

The logo of the Eastern Kern Air Pollution Control District (APCD) is a circular seal. It features a central illustration of a landscape with rolling green hills, a blue body of water, and three white wind turbines. A bright yellow sun is positioned above the turbines. The words "EASTERN KERN" are written in a light blue arc at the top of the seal, and "AIR POLLUTION CONTROL DISTRICT" is written in a light blue arc at the bottom. The text "Eastern Kern APCD" is prominently displayed in a large, bold, dark blue serif font across the center of the slide, with horizontal lines extending from the left and right sides of the text.

# **Eastern Kern APCD**

**Rule Development  
Public Workshop  
July 6, 2022**



# Background - Ozone NAAQS

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NO<sub>x</sub> and VOCs are ozone precursor pollutants, that when emitted can form tropospheric ozone in the presence of light winds, high temperatures, and sunlight.

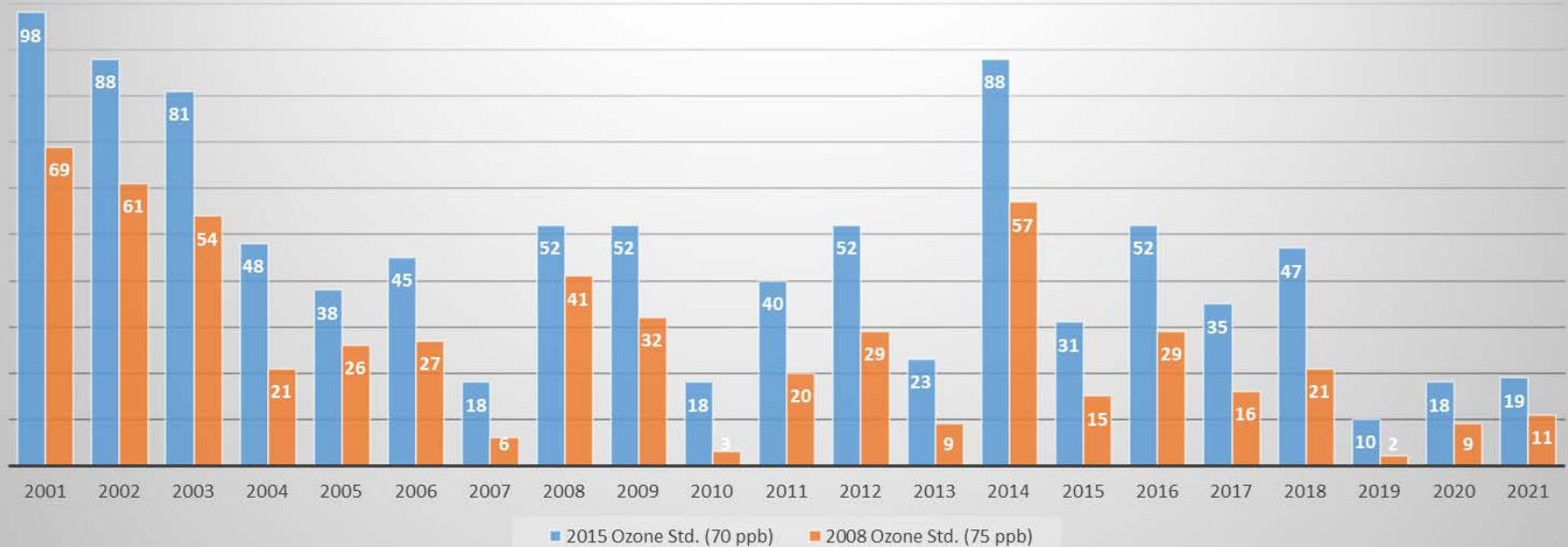
In 2008, EPA adopted a new 8-hour Ozone NAAQS of 75 parts per billion (ppb).

A portion of the District was classified as Serious Nonattainment and required to achieve attainment by the of end of 2020.

The District failed to meet the 75 ppb standard by the attainment date and was reclassified to Severe Nonattainment.

# Ozone Trends

Days exceeding Federal 8-HR Ozone Standard





# Severe Nonattainment

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- On July 7, 2021- Eastern Kern reclassified from serious to “severe” nonattainment area for the 2008 ozone National Ambient Air Quality Standards (NAAQS)
- Language requiring the District to attain the 2008 ozone NAAQS as expeditiously as practicable, no later than July 20, 2027
- Section 182(c)(2)(B) of the Clean Air Act (CAA) requires the District to demonstrate Reasonable Further Progress (RFP) towards attaining the NAAQS



# Severe Nonattainment (cont.)

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- Rule changes were initially intended as contingency measures, to be triggered if the District failed to meet RFP or an ozone attainment deadline
- District was informed in May of 2022 it is not projected to meet RFP requirements with current Rules (3% annual VOC/NO<sub>x</sub> emission reductions for 5 years)

# Severe Nonattainment

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- For attainment plan to be approvable by EPA while not meeting RFP, “all measures achieved in practice by sources in the same source category in nonattainment areas of the next higher classification” must be implemented by the District
- Next higher classification is EXTREME nonattainment for ozone
- San Joaquin Valley & South Coast Air Basins are the areas classified as extreme nonattainment



# Rule 410.8 Changes

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- Section II – Definitions
- Section IV – Exemptions
- Section V – Requirements



# Section II - Definitions

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- VOC definition revised to incorporate 40 CFR 51.100 by reference
- 12 coating categories in table of standards have had definitions added:
  - Bonding Maskant
  - Commercial Interior Adhesive
  - Compatible Substrate Primer
  - Critical Use & Line Sealer Maskant
  - Cryogenic Flexible Primer
  - Cryoprotective Coating
  - & several others...





# Section IV-Exemptions

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Change to the “low usage” exemption from coating VOC content requirements (Subsection G.1)

- Currently 50 gal/yr per formulation, up to 200 gal/yr total (same as aerospace NESHAP)
- 50 gal/yr per formulation → 20 gal/yr per formulation



# Section IV-Exemptions

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Extreme nonattainment areas:

- South Coast – 20 gal/yr per formulation, 200 gal/yr total
- San Joaquin Valley – 1 gal/day & 20 gal/yr per formulation

Other Air Districts in Basin:

- Antelope Valley, Mojave Desert – 20 gal/yr per formulation, 200 gal/yr total



# Section IV-Exemptions

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## Changes to “Touch-Up” and Stencil Coating Exemption

- Rule does not specify a surface area limit to what constitutes “touch-up” coating exempt from VOC limits
- Specified a limit of 9 square feet per aircraft for the exemption (similar to Rule 410.4A – Motor Vehicle & Mobile Equipment Refinishing)
- APCO may allow a larger area for infrequent operations



# Section V-VOC Content Limits

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Comparison to other Air District Rules:

- 10 other air districts have aerospace coating rules
- 85 coating categories assessed
- 51 categories were equivalent to most stringent
- More stringent requirements found for the following:
  - 5 primer categories
  - 17 topcoat categories
  - 5 adhesive categories
  - 1 sealant categories
  - 4 maskant categories
  - 2 lubricant categories

# Section V-VOC Content Limits

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Extreme Nonattainment Area More Stringent

	<b>Eastern Kern</b>	<b>San Joaquin</b>	<b>South Coast</b>
Commercial Exterior Aerodynamic Structure Primer	650	350	N/A
Adhesion Promoter	850	850	250
Antichafe Coating	600	600	420
Flight Test Coating (excl. missile & single use craft)	840	600	840
Metallized Epoxy Coating	740	740	700
Fastener Sealant	675	600	675

# Section V-VOC Content Limits

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Coating categories not listed in extreme nonattainment area rules

## Primers

	<b>Eastern Kern</b>	<b>Antelope Valley</b>	<b>Santa Barbara</b>
Compatible Substrate Primer	780	780	350
Cryogenic Flexible Primer	645	645	350
Elevated Temperature Skydrol- Resistant Commercial Primer	740	740	350
Flexible Primer	640	640	350
Primer Compatible w/ Rain Erosion Resistant Coatings	850	850	N/A

# Section V-VOC Content Limits

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Coating categories not listed in extreme nonattainment areas (cont.)

## Topcoats

	<b>Eastern Kern</b>	<b>Antelope Valley</b>	<b>Mojave Desert</b>
Cryoprotective Coating	600	600	600
Fire Resistant Coating (Space Vehicles)	800	800	800
Fuel Tank Coating, Rapid Cure	720	720	720

# Section V-VOC Content Limits

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Coating categories not listed in extreme nonattainment areas (cont.)

## Adhesives

	<b>Eastern Kern</b>	<b>Antelope Valley</b>	<b>San Diego</b>
Commercial Interior Adhesive	760	760	250*
Cyanoacrylate Adhesive	1,020	1,020	250*
Rocket Motor Bonding Adhesive	890	890	250*
Rubber-Based Adhesive	850	850	250*
Structural, Autoclavable, High Temperature	650	650	N/A

\*limit for “all other adhesives”



# Section V-VOC Content Limits

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Coating categories not listed in extreme nonattainment areas (cont.)

## Maskants

	<b>Eastern Kern</b>	<b>San Diego</b>	<b>Sac Metro</b>
Bonding Maskant	1,230	600	850*
Seal Coat Maskant	1,230	N/A	850*

\*limit for all maskants except chemical milling & processing

# Section V-VOC Content Limits

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Coatings where South Coast/San Joaquin not most stringent:

	<b>Eastern Kern</b>	<b>Extreme Area(s)</b>	<b>Mojave Desert</b>	<b>Sac Metro</b>
Chemical Agent Resistant	550	550	500	N/A
Clear Topcoat	520	520	420	420
Conformal	750	750	750	600
Electric/Radiation Effect	800	800	800	600
Electrostatic Discharge/EMI	800	800	800	612*

\*non-space vehicles

# Section V-VOC Content Limits

Coatings where South Coast/San Joaquin not most stringent (cont.):

	<b>Eastern Kern</b>	<b>Extreme Area(s)</b>	<b>Mojave Desert</b>	<b>Santa Barbara</b>	<b>Sac Metro</b>
Fire Resistant (Interior) - Civilian	650	650	650	600*	600
Fire Resistant (Interior) - Military	800	800	800	600*	N/A
Fire Resistant (Interior) - Space	800	N/A	800	600*	N/A
High Temperature	850	850	720	720	420
Mold Release	780	780	780	780	762

\*SB rule only lists one category of fire-resistant coating

# Section V-VOC Content Limits

Coatings where South Coast/San Joaquin not most stringent (cont.):

	<b>Eastern Kern</b>	<b>Extreme Area(s)</b>	<b>San Diego</b>	<b>Mojave Desert</b>	<b>Ventura</b>	<b>Sac Metro</b>
Rain Erosion-Resistant Coating	800	800	690	600	420	600
Wet Fastener Installation Coating	675	675	675	675	N/A	620
Wing Coating	750	750	420	750	420	N/A
Structural Nonautoclavable Adhesive	850	850	250	700	850	600
Critical Use/Line Sealer Maskant	750	750	650	750	N/A	N/A



# Section V-VOC Content Limits

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Categories initially considered but no longer being revised:

- Adhesion Promoter
- Electric/Radiation Effect Coating
- Electrostatic Discharge & Electromagnetic Interference Coating
- Rain Erosion Resistant Coating
- Wet Fastener Installation Coating
- Wing Coating

# Section V-VOC Content Limits

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## Primers

	Current	Proposed
Commercial Exterior Aerodynamic Structure Primer	650	350
Compatible Substrate Primer	780	350
Cryogenic Flexible Primer	645	350
Elevated Temperature Skydrol-Resistant Commercial Primer	740	350
Flexible Primer	640	350

# Section V-VOC Content Limits

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## Coatings

	Current	Proposed
Antichafe Coating	600	420
Conformal Coating	550	500
Flight Test Coating (excl. missiles & single use aircraft)	750	600
High Temperature Coating	850	720
Metalized Epoxy Coating	740	700
Mold Release Coating	780	762
Clear Topcoat	520	420

# Section V-VOC Content Limits

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## Adhesives

	Current	Proposed
Structural, Non-Autoclavable	850	700

## Sealants

	Current	Proposed
Fastener Sealant	675	600



# Section V-VOC Content Limits

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## Maskants

	<b>Current</b>	<b>Proposed</b>
Bonding Maskant	1,230	600
Critical Use & Line Sealer Maskant	750	650
Seal Coat Maskant	1,230	850

# Section V - Coating Application

## Equipment Cleaning Solvents

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- Rule does not currently set a VOC content limit for these solvents
- Extreme Nonattainment Areas
  - South Coast – VOC content not to exceed 25 g/L
  - San Joaquin – Use enclosed cleaning device or equipment proven to be equally effective

# Section V - Coating Application

## Equipment Cleaning Solvents

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- Non-Extreme Areas
  - Antelope Valley - VOC content not to exceed 200 g/L, or solvent composite partial pressure <45 mmHg @ 20°C (68°F)
  - Santa Barbara – ROC content not to exceed 25 g/L, or use of an enclosed cleaning system or equipment proven to be equally effective
  - Ventura – enclosed spray gun washer, solvent composite partial pressure < 5 mmHg @ 20°C (68°F), or 25 g/L ROC content

# Section V - Coating Application Equipment Cleaning Solvents

Proposed Changes to Cleaning Solvent  
Requirements:

- Use enclosed equipment cleaning device; or
- Outside of an enclosed cleaning device:  
VOC content  $\leq 25$  g/L, or a composite  
partial pressure  $< 5$  mmHg @ 20°C



# Emission Reductions

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- Estimated Emission Reductions:
  - Exemption Change – 1 lb/day (0.0005 ton/day)
  - Coating VOC Content Changes – 1.4 lb/day (0.0007 ton/day)
  - Equipment Cleaning Solvent Change – 1.2 lb/day (0.006 ton/day)
- Total: 0.0018 ton/day
- Emission reductions committed to for contingency: 0.014 ton/day
- Additional emission reductions needed...



# VOC Control Device

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- Two commonly used control devices for coating VOC emissions
- Carbon Adsorber
  - Captures VOC through chemical bonding with carbon, polymer, or zeolite filter
  - Generally lower cost, but VOC must be removed regularly & treated/destroyed through other means
- Thermal/Catalytic Oxidizer
  - Destroys VOC through combustion, high efficiency (98% +)
  - Higher cost; results in NO<sub>x</sub>, CO, & potential toxic emissions

# VOC Control Device

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- Assessed cost to install carbon adsorber
- Primary factor contributing to adsorber cost is amount of carbon required to treat VOC in exhaust stream





# VOC Control Device

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- Carbon required – based on highest emission rate of permitted sources
  - Highest permit limit is 910 lb/day (combined coating & solvent)
  - Estimated 100 lb/hr maximum emissions
  - 6,400 lb of carbon necessary to treat



# VOC Control Device

- Estimate of total capital investment for adsorber
  - EPA Cost Control Manual – replaceable carbon canisters available at following costs:

Canister Size (lb carbon)	Maximum Flow Rate (cfm)	Canister Type	2018 Price (\$)		2022 CPI Adjusted Price (\$)	
			Virgin Carbon	Reactivated Carbon	Virgin Carbon	Reactivated Carbon
1,000	600	Epoxy-Lined Steel	6,600	-	7,486	-
1,000	1,000	Epoxy-Lined Steel	11,500	7,000	13,044	7,940
2,000	2,000	Epoxy-Lined Steel	19,000	10,000	21,551	11,343
2,000	750	Carbon Steel	22,000	13,200	24,954	14,972
3,000	2,000	Epoxy-Lined Steel	13,900	-	15,766	-
4,100	8,000	Polypropylene	45,000	-	51,042	-
5,000	2,500	Carbon Steel	42,600	20,100	48,320	22,799
8,000	4,500	Carbon Steel	66,000	30,000	74,862	34,028
10,000	18,000	Polypropylene	94,500	-	107,188	-



# VOC Control Device

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## Direct Install Costs

- Taxes (10.5%)
- Freight (10%)
- Instrumentation (10%)
- Handling/Erection (14%)
- Piping/Ducting (2%)

## Indirect Install Costs

- Engineering (10%)
- Construction (5%)
- Start-up (2%)
- Performance Test (1%)



# VOC Control Device

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## Additional Costs

- Contractor Fees (10% of combined direct & indirect cost)
- Contingency Reserves (40%, conservative)
- Labor (monitor & maintain adsorber)
- Property Taxes & Insurance
- Administrative
- Overhead



# VOC Control Device

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- Total Capital Investment: ~\$116,000
  - Annualized (4% interest, 10-year life): ~\$14,400
- Indirect Cost: ~\$8,500
- Annual Operation: ~\$11,500
- Labor: ~\$7,400
- Full Carbon Replacement: ~\$33,300
- Total Annual Cost: ~\$66,500



# VOC Control Device

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- Re-assessment of District cost effectiveness threshold
  - Last adjustment to District VOC cost-effectiveness threshold in 1998
- Ozone nonattainment status has increased (Moderate/Serious → Severe)
- San Joaquin Valley APCD threshold of \$22,600/ton VOC (2021) selected for “cost-effectiveness cutoff”

# VOC Control Device

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- Necessary reductions to be cost effective: 2.95 ton/year
- Minimum control efficiency required by Rule: 85.5%
- Uncontrolled emissions to be cost-effective to implement VOC controls: 3.50 ton/year





# Emission Control Plan

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- Owner/Operator shall submit plan to comply with VOC control device requirement within 6 months after adoption
- Plan should include list of permitted operation(s), VOC emission limits, annual VOC emissions from three preceding years, and whether a VOC control device is installed
- If uncontrolled VOC emissions above the amount where a control device is cost-effective (7,000 lbs. or 3.50 tons per year), plan should also include an application to install a VOC control device serving permitted operation



# Phase-In Schedule

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Requirements will be phased-in over time:

- Touch-up coating exemption change effective upon adoption
- Compliance plans for VOC control device required within 6 months after adoption (March 2023)
- “Low use” exemption and VOC content limit changes effective 18 months after adoption (March 2024)
- VOC control device installed & operating (if required) 3 years after adoption (September 2025)





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# **Rule 410.8**

## **Questions**

## **Comments**



# Contact Information

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