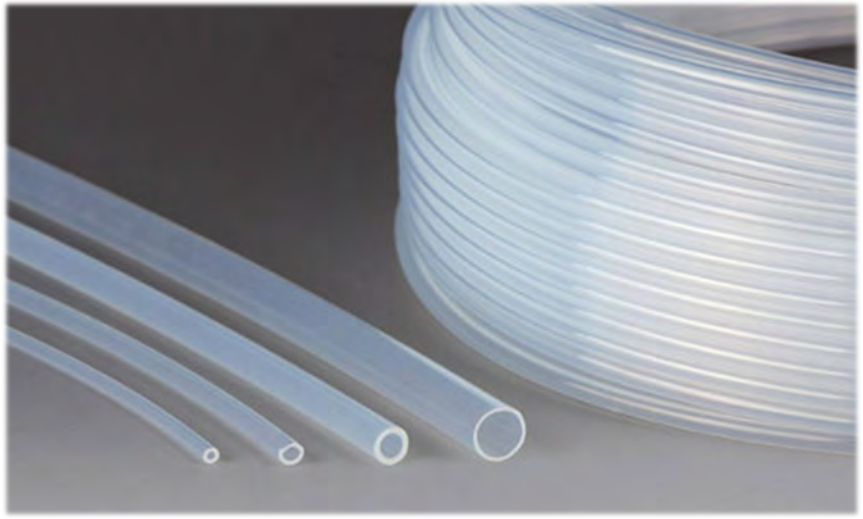
Encapsulated Ball "Ball Valve"
(cut-a-way)

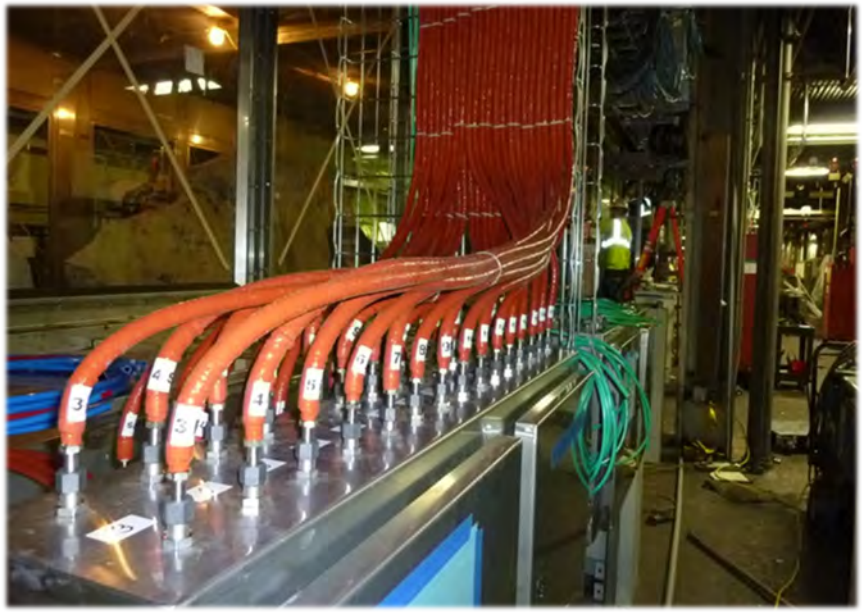


Paint Kitchen / Spray Applicators

Fluid Tubing

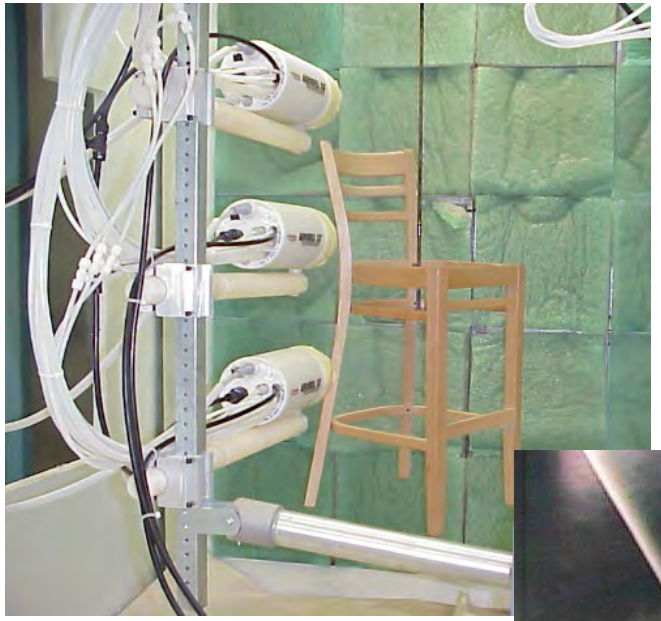
- ✓ Teflon tubing is recommended
- ✓ FEP or PFA (PFA is a high temp version of FEP)
  - Clear, easy to see level of cleanliness
  - Smooth with low coefficient of friction
  - High DI-electric strength (electrostatics)
- ✓ Minimize length and inside diameter “ID” of tubing
  - 1/8” (.125) = 2.41 ml / 300 mm (0.08 oz)
  - 1/4” (.250) = 9.65 ml / 300 mm (0.33 oz)
  - 3/8” (.375) = 21.72 ml / 300 mm (0.73 oz)
  - 1/2” (.500) = 38.60 ml / 300 mm (1.30 oz)
  - Evaluate flow restriction

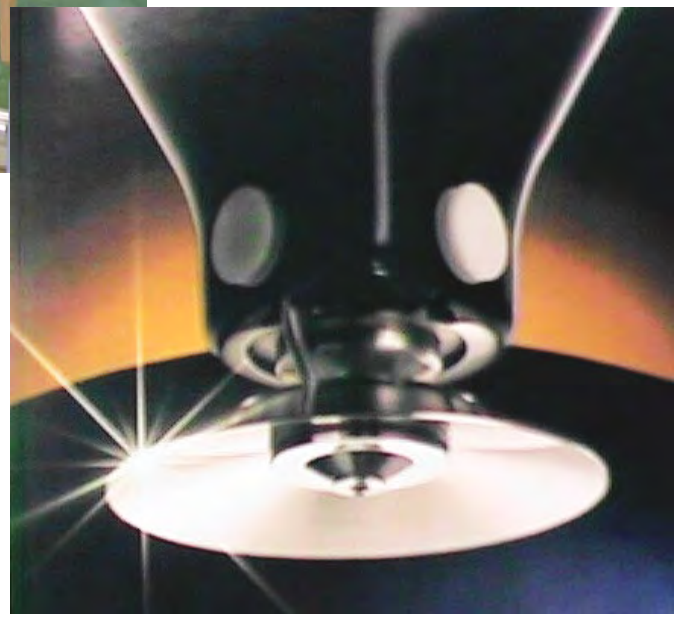




Paint Kitchen / Spray Applicators

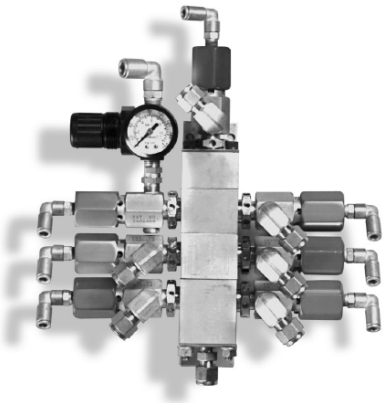
Examples of high-quality products. Most stainless-steel fluid passageways –smooth bore designs





Paint Kitchen / Spray Applicators

Color Select System



Gun Flush Boxes

- Automatically flush handguns
- Avoid messes and simplify cleanup
- Increase production speed

Integrated Color Change

- Plural Component Metering Systems
- Support color change / gun flush boxes
- Intuitive controls

IntelliFlow™

Paint Kitchen / Spray Applicators

- Final fluid filters - In line filters, screens, strainers. elements, gun strainers
- Final air filters – gun mounted filters
- Reusable / disposable

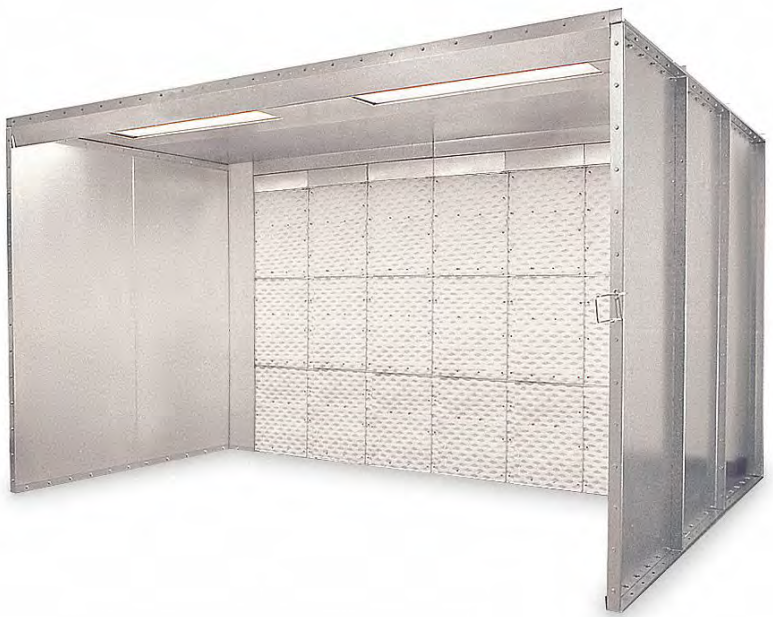
- Gun or Applicator covers
- Hose covers / sleeves

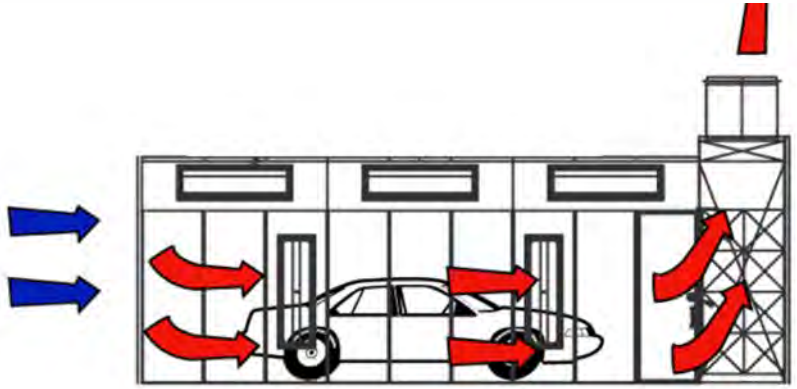
- Keep air caps clean
- General maintenance

Booth / Oven

Spray Booth / Environment

- The environment or location where you are spraying also plays a major role
  - Is the spray booth your applying material in above 75ºF (24ºC)? Is it below 60ºF (15ºC)?
  - Does the humidity of your booth fluctuate throughout the day, month or year?
- Booth temperature & humidity can have as much of an impact on your spray pattern as changing your nozzle size or air pressure
- Knowing your spray booth environment, whether its static or dynamic throughout the year, can help you prepare when selecting the right spray gun and accessory equipment needed
- Air movement is a <u>good</u> thing, air movement is a <u>bad</u> thing





Booth / Oven

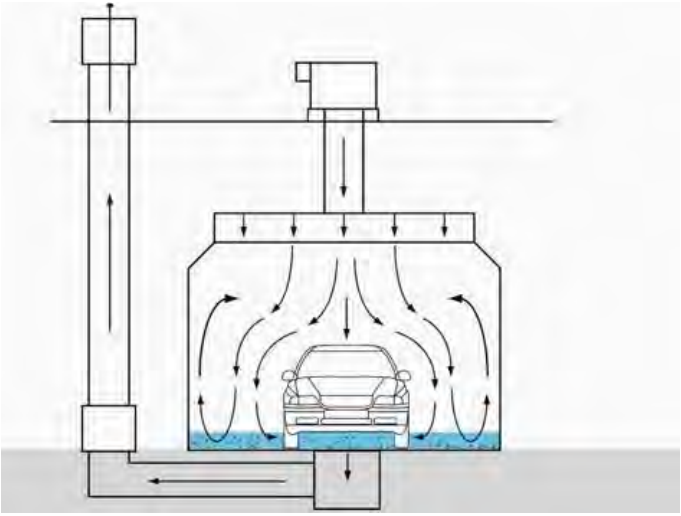
Spray Booth –OSHA & NFPA ratings

- Cross draft – open faced with exhaust filters
- Cross draft – enclosed with exhaust & intake
- Downdraft – enclosed with exhaust & intake
- Spray and bake - paint & cure in same booth
- Cross draft & downdraft water wash booths – water curtain, PH & sludge
- Powder booths – cartridge filters, cyclone

Example clean baseline reading

- Wall & floor coverings / floor tacky mattings / manometer
- Inspect gaskets, caulking and lighting in booths

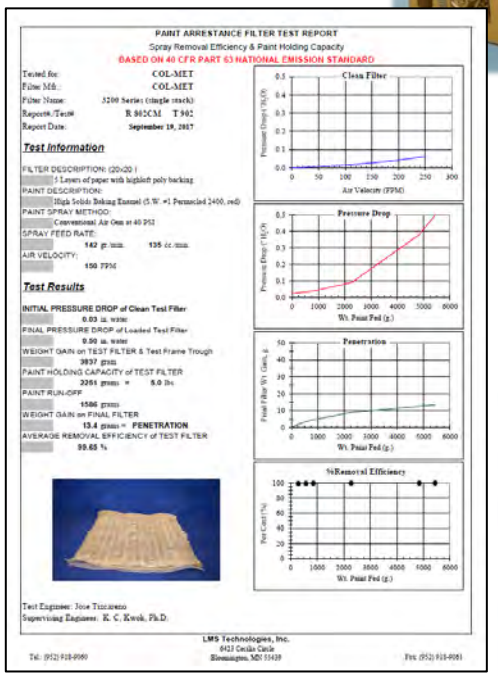
- Air make-up units – inspect filters, adjustments, cleaning, dirt accumulation – check twice a year



Booth / Oven

Spray Booth Filters

- There are a wide range of materials: polyester, fiberglass, paper, plastic, cardboard and more
- Available n a wide range of shapes and sizes: blankets, pads, custom
- Filters must have third party test validation with minimum 98% capture efficiency to meet EPA NESHAP standards.



PAINT ARRESTANCE FILTER TEST REPORT

Spray Removal Efficiency & Paint Holding Capacity

BASED ON 40 CFR PART 63 NATIONAL EMISSION STANDARD

Tested for: COL-MET
Filter Mfr.: COL-MET
Filter Name: 5200 Series (single stack)
Report#/Test#: R 802CM T 902
Report Date: September 19, 2017

Test Information

FILTER DESCRIPTION: (20x20)
5 Layers of paper with highloft poly backing
PAINT DESCRIPTION:
High Solids Baking Enamel (S.W. #1 Permaclad 2400, red)
PAINT SPRAY METHOD:
Conventional Air Gun at 40 PSI
SPRAY FEED RATE:
142 gr./min. 135 cc./min.
AIR VELOCITY:
150 FPM

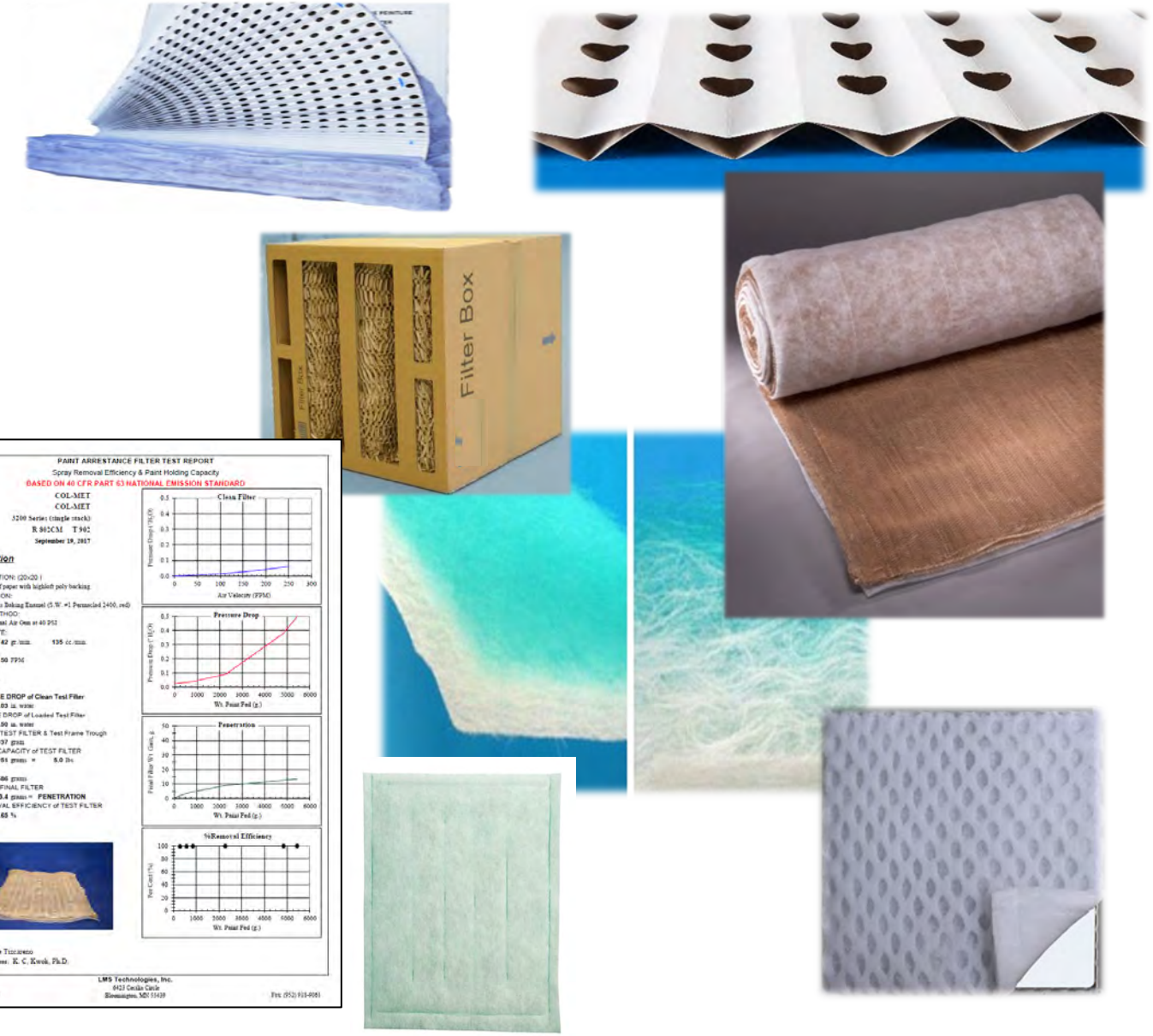
Test Results

INITIAL PRESSURE DROP of Clean Test Filter
0.03 in. water
FINAL PRESSURE DROP of Loaded Test Filter
0.90 in. water
WEIGHT GAIN on TEST FILTER & Test Frame Trough
3937 grms.
PAINT HOLDING CAPACITY of TEST FILTER
2351 grms. = 5.0 lbs.
PAINT RUN-OFF
1586 grms.
WEIGHT GAIN on FINAL FILTER
13.4 grms = PENETRATION
AVERAGE REMOVAL EFFICIENCY of TEST FILTER
99.65 %

Clean Filter
Pressure Drop
Penetration
%Removal Efficiency

Test Engineer: Jose Tizzieno
Supervising Engineer: K. C. Kwok, Ph.D.

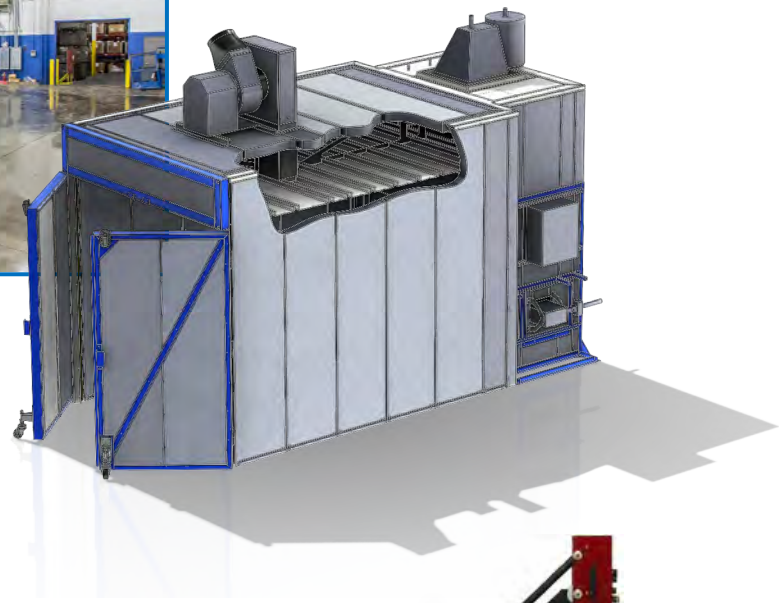
LMS Technologies, Inc.
6433 Cecilia Circle
Bloomington, MN 55439
Tel: (952) 910-0980 Fax: (952) 910-0981

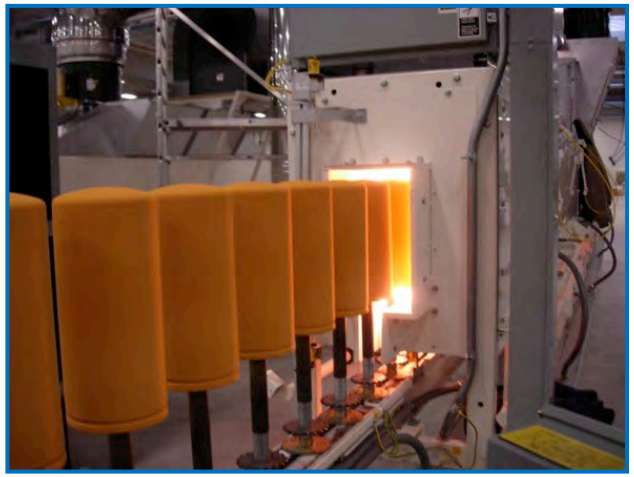


Booth / Oven

Oven / Heat Lamps

- Oven types - batch, conveyorized, flatline, dry, cure, burn-off
  - Dirty ovens can deposit containments.
- Be aware of No cold spots on the floor or No hot spots at ceiling. Ample air movement is required to eliminate heat stagnation.
- Heat Lamps – good working order and keep clean.





Operator

- Provide coveralls, gloves, spray socks, masks, hair nets, disposable shoe covers, etc. Dirty or worn products can add to additional contamination

- Insure the proper personal protective equipment (PPE) is available – air feed or cartridge respirators, steel toe shoes, safety glasses, hearing protection, etc.

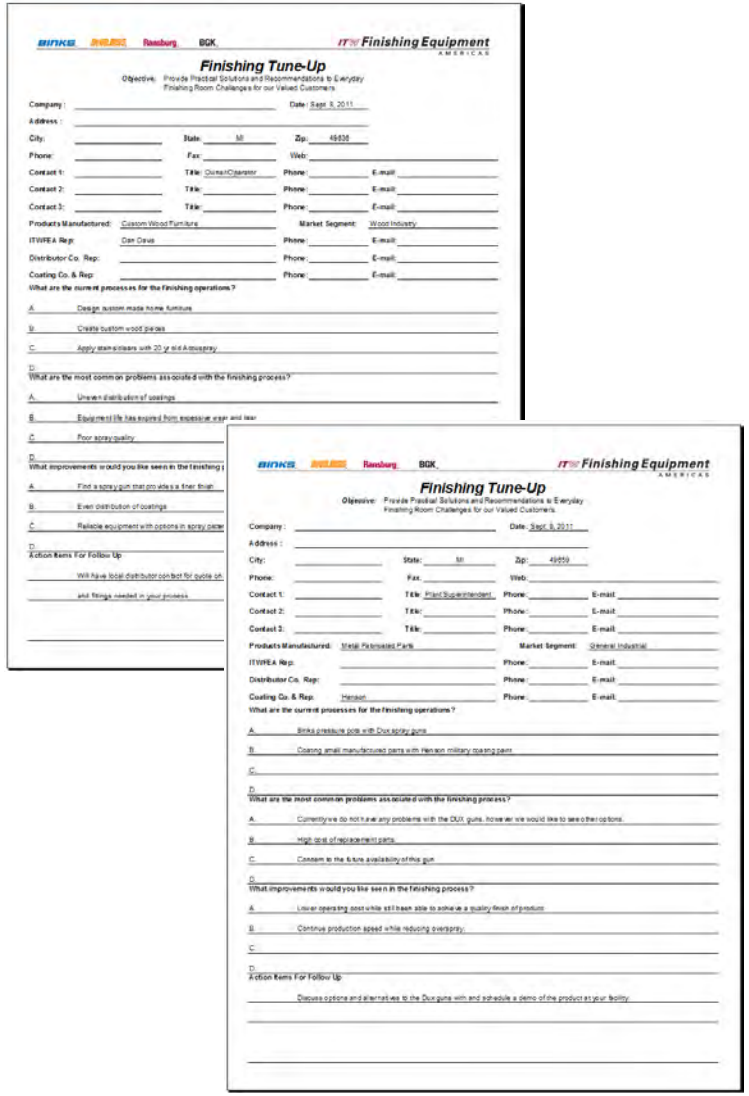
- The operator should be fully trained on the process, equipment, coatings, clean-up and basic maintenance.

Operator

- Shop supplies - usually quality supplies like tack rags & wipes pay for themselves in the long run. Make sure they are stocked and accessible.

Basic Check list

- Visual inspection of equipment
- Clear work instructions
- Quality control at each station
- Operator empowerment
- Documentation / reporting
- General vs. scheduled maintenance
- Stock back-up pump, applicator. – switch equipment out.
- Review stocking levels on repair kits, filters, wear parts, coatings, solvents, shop supplies, etc.
- Verify right equipment & supplies for the job
- Full system audit
- Check with OSHA, EPA & local codes



Finishing Tune-Up

Objective: Provide Practical Solutions and Recommendations to Everyday Finishing Room Challenges for our Valued Customers

Company: Date: Sept. 9, 2011
Address:
City: State: MI Zip: 49838
Phone: Fax: Web:
Contact 1: Title: Owner/Operator Phone: E-mail:
Contact 2: Title: Phone: E-mail:
Contact 3: Title: Phone: E-mail:
Products Manufactured: Custom Wood Furniture Market Segment: Wood Industry
ITW FEA Rep: Dan Davis Phone: E-mail:
Distributor Co. Rep: Phone: E-mail:
Coating Co. & Rep: Phone: E-mail:

What are the current processes for the finishing operations?

A. Design custom made home furniture
B. Create custom wood pieces
C. Apply stain/colors with 20 yr old Airless spray
D.

What are the most common problems associated with the finishing process?

A. Uneven distribution of coatings
B. Equipment life has expired from excessive wear and tear
C. Poor spray quality
D.

What improvements would you like seen in the finishing p

A. Find a spray gun that provides a finer finish
B. Even distribution of coatings
C. Relocate equipment with options in spray booth
D.

Action Items For Follow Up

Will have local distributor contact for quote sh

and fittings needed in your process.

Finishing Tune-Up

Objective: Provide Practical Solutions and Recommendations to Everyday Finishing Room Challenges for our Valued Customers

Company: Date: Sept. 9, 2011
Address:
City: State: MI Zip: 49859
Phone: Fax: Web:
Contact 1: Title: Plant Superintendent Phone: E-mail:
Contact 2: Title: Phone: E-mail:
Contact 3: Title: Phone: E-mail:
Products Manufactured: Metal Fabricated Parts Market Segment: General Industrial
ITW FEA Rep: Phone: E-mail:
Distributor Co. Rep: Phone: E-mail:
Coating Co. & Rep: Henson Phone: E-mail:

What are the current processes for the finishing operations?

A. Binks pressure pots with Duv spray guns
B. Coating small manufactured parts with Henson military coating pans
C.
D.

What are the most common problems associated with the finishing process?

A. Currently we do not have any problems with the DUV guns, however we would like to see other options.
B. High cost of replacement parts.
C. Concern for the future availability of this gun
D.

What improvements would you like seen in the finishing process?

A. Lower operating cost while still been able to achieve a quality finish of product
B. Continue production speed while reducing overspray.
C.
D.

Action Items For Follow Up

Discuss options and alternatives to the Duv guns with and schedule a demo of the product at your facility.

Thank you!

If you'd like a copy of today's presentation, email marketing@carlisleft.com

FINISHING EDUCATION UNIVERSITY

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