

Dimethyl Carbonate (DMC) replaces MEK

April 2011

Overview

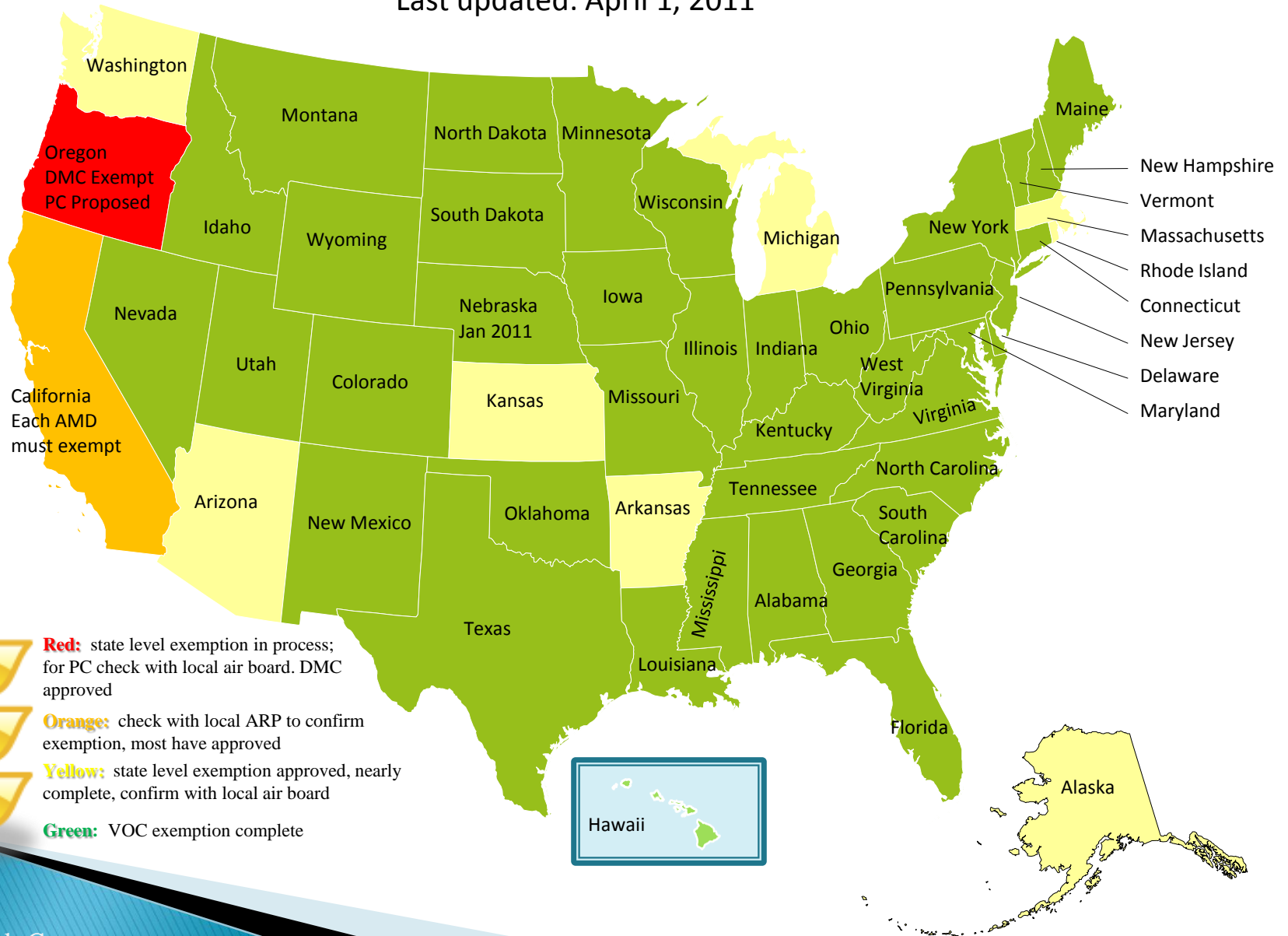
- ▶ Review of DMC physical properties
- ▶ VOC exemption status by state
- ▶ Physical properties comparison: DMC VS MEK
- ▶ Regulatory comparison: DMC VS MEK
- ▶ Use recommendations of DMC

DMC: Physical Properties

- ▶ Colorless
- ▶ Moderate to fast evaporation rate
 - n-butyl acetate =1; DMC=3.4 ; acetone=7.2;
- ▶ Good solvency and compatibility
 - Polar solvency
 - Moderate H-bonding strength
- ▶ Low toxicity
 - Mild odor, sweet and crisp
 - Low skin irritation
 - TWA 200 ppm, recommended exposure limit
- ▶ Freeze point: 2 – 4 °C (36 –38 °F)
- ▶ Flammable Liquid, Flash point: 17 °C (63 °F)
- ▶ Density: 1.071

DMC & PC VOC EXEMPT STATES

Last updated: April 1, 2011



Physical Property Comparison: DMC VS MEK

Physical Property	DMC	MEK
Density @ 25C (#/gal)	8.9	6.7
Boiling Point (C)	90	80
Evaporation Rate	3.2	4.0
Flash Point (F)	17.2	-3.9
Hansen solubility Parameter (Cal/cm) ³	9.9	9.3
Polar/Hydrogen bonding	4.7/1.9	4.4/2.5
Surface Tension (dynes/cm)	28.5	24.2
Vapor Pressure 20 C (mm Hg)	42	85
Freeze Point (C)	4	-86.3

DMC compares favorably

- ▶ DMC physical properties compare favorably to MEK
- ▶ Pros: improved flash point for fire safety
- ▶ Cons: freeze point

Regulatory Comparison: DMC VS MEK

Regulation	DMC	MEK
SARA 313 Reportable	No	No
Hazardous Air Pollutant	No	No
VOC	No	Yes

DMC: Paint & Coating Use

- ▶ **Co-Solvent:** DMC is best used as a co-solvent for:
acrylics, urethane and alkyd systems
 - Partial to full replacement with DMC did not show negative coating performance for polyurethane varnish and matt finish paints
- ▶ **Compatibility:** DMC is miscible with almost all organic solvents
- ▶ **Regulatory Compliance:** DMC easily replaces:
 - oxygenated solvents like esters and glycol ethers for improved regulatory compliance
 - partial amounts of alcohols and ketones