

Extending the Control of Volatile Organic Compound Content to Cleaning Products

PURPOSE

This consultation paper sets out a proposal to extend the control on the volatile organic compound (VOC) content of consumer products under the Air Pollution Control (Volatile Organic Compounds) Regulation (Cap. 311W) (VOCs Regulation) to cover seven types of cleaning products.

BACKGROUND

2. VOCs are organic chemicals that would evaporate at room temperature and could contribute to the formation of ozone under photochemical reactions. The ambient concentrations of major air pollutants have dropped significantly in recent years, except that of ozone which has exhibited an increasing trend¹. As VOCs are one of the key precursors to the formation of ozone, reducing VOC emissions at sources is a critical measure to tackle the worsening ozone pollution in Hong Kong.

3. The ozone pollution has been on an upward trend in the Pearl River Delta region. The Governments of the Hong Kong SAR and Guangdong Province are committed to improving regional air quality and have jointly set emission reduction targets for major air pollutants, including VOCs². In addition, Hong Kong, Guangdong and Macao authorities have collaboratively launched a joint study on the characterisation of ozone formation and regional transportation in the Greater Bay Area, with a view to tackling the regional ozone pollution in a comprehensive manner.

MEASURES TARGETING LOCAL VOC EMISSIONS

4. In Hong Kong, the top VOC emission source is the consumption of VOC-containing products, followed by road transport and marine vessels³. The Government

1 Compared with 1999, the ambient concentration of respirable suspended particulates, fine suspended particulates, nitrogen dioxide and sulphur dioxide dropped by 48%, 55%, 42% and 72% respectively in 2020. However, ozone showed an increase in concentration by 53% in the same period.

2 A set of emission reduction targets has been set for 2015 and 2020 covering four major air pollutants, namely sulphur dioxide, nitrogen oxides, respirable suspended particulates and VOCs. Taking 2010 as the base year, the VOC reduction targets in Hong Kong for 2015 and 2020 were set as 5% and 15% respectively.

3 In 2020, the consumption of VOC-containing products, road transport and marine vessels accounted for 47%, 23% and 16% of total VOC emissions respectively.

has been adopting a multi-pronged strategy to reduce local VOC emissions from these sources. For instance, the emission standard of petrol motorcycles, which emit a significant amount of VOCs amongst different types of vehicles, has been tightened to Euro 4 since October 2020. A Euro 4 petrol motorcycle emits about 50% less VOCs than its Euro 3 counterpart.

5. The VOCs Regulation⁴ was enacted in 2007 to prohibit in phases the import and local manufacture of specified VOC-containing products such as paints, consumer products, printing inks, adhesives, and sealants, etc. if their VOC content exceeded the relevant statutory content limits. The VOCs Regulation was amended in 2009 and 2017 to extend the control to cover more products. There are currently 172 types of VOC-containing products being regulated under the VOCs Regulation, including six broad categories of consumer products⁵.

6. The VOC emissions in Hong Kong have been steadily reducing due to the continuous implementation of air pollutant emission reduction measures. The total VOC emissions have reduced by 50% from 44 100 tonnes in 2006 to 21 910 tonnes in 2020⁶. As regards the VOC emissions from products, they have reduced by 62% to 10 330 tonnes in 2020 since the implementation of the Regulation. Of which, emissions from consumer products accounted for about 4 900 tonnes. To further improve air quality, the Clean Air Plan for Hong Kong 2035⁷ issued in 2021 has set out that the Government would extend the VOC control to cleaning products.

EXPLORING THE SCOPE OF EXTENDED CONTROL

7. In 2019, the Government completed a consultancy study on consumer products supplied in local chain stores⁸. Apart from the six categories of consumer products being regulated under the VOCs Regulation, the study identified four other categories of consumer products⁹, namely cleaning products, personal care products, laundry products, and other household products, that are commonly used but not regulated.

4 Reference about the VOCs Regulation can be found at the following website:

http://www.epd.gov.hk/epd/english/environmentinhk/air/prob_solutions/voc_reg.html

5 These six categories of consumer products are air freshener, hairspray, floor wax stripper, insect repellent, insecticide and multi-purpose lubricant.

6 The figures were based on the 2020 Hong Kong Air Pollutant Emission Inventory Report published in August 2022.

7 The Clean Air Plan for Hong Kong 2035 can be found at the following website:

https://www.enb.gov.hk/sites/default/files/pdf/Clean_Air_Plan_2035_eng.pdf

8 The local chain stores involved in the study included supermarkets, drugstores and convenience stores.

9 The types of consumer products were referenced to the California Consumer Products Regulations enacted by the California Air Resource Board (CARB) which set VOC content limits for about 100 types of consumer products.

8. The study collected marketing data of unregulated consumer products, and an accredited laboratory was appointed to test the VOC content of representative products. Based on the marketing data and the VOC testing results, the study estimated the reduction in VOC emissions if unregulated consumer products are required to comply with the VOC content limits of the California Consumer Products Regulations (the California Regulations)¹⁰. The results revealed that about 80% of the VOC emission reduction was attributable to seven types of cleaning products, namely general purpose cleaner, kitchen cleaner, glass cleaner, toilet or urinal care product, bathroom and tile cleaner, disinfectant, and sanitiser. With reference to the California Regulations, the seven types of cleaning products are proposed to be defined as shown in **Annex**.

EXPLORING THE FEASIBILITY OF EXTENDED CONTROL WITH STAKEHOLDERS

9. To further explore the feasibility of extending the VOC control to cleaning products, we engaged with major cleaning product suppliers for both household and institutional/commercial markets in 2019 to collect their views on imposing the content limits of the California Regulations on cleaning products. Given that many products on the local market have already complied with the VOC content limits of the California Regulations, the suppliers were in general supportive of the proposed control. For some cleaning products that do not meet the content limits of the California Regulations, the suppliers considered the proposed control practicable if sufficient time is provided for product reformulation and testing.

10. We also approached the Hong Kong Cleaning Association (HKCA) regarding the proposed control. The HKCA anticipated that the proposed control would not have any adverse impacts on cleaning contractors and property management as the cost of cleaning products only accounted for a very small portion of the cleaning service cost.

11. During the engagement with product suppliers, we collected further information to assess the market share for each type of cleaning product. Representative cleaning products covering different price ranges were also selected for determining the VOC content with a view to understanding the updated market situation and compliant status of local cleaning products.

¹⁰ The California Regulations have the most comprehensive and stringent control on consumer products which have been implemented in all districts in the state of California. See Article 1 and 2 of the California Regulations at: <https://ww2.arb.ca.gov/our-work/programs/consumer-products-program/current-regulations>.

12. Concerning the household market, the assessment covered the seven types of cleaning products identified in the above-mentioned consultancy study that accounted for about 80% of the total product consumption. In general, anti-bacterial products identified in the household market are laundry detergents, which are not subject to control under the California Regulations. Except for sanitisers, at least 76 products of the other 6 types of cleaning products on the household market, which accounted for over 70% market share, can comply with the VOC content limits of the California Regulations. The assessment findings indicated that low VOC products are commonly supplied on the household market and accepted by consumers. For the institutional/commercial market, the assessment results revealed that general purpose cleaners and disinfectants are the most commonly used cleaning products in institutional and commercial premises, whilst there are fewer other types of cleaning products available on the market. Similar to the household market, the products on the institutional/commercial market showed a high compliance rate¹¹.

13. The aforesaid assessment revealed that cleaning products with low VOC content are readily available in the market, and have taken up a considerable market share. This suggests that the implementation of the proposed control would not cause substantial impacts on the product supply. Although no sanitising products could be identified in the household and institutional/commercial markets during our assessment, given the subtle differences between the definitions and functions of disinfectants and sanitisers, imposing the control on sanitising products could prevent suppliers from trying to circumvent the control by claiming disinfecting products as sanitising products.

THE CONTROL PROPOSAL

14. We propose to control the VOC content of seven types of cleaning products with effect from 1 December 2023 as set out in the table below. With the exception of kitchen cleaners, the proposed VOC content limits are set with reference to the content limits of the respective cleaning products in the California Regulations. For kitchen cleaners, the proposed VOC content limit is set with reference to the limit for “oven or grill cleaners” in the California Regulations so as to allow a higher degreasing capability to cope with the grease generated from the stir-frying and deep-frying in Chinese-style cooking.

¹¹ Based on the product information provided by suppliers, nearly all high-end products were in compliance with the California Regulations. The test results of mid-end and low-end products also revealed that about 90% of assessed products comply with the California Regulations.

Item	Cleaning Product	Proposed VOC Content Limit (% VOC by weight [^])	
		Aerosol	Non-aerosol
1	Bathroom and tile cleaner	7	1
2	Disinfectant	70	1
3	General purpose cleaner	8	0.5
4	Glass cleaner	10	3
5	Kitchen cleaner	8	4
6	Sanitiser	70	1
7	Toilet or urinal care product	10	3

Note:

[^] The VOC content in a ready-to-use condition shall be determined by Method 310 using the calculation methods as set out in Schedule 3 – Part 7 of the VOCs Regulation.

IMPACTS ON CLEANING PERFORMANCE

15. VOCs are typically used as a propellant in aerosol products, and as a solvent to dissolve active ingredients or provide degreasing functions in non-aerosol products. VOCs used as a propellant in aerosol products have no relevance to the cleaning performance of the products and can be replaced by other alternative propellants such as carbon dioxide. As regards non-aerosol products, major suppliers were consulted on the potential impacts on the cleaning performance due to product reformulation for complying with the proposed limits. The suppliers advised that the overall performance of cleaning products after product reformulation could maintain a satisfactory level despite the degreasing capability and foaming functions may decline slightly due to lowering of the VOC content.

IMPACTS ON DISINFECTING EFFICACY

16. The efficacy of disinfecting and sanitising products has been duly considered to ensure that public health would not be jeopardised by limiting the VOC content of these products. In consultation with medical experts in the field of public health and product manufacturers, the California Air Resources Board (CARB) assessed in 2006¹²

12 Technical Support Document for the 2006 proposed amendments to the California Regulation published by CARB. (<https://ww3.arb.ca.gov/regact/cpwg2006/appena.pdf>).

the potential impacts of the California Regulations on the disinfecting function of disinfecting and sanitising products. The review determined that the adoption of the VOC content limits of the California Regulations could still allow products to achieve a satisfactory level of disinfecting or sanitising function.

17. The major active ingredients of many disinfecting and sanitising products on the local market include sodium hypochlorite, benzalkonium chloride, and chloroxylenol. Sodium hypochlorite is not a VOC. Benzalkonium chloride has relatively low volatility and is exempted from the control under the current VOCs Regulation. Products containing these active ingredients would not be affected by the proposed control. For disinfecting and sanitising products containing chloroxylenol (also known as PCMX), VOC solvent is added to products since PCMX is not easily soluble in water. The VOC content of these products is comparatively low and should be able to comply with the proposed content limits. In addition to the above, alcohol-based disinfecting products (usually containing 60-80% isopropanol) in the form of liquid, gelatin, and wet wipes are also commonly used to sanitise hands against pathogens, particularly as anti-epidemic products against the COVID-19 epidemic. Making reference to the California Regulations, the proposed definitions for disinfectants and sanitisers have excluded these products such that they would not be subject to the proposed control.

COST IMPLICATIONS

18. The extensive use of low-VOC cleaning products on the market indicated that the proposed control should have little impact on the cost of products. For those products requiring product reformulation to comply with the proposed content limits, the reformulation may involve cost adjustment due to the use of alternative raw materials and one-off expenses covering product development and marketing, but no substantial impact on the cost and product price in the long run is expected given that the VOC component only accounts for a very small portion of the products. For end-users in the institutional/ commercial market such as cleaning contractors and property management agents, the proposed control should not pose any substantial cost implications on them as the cost with respect to the use of cleaning products only constitutes a small portion of their total expenditure of cleaning service.

OTHER CONTROL REQUIREMENTS

19. The following provisions in the VOCs Regulation for the control of consumer

products will remain unchanged:

- (i) reporting and keeping of sales information;
- (ii) exemption from control;
- (iii) allowable exemption of fragrance incorporated into the product up to 2% by weight of the product; and
- (iv) offences and penalties.

VOC REDUCTION

20. In 2020, about 4 900 tonnes of VOCs were emitted from the consumption of consumer products. Based on the available product and market information, the implementation of the proposal could reduce not less than 270 tonnes of VOC emissions per year. Taking into account all products in the market, the actual emission reduction is anticipated to be higher.

WAY FORWARD

21. After the consultation, we shall finalise the proposal and consult the Advisory Council on the Environment and the Panel on Environmental Affairs of the Legislative Council.

VIEW SOUGHT

22. Please send us your views on the proposal on or before 28 February 2023 by mail / electronic mail / facsimile to the following:

Environmental Protection Department
33/F, Revenue Tower
5 Gloucester Road
Wan Chai, Hong Kong
(Attn.: VOC Consultation - Cleaning Products)

E-mail address: VOCConsult@epd.gov.hk

Facsimile: 2827 8040

23. Please note that the Government may wish, either in discussion with others or in any subsequent report, whether privately or publicly, refer to and attribute views submitted in response to this consultation document. Any request to treat all or part of a response in confidence will be respected, but if no such request is made, it will be assumed that the response is not intended to be confidential.

Environmental Protection Department
December 2022

Proposed definitions of seven types of cleaning products

(1) BATHROOM AND TILE CLEANER

means any product designed or labelled to clean tile or surfaces in the bathroom.

(2) DISINFECTANT

means any product that is labelled as a "disinfectant", or is designed or labelled primarily to destroy or irreversibly inactivate infectious or other undesirable bacteria, pathogenic fungi, or viruses on surfaces or inanimate objects. Products that are labelled as both a "sanitiser" and a "disinfectant" are considered disinfectants.

"Disinfectant" does not include any of the following:

- (i) products labelled solely for use on humans or animals;
- (ii) products labelled solely for agricultural use;
- (iii) products labelled solely for use in swimming pools, therapeutic tubs, or hot tubs;
- (iv) products labelled solely for use on medical devices or medical equipment surfaces;
- (v) products labelled solely for use in medical, convalescent, or veterinary establishments;
- (vi) products labelled solely for use on food-contact surfaces;
- (vii) products labelled solely for use on fabrics;
- (viii) alcohol-based products labelled as containing not less than 60% (by volume) ethanol, isopropanol or n-propanol, or a combination of these substances; or
- (ix) products which are designed or labelled with other primary functions that make disinfecting or sanitising claims on the label.

(3) GENERAL PURPOSE CLEANER

means any product that is designed or labelled to clean hard surfaces in homes, garages, patios, commercial, or institutional environments. “General Purpose Cleaner” includes products that clean appliances, counters, walls, cabinets or floors and products that claim to clean a variety of similar surfaces such as plastics, stone or metal.

“General Purpose Cleaner” does not include “Kitchen Cleaner” and dishwashing detergents.

(4) GLASS CLEANER

means any product designed or labelled primarily for cleaning surfaces made of glass.

“Glass Cleaner” does not include products designed or labelled solely for the purpose of cleaning optical materials used in eyeglasses, photographic equipment, scientific equipment and photocopying machines.

(5) KITCHEN CLEANER

means any product that is designed or labelled to:

- (i) clean hard surfaces in kitchens; or
- (ii) remove baked on greases or deposits from food preparation or food cooking stoves or tools.

“Kitchen cleaner” does not include dishwashing detergents.

(6) SANITISER

means any product that is labelled as a “sanitiser,” or is designed or labelled

primarily to reduce, but not necessarily eliminate, microorganisms in the air, on surfaces, or on inanimate objects.

“Sanitiser” does not include any of the following:

- (i) “Disinfectant”;
- (ii) products labelled solely for use on humans or animals;
- (iii) products labelled solely for agricultural use;
- (iv) products labelled solely for use in swimming pools, therapeutic tubs, or hot tubs;
- (v) products labelled solely for use on medical devices or medical equipment surfaces;
- (vi) products labelled solely for use in medical, convalescent or veterinary establishments;
- (vii) products labelled solely for use on food-contact surfaces;
- (viii) products labelled solely for use on fabrics;
- (ix) alcohol-based products labelled as containing not less than 60% (by volume) ethanol, isopropanol or n-propanol, or a combination of these substances; or
- (x) products which are designed or labelled with other primary functions that make disinfecting or sanitising claims on the label.

(7) TOILET OR URINAL CARE PRODUCT

means any product that is designed or labelled to clean or to deodorise toilet bowl, toilet tank, or urinal.