Proposed Amended Rule 1130 – Graphic Arts

Working Group Meeting #3

September 22, 2026, 10:30 AM (PDT)

Join Zoom Meeting: https://aqmd.zoomgov.com/j/1653609495

Meeting ID: **165 360 9495**

Agenda

- Background
- Objectives
- BARCT Assessment
- Staff Recommendations

WGM #2 Summay

- Regulatory background for para-Chlorobenzotrifluoride (pCBtF) and tert-Butyl Acetate (t-BAc)
- Rule 1130 analysis
  - Manufacturer survey result for pCBtF and t-BAc
  - Equipment and emission inventory
  - Compliance of VOC limits
  - Unregulated printing equipment
- Site visit

Rule 1130 Background

- Rule first adopted in 1980
- Last amendment in 2014
- VOC limits established for
  - Graphic arts materials including coatings, inks, and adhesives (Table of Standards I); and
  - Fountain solution (Table of Standard II)
- No Change on any VOC limit since the 1999 amendment

Rulemaking Objectives

Toxic Compound Prohibition

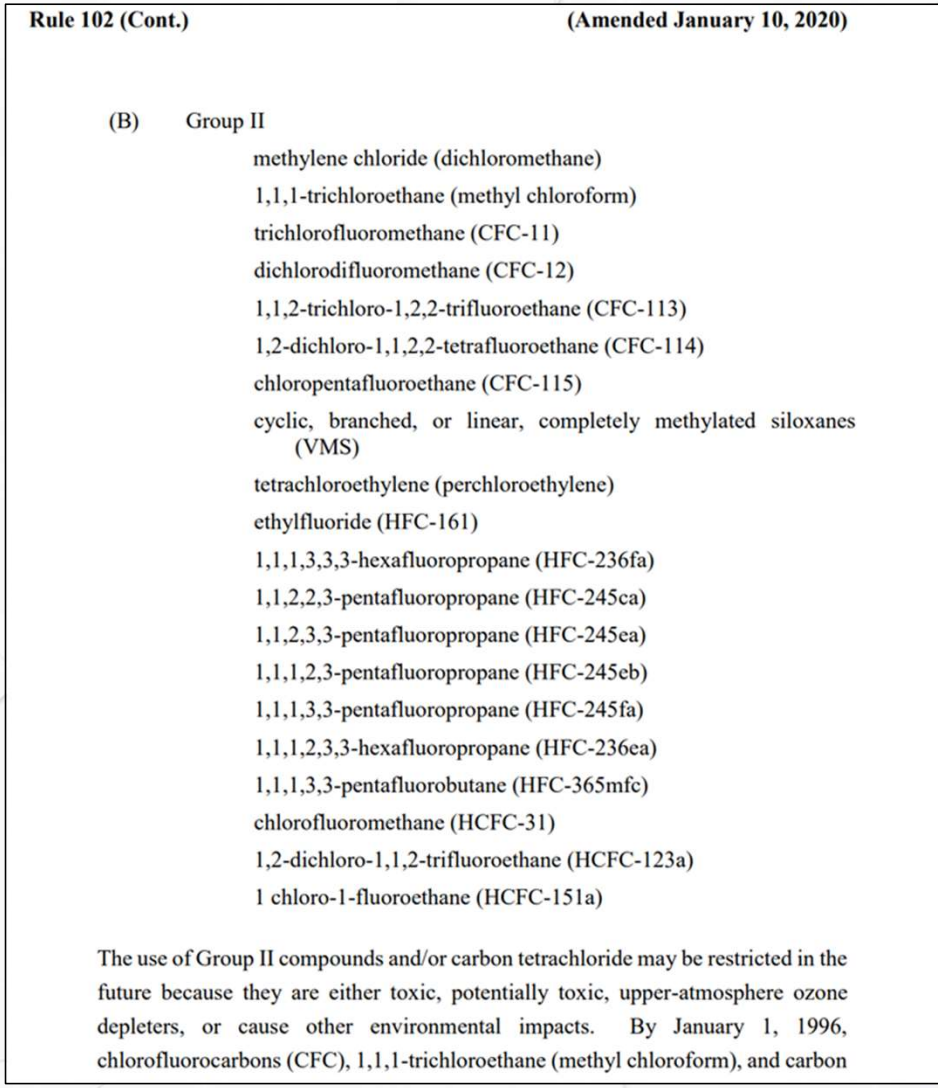
- Reduce toxic risk by phasing out:
  - pCBtF and t-BAc
  - Group II exempt compounds
    - Compounds identified in Rule 102 – Definitions of Terms as toxic, potentially toxic, or cause other environmental impacts
- No indication chemicals are used in Rule 1130 products

VOC Emission Reduction

- Staff identified potential to:
  - lower VOC limits; and
  - Include unregulated digital printing
- A Best Available Retrofit Control Technology (BARCT) assessment was conducted

Group II Exempt Compounds

- Prohibited in many South Coast AQMD VOC rules including:
  - 1106, 1113, 1136, 1144, 1151, 1168, 1171
- Considering to prohibit all Group II compounds



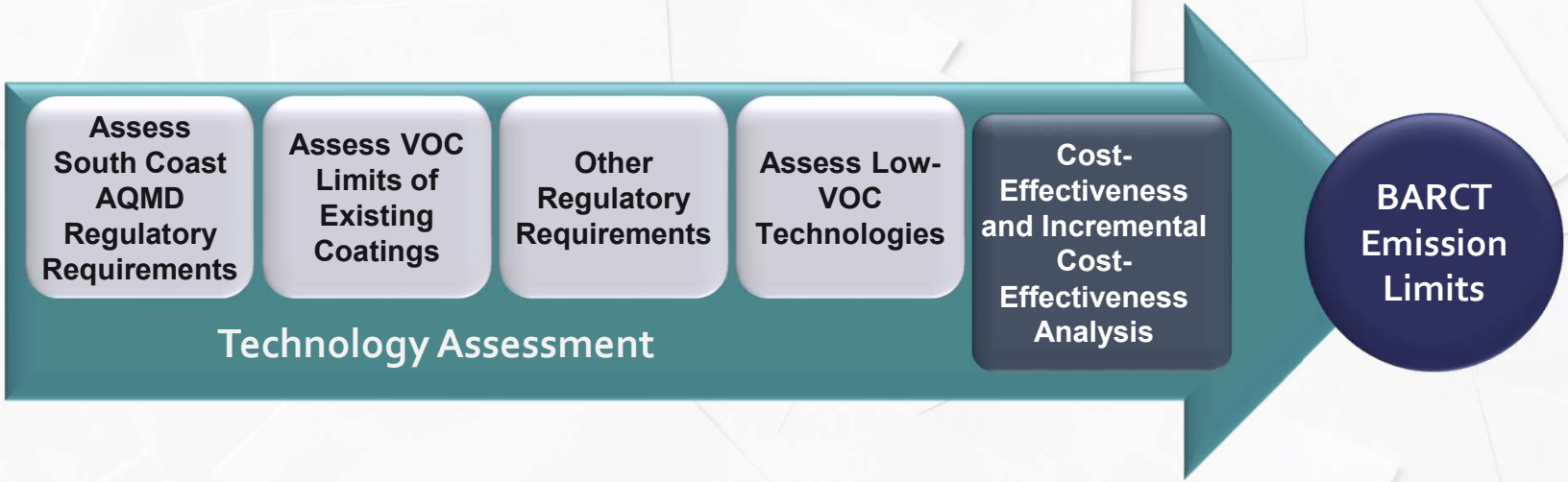
Rule 102 (Cont.) **(Amended January 10, 2020)**

(B) Group II

methylene chloride (dichloromethane)
1,1,1-trichloroethane (methyl chloroform)
trichlorofluoromethane (CFC-11)
dichlorodifluoromethane (CFC-12)
1,1,2-trichloro-1,2,2-trifluoroethane (CFC-113)
1,2-dichloro-1,1,2,2-tetrafluoroethane (CFC-114)
chloropentafluoroethane (CFC-115)
cyclic, branched, or linear, completely methylated siloxanes (VMS)
tetrachloroethylene (perchloroethylene)
ethylfluoride (HFC-161)
1,1,1,3,3,3-hexafluoropropane (HFC-236fa)
1,1,2,2,3-pentafluoropropane (HFC-245ca)
1,1,2,3,3-pentafluoropropane (HFC-245ea)
1,1,1,2,3-pentafluoropropane (HFC-245eb)
1,1,1,3,3-pentafluoropropane (HFC-245fa)
1,1,1,2,3,3-hexafluoropropane (HFC-236ea)
1,1,1,3,3-pentafluorobutane (HFC-365mfc)
chlorofluoromethane (HCFC-31)
1,2-dichloro-1,1,2-trifluoroethane (HCFC-123a)
1 chloro-1-fluoroethane (HCFC-151a)

The use of Group II compounds and/or carbon tetrachloride may be restricted in the future because they are either toxic, potentially toxic, upper-atmosphere ozone depleters, or cause other environmental impacts. By January 1, 1996, chlorofluorocarbons (CFC), 1,1,1-trichloroethane (methyl chloroform), and carbon

BARCT Assessment



- When considering lower or new VOC limits, staff conducts BARCT assessment

Current VOC Limits – Graphic Art Materials

Assess South Coast AQMD Regulatory Requirements

- Table summarizes the graphic art material VOC limits
- Applicable to supply chains and end users
- For recordkeeping purposes, retention factors for lithographic inks: 20% for heatset, 95% for non-heatset

Graphic Art Material VOC Limits (Current)

Category	VOC Limit (g/L)
Adhesives	150
Flexographic Ink on Porous Substrates	225
Matte Finish Inks	535*
Metallic Inks	460*
All other inks and coatings	300

*Higher limit only applicable to facilities which use less than 2 gallons per day and 125 gallons per year, and emit less than 10 tons per year of VOC

Current VOC Limits – Fountain Solutions

- Fountain solutions are usually high VOC products mixed with water
- VOC limits for fountain solutions is **as applied** (VOC of the mixture rather than individual components)

Type	VOC Limit (g/L)
Heatset Web-Fed	
Alcohol without Refrigerated Chiller	16
Alcohol with Refrigerated Chiller	30
Alcohol Substitute	50
Sheet-Fed	
Alcohol without Refrigerated Chiller	50
Alcohol with Refrigerated Chiller	85
Alcohol Substitute	50
Non-Heatset Web-Fed	50

Other Regulatory Requirements

Comparing VOC Limits for Graphic Art Materials

- Limits for inks and coatings are identical in most other jurisdictions

Category	South Coast	Bay Area Air District	Valley Air District
	(g/L)		
Adhesives	150	150	150
Flexographic Ink on Porous Substrates	225	225	225
Matte Finish Inks	535*	-	535†
Metallic Inks	460*	-	460†
All other inks and coatings	300	300	300

* Higher limit only applicable to facilities which use less than 2 gallons per day and 125 gallons per year, and emit less than 10 tons per year of VOC

† Higher limit only applicable to facilities which emit less than 10 tons per year VOC

Digital Printing

- Bay Area and Valley Air Districts regulate digital printing with labeling and recordkeeping requirements
  - With exemption from VOC limits
- Not regulated by any South Coast AQMD rule

- Bay Area Air District Definition
  - **Digital Printing:** A print-on-demand method of printing in which an electronic output device transfers variable data, in the form of an image, from a computer to a variety of substrates. Digital printing methods include, but are not limited to, inkjet printing, electrophotographic printing, dye sublimation printing, thermal wax printing and solid ink printing.
- Valley Air District Definition
  - **Digital Printer:** a printing device that uses a computer-driven machine to transfer an electronic image to a substrate through the use of inks, toners, or other graphic materials. Digital printing technologies include, but are not limited to, various forms of inkjet, thermography, electrophotography, ionography, and magnetography.

Comparing Limits for Fountain Solutions

Valley Air District limits for fountain solutions are lower for certain categories

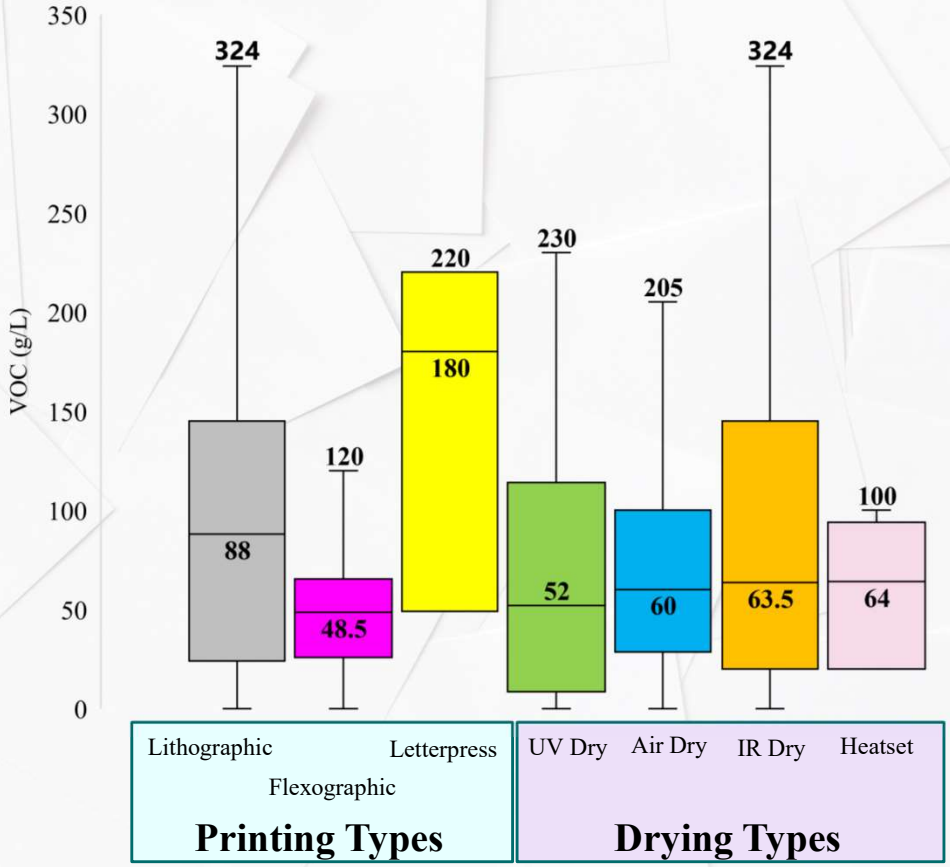
- Heatset Web-Fed Alcohol with Refrigerated Chiller and Alcohol Substitutes at approximately 16 grams per liter
- Sheet-Fed Alcohol with Refrigerated Chiller at approximately 50 grams per liter

Type	South Coast (g/L)	Bay Area Air District (% by volume)	Valley Air District (% by volume)
Heatset Web-Fed			
Alcohol without Refrigerated Chiller	16	8% (~80 g/L)	1.6% (~16 g/L)
Alcohol with Refrigerated Chiller	30		
Alcohol Substitute	50		
Sheet-Fed			
Alcohol without Refrigerated Chiller	50		5% (~50 g/L)
Alcohol with Refrigerated Chiller	85		
Alcohol Substitute	50		
Non-Heatset Web-Fed	50		8% (~80 g/L)

Assess VOC Limits of Existing Coatings

VOC of Inks

- Staff reviewed inspection reports of print shops with South Coast AQMD Permits to Operate
  - Recorded lowest and highest VOCs of inks used at each facility
  - Facility highest recorded and average high VOC for each printing and drying type shown on graph
- Majority of inks currently used are below 100 g/L in most categories
  - Well below their VOC limits
- Higher VOC for letterpress printers



*Inks over 300 g/L used at facilities with VOC controls

VOC of Digital Inks

- Several types of digital printing processes with different requirements
  - Certain types of inks much higher VOCs than others
- Range of reported VOC: 0 - 790 g/L
  - Highest VOCs reported for liquid electrophotography (LEP), which recovers majority of the VOC-containing solvent during the process

Assess Low-VOC Technologies

VOC Controls

- Most common control technology for printing presses are Regenerative Thermal Oxidizers (RTOs)
  - Used to control total VOC emitted by facility, or to use coatings VOC above limits
  - Rule 1130 requires 95% destruction efficiency or output no more than 50 PPMV, and 90% control efficiency
  - Average efficiency of RTOs at Rule 1130 facilities is 98%
- Controls are expensive, typically installed to use inks with higher VOC or to avoid Title V requirements
- Staff will primarily consider low VOC inks to achieve limits rather than controls

Staff Recommendations

- Prohibit pCBtF, t-BAc, and Group II exempts
- Consider lowering all ink and coating categories to 100 g/L or less
  - Or comply with approved emission control system as currently allowed in the rule
  - Consider higher limit for letterpress
- Lower heatset web-fed and sheet-fed fountain solution limits to match Valley Air District limits
- Regulate digital printing operations
  - Consider limiting most digital inks to 300 g/L, higher for LEP

Next Steps

- Continue Site Visits and Meetings with Stakeholders
- Release Rule Language Q4 2026
- Public Hearing March 5, 2027 (subject to change)

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