



VOC Reduction in Solvent Cement

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VOC containing materials are essential for solvent welding



- Volatile Organic Compounds (VOC): Organic chemicals that evaporate into the atmosphere at room temperature.
- VOC evaporation mainly occurs when the applied layer of solvent cement is exposed to air.



Solvent Cement

Volatile Organic Compounds

Indoor environment

Health hazard

- *Short term*

- *Long term*

Outdoor environment

Ground level ozone

Airborne fine particulates

Indoor Air Quality

CDPH Standard Method

Indoor chamber test under defined conditions (temperature, relative humidity, and ventilation)

US Green Building Initiative LEED v4

Specifies limit values for both VOC content and VOC emissions in order to obtain LEED credit for Indoor Environmental Quality

Outdoor Air Quality

South Coast Air Quality Management District (SCAQMD)

Rule 1168 to protect outdoor air quality against smog by setting limits for VOC content in solvent cements.

SCAQMD Rule 1168: limits VOC for solvent cement



- SCAQMD Rule 1168 was adopted in 1989 to protect outdoor air quality against smog.
- One of the most stringent air quality regulations in USA
- SCAQMD standards are adopted by many regulatory agencies across the world.

Maximum VOC allowed (g/L)

PVC Solvent Cement	425
CPVC Solvent Cement	400
ABS Solvent Cement	325
ABS to PVC Transition Cement	425
Primer	550

SCAQMD Method 316A-92



Preparation



Application



Curing

Heating
1 hr @ 110 C

Calculation

Solid content
VOC exempt solvent
Specific gravity

**VOC
Retained**

**VOC
Emitted**

Strategy 1 : Optimize solvent blend



Solvent Cement

- ✓ Not all solvents are equal
- ✓ Introduce VOC exempt solvent in the blend
- ✓ Slow evaporating solvent can help with VOC emitted

Watch out

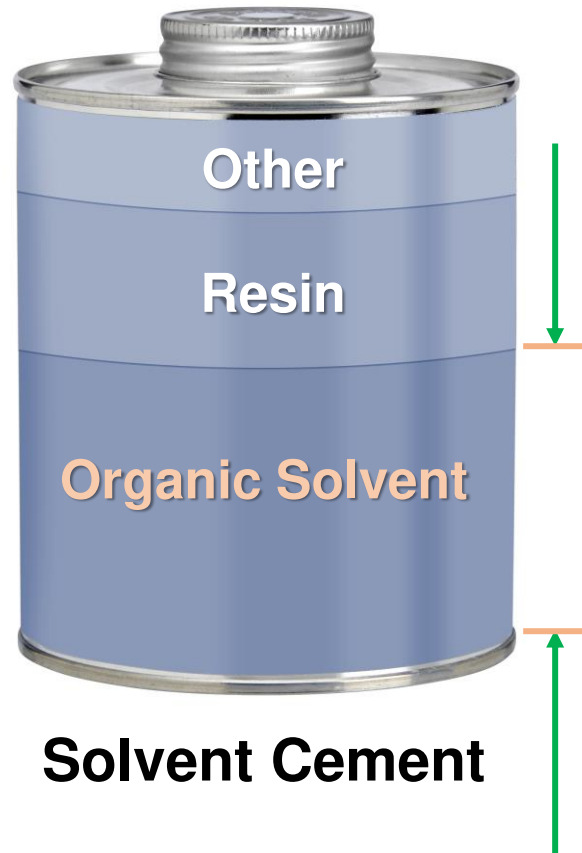
- X Health hazard
- X Product stability
- X Cure rate

Some VOC Exempt solvents*

Methyl Acetate
Acetone
Methyl Formate
Propylene Carbonate
Methylene Chloride

*<https://www.epa.gov/ground-level-ozone-pollution/complete-list-voc-exemption-rules>

Strategy 2 : Reduce amount of solvent



✓ Higher solid content

Watch out

✗ Viscosity

✗ Product stability

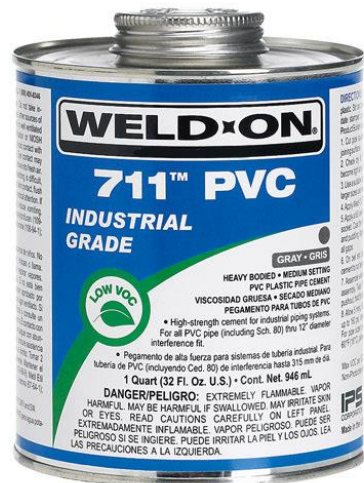
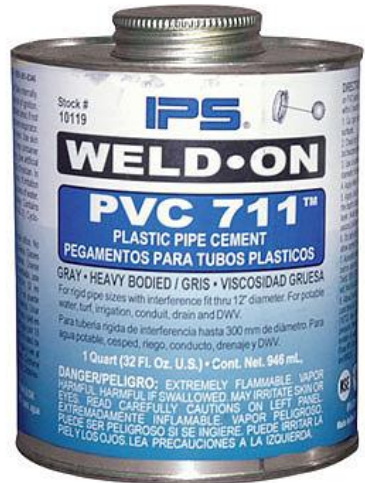
✗ Cure rate

✗ Cost

VOC requirements will become more prevalent and stricter



- New generation of low-emitting VOC products that can perform similar to traditional products.
- Both indoor and outdoor VOC emissions will be equally important.
- Two-part CPVC/PVC pipe adhesive based product provide zero VOC alternatives.



VOC

510 g/L

425 g/L

<50 g/L

