

Evaluation of Fragrance Speciation

September 20, 2019
10:00am-12:00pm



Fragrance Background

- ❖ Fragrance is defined in 94508(a)(54) of the Consumer Products Regulation as:
 - ❖ a substance or complex mixture of aroma chemicals, natural essential oils, and other functional components with a combined vapor pressure not in excess of 2 mm of Hg at 20°C, the sole purpose of which is to impart an odor or scent, or to counteract a malodor.
- ❖ “Fragrance” was included in the list of product formulation ingredients that were required to be submitted in response to CARB’s 2013-2015 Consumer & Commercial Product Survey
- ❖ The inherent complexity of fragrance mixtures as well as trade secrets that govern disclosure of fragrance formulations meant that most product formulators did not speciate their fragrance ingredients when responding to the survey.
- ❖ The ingredient reported to CARB as “fragrance” represents about 7.8% of the 2013 Consumer and Commercial Products Survey TOG mass.

Fragrance Speciation

- ❖ Historically, the consumer products program has considered fragrance to be 100% VOC with a reactivity derived from terpinolene for inventory purposes.
- ❖ Initial analysis of the 2013 survey data indicated that there was the potential for regulatory activity in product categories where the fragrance ingredient showed prevalence compared to other VOC ingredients, so an additional survey of fragrance formulators was conducted in 2016.
- ❖ A draft report detailing the results of the 2016 Fragrance Formulator Survey was released in December 2018.

Fragrance Speciation cont.

2016 CARB Draft Fragrance Formulator Survey Summary

VOC	Value
VOC Compounds Reported	141
VOC Range of Formulations	0.6%-100.0%
Non Speciated Compounds	61.6%
Reported TOG Compounds	38.4%
VOC % of TOG	46.6%
LVP-VOC % of TOG	53.4%

LVP-VOC	Value
LVP-VOC Compounds Reported	123
Survey Categories Represented	23
Products Represented	362
PWMIR Range (g O3/g Fragrance)	0.73-4.46

Fragrance Speciation Cont.

- ❖ Some CARB takeaways from the 2016 Fragrance Formulator Survey were:
 - ❖ Majority of fragrance mass was reported as “Grouped LVP” and not chemically speciated
 - ❖ Fragrance is not 100% VOC in every use case scenario, but more information was required before revisiting fragrance speciation assumptions
 - ❖ Fragrance in certain categories showed higher concentrations of terpene compounds compared to fragrance in other categories, which suggested more than one speciation profile for fragrance may be required

Fragrance Speciation Cont.

- ❖ Discussions have continued between CARB and the consumer products industry during 2019 in order to refine our understanding of fragrance VOC speciation and reactivity
- ❖ Additional fragrance compositional data provided to CARB will:
 - ❖ Attenuate the reductions we can expect to achieve through the adoption of VOC limit changes and new VOC limits
 - ❖ Improve emissions inventory

Fragrance Speciation Cont.

- ❖ In consultation with the fragrance stakeholders, CARB identified compounds commonly used to formulate fragrance mixtures, along with their physical properties, reactivities, and relative weighting
- ❖ From this list, we were able to estimate an average VOC content and reactivity for the fragrance ingredient across most survey categories
- ❖ This average VOC content was consistent with averages derived from individual fragrance formulations received as part of the 2016 fragrance survey
- ❖ Initial revised assumption for MOST survey categories
 - ❖ 25% VOC, 75% LVP, 2.8 MIR

Fragrance Speciation Cont.

- ❖ There is a subset of survey categories where the data suggested a 100% VOC speciation for fragrance remains appropriate
 - ❖ These were categories that showed relatively high concentrations of monoterpene compounds when compared to the fragrance concentration
 - ❖ Also, fully speciated fragrances that were present in these categories also showed high monoterpene concentrations
 - ❖ Mostly solvent and cleaning/degreasing categories
- ❖ 100% VOC, 4.04 MIR (monoterpene)

Fragrance Speciation 2019 Update cont.

Survey Categories retaining 100% VOC Speciation for fragrance

Air Freshener, solid/semisolid	Metal Polish/Cleanser (aerosol)
Algaecide/Disinfectant/Sanitizer/Shock Treatment	Metal Polish/Cleanser (nonaerosol)
Automotive Rubbing or Polishing Compound	Multi-purpose Solvent (aerosol)
Brake Cleaner	Other cleaners and degreasers
Bug and Tar Remover	Other fabric, carpet, and upholstery care products
Clean Up Solvent	Other solvent and thinning products
Footwear or Leather Care Product (aerosol)	Oven or Grill Cleaner (aerosol)
Furniture Maintenance Product (aerosol)	Oven or Grill Cleaner (nonaerosol)
Furniture Maintenance Product (nonaerosol)	Paint Remover or Stripper
General Purpose Adhesive Remover	Paint Thinner (nonaerosol)
General Purpose Cleaner (aerosol)	Penetrant
General Purpose Cleaner (nonaerosol)	Septic Tank Cleaner
General Purpose Degreaser (aerosol)	Single Purpose Cleaner
General Purpose Degreaser (labeled not for retail sale)	Single Purpose Degreaser
General Purpose Degreaser (nonaerosol)	Spot Remover (nonaerosol)
Graffiti Remover (nonaerosol)	Wood Cleaner (aerosol)
Heavy-Duty Hand Cleaner or Soap (nonaerosol)	Wood Cleaner (nonaerosol)
Lawn or Garden Insecticide (nonaerosol)	

Next Steps

- ❖ Consumer Products Emissions Inventory update is ongoing
 - ❖ Complete by end of 2019
- ❖ The fragrance speciation updates will be reflected in data presented in upcoming work group meetings and public workshop

Discussion & Questions

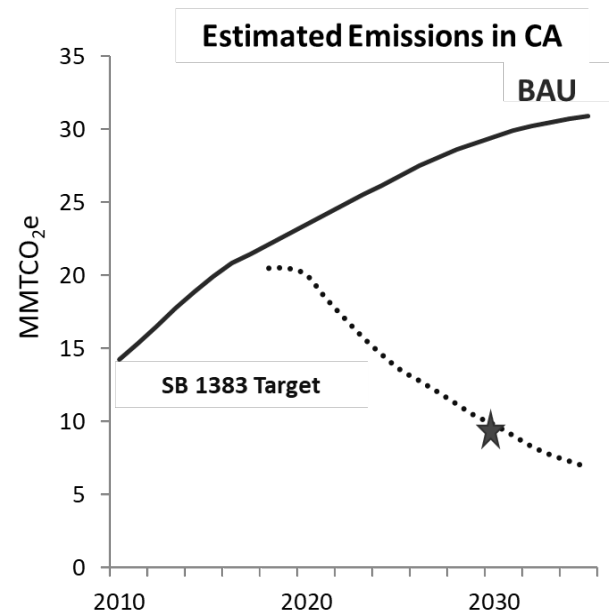
Discussion of HFC-152a Aerosol Propellant

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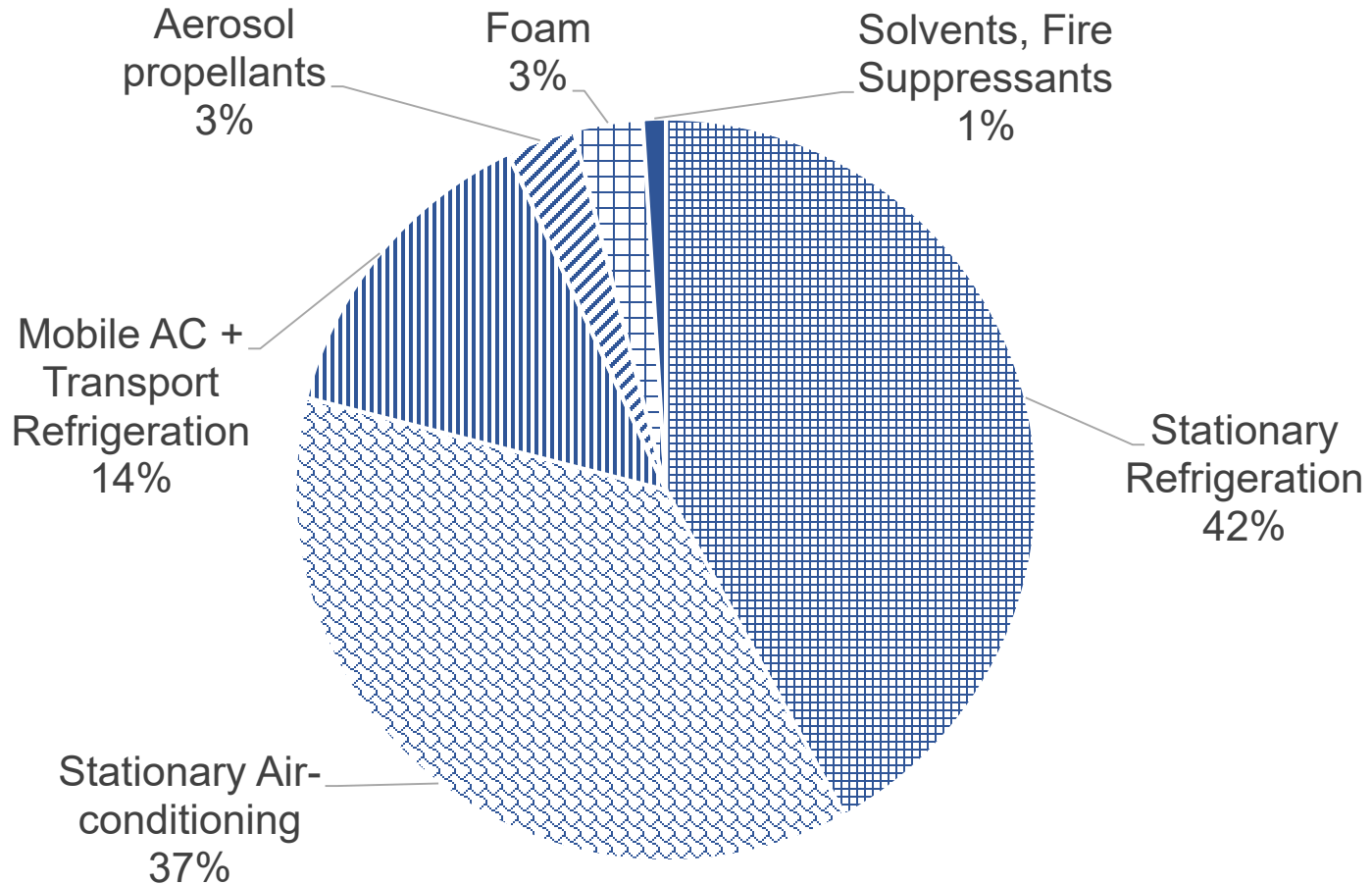


HFC Background

- ❖ HFCs represent about four percent of California GHG emissions
- ❖ Without further action, emissions projected to double over next 20 years
- ❖ California SB 1383 reduction goal: 40 percent below 2013 levels by 2030
- ❖ Most emissions from stationary refrigeration and air conditioning applications
- ❖ HFC-152a propellant commonly used in aerosol consumer products



HFC Emissions Sources in California (Year 2030)



Business-as-Usual
27 MMTCO₂E (100-year GWP)

Kigali Amendment to the Montreal Protocol

- ❖ Phase-down production of HFCs
- ❖ Goal to reduce HFC production and consumption by 85 percent by 2036
- ❖ United States signed on in 2016, not ratified by US Senate
- ❖ Ban on HFC trade with non-participating countries beginning in 2033
- ❖ For more information on the Kigali Amendment, visit the [FAQ page](#)

Year	Percent Decrease for Developed Countries
2019	10%
2024	40%
2029	70%
2034	80%
2036	85%

HFC-152a Emissions 2015 Consumer Products Survey

Survey Category	HFC-152a
Pressurized Gas Duster	1.32
Hair Finishing Spray	0.69
Single Phase Aerosol Air Freshener	0.17
Antiperspirant HFC	0.14
Deodorant	0.13
Electronic Cleaner	0.05
Hair Styling Product	0.03
Deodorant Body Spray	0.03
Silicone-based Multi-purpose Lubricant	0.03
Hair Mousse	0.02
Crawling Bug Insecticide (aerosol)	0.01
All Other Categories	0.09
TOTAL	2.72

Consumer Product Aerosol Propellant Status

Propellant	Global Warming Potential	VOC?
HFC-152a	124	Exempt
HFO-1234ze	6	Exempt
Butane	4	Yes
Isobutane	3	Yes
Propane	3	Yes
Dimethyl Ether	1	Yes
Carbon Dioxide	1	No

Consumer Products Regulation Amendments

**CARB to evaluate options for meeting
2023 and 2031 VOC reduction commitments
with the smallest possible GHG footprint**

Next Steps

Regulatory Strategies Work Group Webinars:

- ❖ **October 2nd**: Crawling Bug Insecticide, Floor Wax Stripper, Paint Stripper, Aerosol Cooking Spray, Charcoal Lighter Material
- ❖ **October 10th**: Hair Finishing Spray, Dry Shampoo, Aerosol Sunscreen, Mouthwash, PFP with 20% or less fragrance, APDO
- ❖ **October 17th**: Hand Sanitizer, Air Freshener, Laundry Detergent, Fabric Softener, Non-Aerosol Glass Cleaner

Regulatory Definitions Work Group Meeting

- ❖ **October 4th**: Sacramento, CA and by teleconference

Work Group Information

- ❖ 2nd Public Workshop this November

Discussion & Questions

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