

# Wellbeing with Low VOC Paints

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20000+ breaths a Day

Breathe

2 kg a Day

FOOD

8000+ L a Day

Air

3 L a Day

H<sub>2</sub>O

Yet we pay so much attention to what we eat and drink, and **so little** to what we **Breathe.**

<https://www.webmd.com/lung/ss/slideshow-lung-facts-overview> (accessed on 15.10.2022)

<https://www.bbc.com/worklife/article/20200303-why-slowng-your-breathing-helps-you-relax> (accessed on 15.10.2022)

Irene B., Mark W., Antigone K.B., Bertil S., Widjaja L., Yoshimitsu H. and Kazuyo H..Asia Pacific journal of clinical nutrition 13 (2004) 217-20.

<https://www.healthline.com/nutrition/how-much-water-should-you-drink-per-day> (accessed on 15.10.2022)

<https://www.lung.org/blog/how-your-lungs-work#:~:text=2%2C000%20Gallons%20a%20Day,pumped%20through%20your%20heart%20daily>. (accessed on 15.10.2022)

<https://seetheair.org/2017/01/31/we-breathe-11000-liters-of-air-daily/> (accessed on 15.10.2022)

Classification: **Public**

## Outdoor

- Pollutants (Anthropogenic)
  - Carbon monoxide
  - Lead
  - Nitrogen dioxide
  - Ozone
  - Particulate matter of different size fractions
  - Sulfur dioxide
- Pollutants (Natural)
  - Pollen, Mold spores
  - Dust

## Indoor

- Pollutants (Anthropogenic)
  - Combustion byproducts (carbon monoxide, particulate matter, tobacco smoke, etc.)
  - Pesticides, lead, and asbestos
  - Ozone (from some air cleaners)
  - Volatile organic compounds (VOCs)
- Pollutants (Natural)
  - Substances of natural origin such as radon and pet dander
  - Biological agents such as molds

Indoor air pollution poses a greater risk; VOCs indoors could be 2 – 5 times higher

<https://www.epa.gov/report-environment> (accessed on 15.10.2022)

[https://www.grihaindia.org/grihasummit/tgs2016/presentations/18feb/IndoorEnvQuality/Sumit](https://www.grihaindia.org/grihasummit/tgs2016/presentations/18feb/IndoorEnvQuality/Sumit_Sharma.pdf)

[\\_Sharma.pdf](https://www.grihaindia.org/grihasummit/tgs2016/presentations/18feb/IndoorEnvQuality/Sumit_Sharma.pdf) (accessed on 15.10.2022)

Classification: **Public**

Volatile organic compounds (VOC) means any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, which participates in atmospheric photochemical reactions (EPA).

VOCs are organic chemical compounds whose composition makes it possible for them to evaporate under normal indoor atmospheric conditions of temperature and pressure

Any organic compound having an initial boiling point less than or equal to 250°C measured at a standard pressure of 101.3 kPa (EU)

The EPA lists compounds that it has determined to be negligibly reactive in its regulations as being excluded from the regulatory definition of VOCs

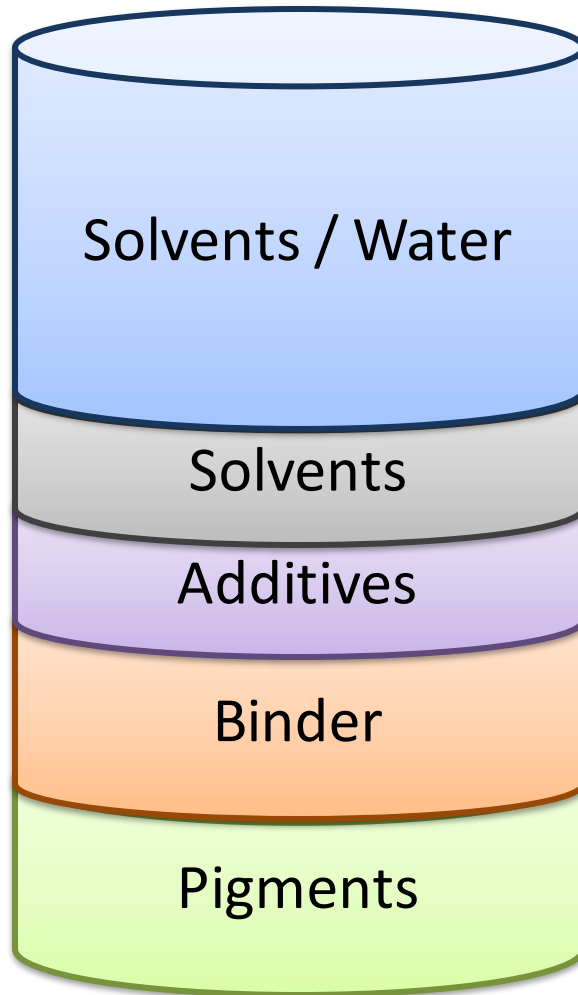
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<https://www.epa.gov/air-emissions-inventories/what-definition-voc>

DIRECTIVE 2004/42/CE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL, Official Journal of the European Union, 2004, L 143/87.

Classification: **Public**

## Paint contents



## Examples of VOCs in paints

- Solvents
  - Alcohols (MeOH, EtOH, IPA)
  - Aliphatic hydrocarbons (MTO, n-hexane, octane)
  - Esters (Monoisobutyrate, alkyl acetates)
  - Aldehydes and ketones (MEK, MIBK)
  - Aromatic hydrocarbons (C IX, toluene, xylene)
- Other chemicals
  - Formaldehyde
  - Methylene chloride
  - Glycols (MEG, DEG, PG)
  - Monomers (Styrene, BA, MMA, EHA)
  - Terpenes (Limonene,  $\alpha$ -Pinene)



## Coating VOC or Regulatory VOC

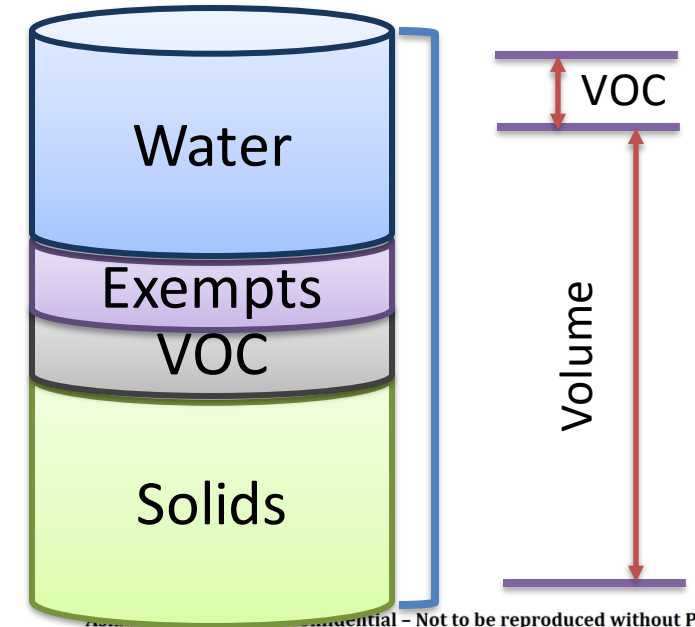
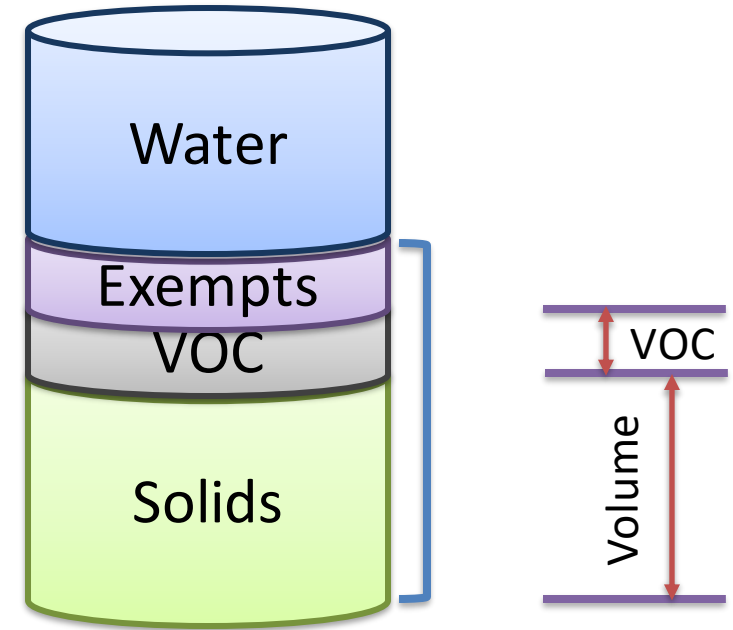
Grams of VOC per liter of coating, less water and exempt compounds

$$VOC_{Regulatory} = \frac{W_{volatiles} - W_{water} - W_{exempt\ compounds}}{V_{coating} - V_{water} - V_{exempt\ compounds}} \text{ in g/L}$$

## Material VOC or As supplied VOC or Actual VOC

grams of VOC per liter of coating

$$VOC_{Material} = \frac{W_{volatiles} - W_{water} - W_{exempt\ compounds}}{V_{coating}} \text{ in g/L}$$





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## **ASTM D6886-18**

Standard Test Method for Determination of the Weight Percent Individual Volatile Organic Compounds in Waterborne Air-Dry Coatings by Gas Chromatography

## **ASTM D3960-05(2018)**

Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings



Standards

## **ISO 11890-2:2020**

Paints and varnishes — Determination of volatile organic compounds(VOC) and/or semi volatile organic compounds (SVOC) content — Part 2: Gas-chromatographic method



**METHOD 24**—Determination of volatile matter content, water content, Density, volume solids, and weight solids of surface coatings

Product	CARB SCM*	EU#\$	GreenPro€	China£	Australia¥\$
Flat Coatings	50	30	50	50	60
Nonflat Coatings	100	—	—	80	70
High Gloss Coatings	150	100	150	—	70
Anti-corrosive coatings	250	130	250	—	—
Wood stains	250	130	250	—	—
Roof Coatings	50	40	—	—	100
Wood Coatings	275	300	550	—	—
Floor Coatings	100	140	100	—	—

\* GREEN SEAL STANDARD FOR PAINTS, COATINGS, STAINS, AND SEALERS; EDITION 4.0; September 7, 2021

# DIRECTIVE 2004/42/CE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL, Official Journal of the European Union, 30.4.2004

€ GREEN PRODUCTS RATING PAINTS, Green Products and Services Council ([www.greenbusinesscentre.com](http://www.greenbusinesscentre.com))

£ <https://www.pcimag.com/articles/100037-puzzled-by-global-voc-and-emission-standards-in-architectural-paints> (accessed on 15.10.2022)

¥ <https://neotech-coatings.s3-ap-southeast-2.amazonaws.com/standards/CSIRO-VOC-details.pdf> (Accessed on 15.10.2022)

\$ Material VOC in g/L

Classification: **Public**



## Indoor Air Quality

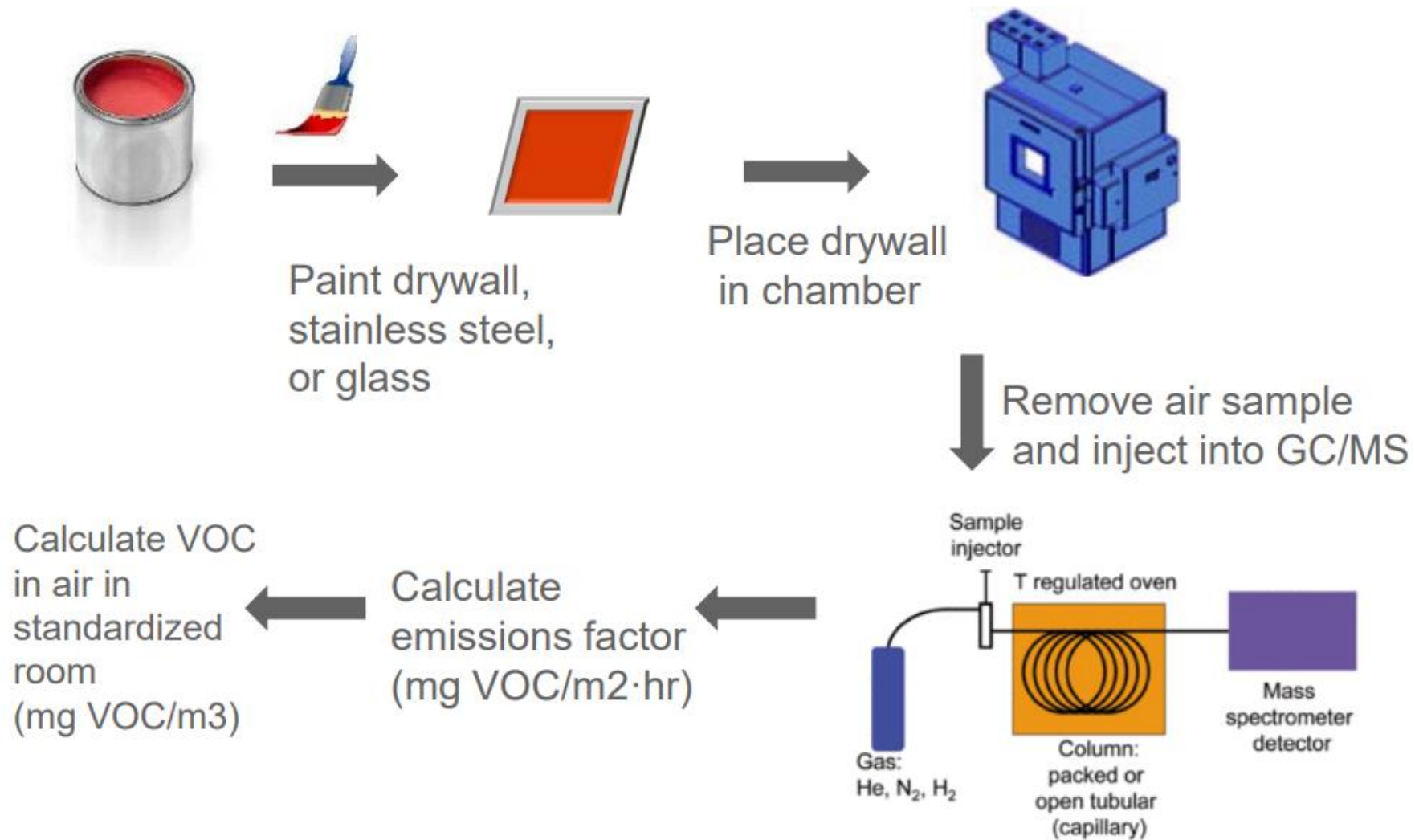
- As supplied or Regulatory VOC is an estimation of potential emissions
- Emission VOC is a measure of VOC emitted from a drying paint over a period of 14 days
- Products intended for interior application shall be tested according to, and meet the emissions limits specified in, the California Department of Public Health (CDPH) Standard Method v1.2 (2017)
- Products marketed for use in school classrooms must be evaluated using the classroom scenario. Products marketed for use in other spaces must be evaluated using the default private office scenario
- Total volatile organic compounds (TVOC) is a group of VOCs used to represent the entire pool of pollutants. It is represented as a single measure in parts per billion (ppb) or milligrams per cubic meter ( $\text{mg m}^{-3}$ )

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GREEN SEAL STANDARD FOR PAINTS, COATINGS, STAINS, AND SEALERS; EDITION 4.0; September 7, 2021  
LEED v4 for BUILDING DESIGN AND CONSTRUCTION

Classification: **Public**

TVOC Level $\text{mg m}^{-3}$	Level of Concern
Less than 0.3	Low
0.3 to 0.5	Acceptable
0.5 to 1	Marginal
1 to 3	High



- GREEN SEAL STANDARD FOR PAINTS, COATINGS, STAINS, AND SEALERS; EDITION 4.0; September 7, 2021
- Emission VOC pictogram: Courtesy - Eastman Chemicals

Classification: **Public**

- ✓ Heavy Metals
- ✓ Pesticide residues
- ✓ Carcinogen Mutagen Reprotoxin (CMR)
- ✓ Fluorinated compounds
- ✓ Preservatives
- ✓ Hazardous air pollutants (HAPs)
- ✓ Endocrine disruptors
- ✓ Residual monomers
- ✓ Aquatic toxicity

- ✓ Phthalates
- ✓ Organotin compounds
- ✓ Volatile aromatic compound (VAC)
- ✓ Substances of very high concern (SVHC)
- ✓ Formaldehyde
- ✓ STOT
- ✓ Acute toxicity
- ✓ Halogenated solvents
- ✓ Aspiration toxicity



## CII-GreenPro

- 187 products manufactured at 8 factories
- It includes interior paints, exterior paints, enamels and wood finishes



## Green Assure (Voluntary)

- 29 Products from Interior and exterior range
- Follows Green Seal for VOC



## US Green Seal

- 3 Products
- Additional emphasis on recyclable content of container and product performance



- Performance properties of Royale brand
- First GS 11 compliant Paint
- Flame retardant performance
- Covers Hairline Cracks



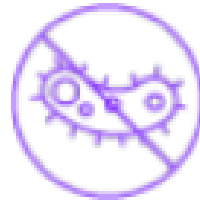
- Performance properties of Royale brand
- LEED V.4 compliance
- Formaldehyde abatement
- Silver ion Technology - Kills 99.9 % bacteria
- AAF Compliant Version available

Classification: **Public**



- Ultra Sheen finish
- Ultra matt variant
- Best in class Stain Cleanability
- With Teflon Protector
- Covers Hairline Cracks
- Resistant to Scuffing

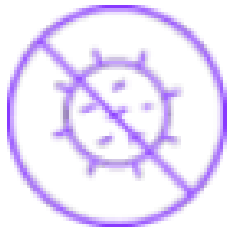




**ANTI-BACTERIAL**



**GREEN ASSURE**



**ANTI-FUNGAL**



**LOW VOC**



- Organizers and their team
- Rajeev Kumar Goel
- Bhushan Pradhan
- Contributors to this presentation:
  - ✓ Sunil Jambhale
  - ✓ Lathiesh Srinivasan



Research and Technology Center – Asian Paints

# Thank you