

# **Low VOC-How Did We Get Here?**

*BodyShop Business Conference*

May 5, 2011

# South Coast Air Quality Management District = **SCAQMD**

SCAQMD = 16 million people, approximately ½ of California

1987 SCAQMD passed famous **Rule 1151**

“Forcing Legislation” – invent ways to comply

Proscribed 65% transfer efficiency for spray guns

High volume, low pressure (HVLP) under 10 PSI @ cap

Specified VOC limits for automotive coatings

Rule said basecoat color + clear topcoat “sandwich”  
must be under 3.5 pounds per gallon solvent

# SCAQMD says 12% of VOC's from paint & solvents

Contributing **industries** include:

Woodworking

Printing

Cleaning metal

Auto refinish



Easy targets, every body shop has a sign out front

As always, mostly auto exhaust that makes smog

# Rule 1151 Amendments

## July 1, 2008

Original Rule 1151 specified: **3.5** pounds or less VOC  
*“sandwich”*

Made from 5-6 pounds base color + 2.1 pounds clear

2.1 pound clear made it legal

No National Rule clear (3.5 lbs) would work

**New Rule** (grace period until 12-31-2008)

Clear coat = maximum **2.1** pounds of VOC per gallon

Base coat = maximum **3.5** pounds of VOC per gallon

# One gallon of auto paint weighs approximately 10 pounds

Lacquer resin approximately 90% solvent, 10% solids

Enamel resin approximately 70% solvent, 30% solids

Traditional basecoats approx 50% solvent, 50% solids

Waterborne resin under 35% solvent, 65% solids



# Achieve compliance by using “exempt” solvents:

\*California says will not cause smog in sunlight

Common exempt solvents include:

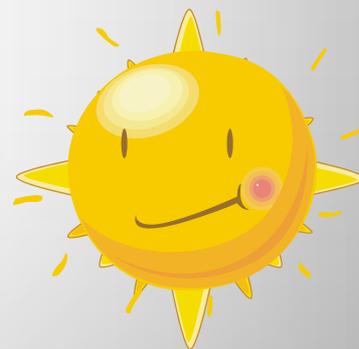
Acetone

Ethyl acetate

Tertiary butyl acetate (TBAc)

Isopropanol

P-chlorobenzotrifluoride (BCBTF)



# Achieve compliance by using water

No Volatile Organic Compounds at all!

Not tap water, de-ionized, purified, multi-filtered

Evaporation rate and dry control sacrificed in either case:

- Very limited range of exempt solvents
- Water evaporates at **one-speed**



# Spray Adjustability

Refinish painters controlled the spray times, weather changes and color results by using faster/slower solvents and catalysts

“Compliant” solvents have little *solvency* and are very fast or very slow to evaporate

Water is a one-speed solvent and will dry at the same speed each time

It's not lighter than air so may have to be blown out of the finish with moving air

Remember, this isn't about your convenience, it's about **cleaner**

**air**



# Basic chemistry

Lacquer dries in one step

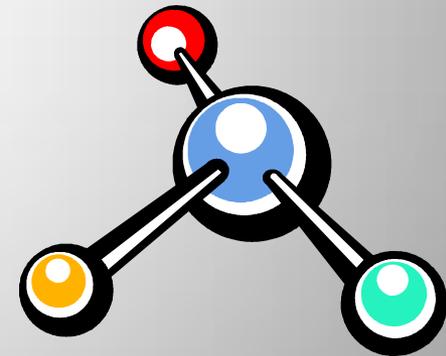
1. by evaporation of the solvent (thinner)

Enamel dries in two steps

1. by evaporation of the solvent (reducer) and
2. oxidation of the binder by contact with air

Urethane enamel dries in three steps

1. by evaporation of the reducer
2. oxidation of the binder
3. and cross-linking of the catalyst



# Basic chemistry

Waterborne **dries differently**

*Resin is not dissolved but coalesces (melts, ruptures) to form a film*

Dries by evaporation of the water & solvent

(still contains solvent, but **less** than 3.5 lbs)

Actual chemistry ***significantly*** different by brand

Resin construction, reduction percentage, viscosity, catalyzation, air pressure, gun speed, flash times and many more differ considerably by paint brand

Shared secret ...

(most solvent refinish coatings use very similar chemistry!)

# Trick Chemistry

In the course of my story interviews, chemists offered me the following terms:

Emulsion polymerization

Maximum incremental reactivity

Rheological control

Polymer molecular chains

Stabilized dispersant technologies

Ionic acidity

Hydrophilic resin \*likes water

Hydrophobic resin \*hates water

Electrostatic repulsion

Passivated aluminum flakes \*Al & H<sub>2</sub>O form hydrogen gas\*



# Difficult to manage the solubility

- Too much and paint is so *soft* it washes off in the rain
- Too little and color is so *hard* clear won't adhere

Much less “spray latitude;” painter must follow exact directions, can't change solvent or catalyst speeds to accommodate individual painting styles

\*Most problems in California were painters who insisted on applying the **new** stuff the **old** way

STAY WITHIN ONE PAINT BRAND!!!!

# Why change now?

Because water evaporates at one speed, metallic control is **very** consistent

Turns out this chemistry can be **very** productive

1. Chase many fewer color matches
2. Edges blend smoothly into OEM waterborne coatings
3. Flash times are quick in most weather conditions
4. Blowing air across the film shortens flash times even more
5. Paint shop production often increases
6. Paint costs are largely unchanged
7. Consumers like *green* vendors
8. Help save breathable air for your grandchildren

# Getting your shop ready



Need buy-in from the top down:

Owner's money, Manager's production, Painter's results

Paint technology is changing fast, use the best choice

Painter Training is the **Most** important piece!

Mixing & storage procedures (agitation, hot/cold)

Surface preparation changes (faster coverage, finer grits)

Exact and specific spray techniques (flash, speed, coats)

Quality compressed air, clean spray cabin (blowing = dirt)

Different by paint brand

Must follow specific, strict application directions

# Shop equipment audit

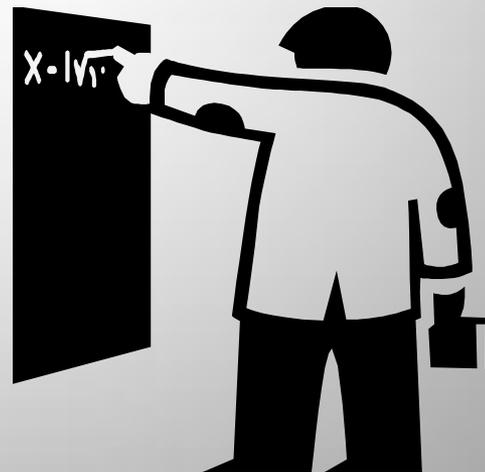
Air compressor function: oil, moisture content, CFM volume!

Booth specifics: FPM air speed, CFM volume, temperature rise

Spray guns: rust-proof, dedicated, correct tip & cap

Gun washer & waste stream: separate units & storage

Painter training!



# *Clean Air Act of 1970*

*\*amended 1977*

All air quality rules, regulations and laws date to this

Many states & localities with poor air quality propose to enact legislation that will both improve their daily air quality and comply with mandated changes

Currently two 'associations of states' have written their intent to create regulations that mimic the SCAQMD rules (HVLP) and VOC limits

# Lake Air Directors Consortium

*LADCO* is five mid western States bordering the Great Lakes:

1. Illinois
2. Indiana
3. Michigan
4. Wisconsin
5. Ohio



# Ozone Transport Commission

*OTC* is 13 eastern seaboard states that have published their intention to adopt regulations for collision repair:

Maine

New Hampshire

Massachusetts

Rhode Island

Connecticut

New Jersey

Delaware

*\*Only Delaware has published so far, comply by 1-1-12*

Maryland

Vermont

New York

Pennsylvania

Virginia

Washington DC



# More states coming?

If LADCO and OTC both pass regulations requiring 3.5 pounds of VOC or less in refinish basecoats, one half the population of the USA will be regulated

States with an environmental bent (Oregon)& those with really bad air quality (Texas) are likely to pass body shop VOC limits too

Which of your elected representatives will vote *against* clean air?



It's not a bad thing, the air quality gets better and the paint chemistry gets more productive

# What next?

Talk to your paint jobber about your interest

Talk to several other shops using your brand

Attend training to see the brand in action

Bring your shop's equipment up to snuff

Remember, you must follow exact directions, different by brand

Join the 10%-15% of the shops in the US now using compliant basecoats productively and profitably!

Thanks for listening!

Questions?

