立法會
Legislative Council

LC Paper No. CB(1)176/17-18(02)

Ref. : CB1/SS/2/17

Subcommittee on Air Pollution Control (Volatile Organic Compounds) (Amendment) Regulation 2017

Background brief

Purpose

This paper provides background information on the Air Pollution Control (Volatile Organic Compounds) (Amendment) Regulation 2017 ("the Amendment Regulation"), and gives a brief account of relevant discussion held by the Panel on Environmental Affairs ("EA Panel") on the subject.

Background

2. Volatile organic compounds ("VOCs") are organic chemicals that evaporate at room temperature. Most of them can contribute to the formation of photochemical smog, a key air pollution problem in the Pearl River Delta ("PRD") region. Photochemical smog leads to high levels of ozone and fine particulates in Hong Kong particularly when the prevailing wind is from inland and the sunshine is strong. VOCs can also irritate eyes, cause respiratory tract symptoms and provoke asthmatic attacks in asthma sufferers. In Hong Kong, most man-made VOCs originate from non-combustion sources (58%), which are mainly VOC-containing products such as paints, printing inks and consumer products.

3. In 2002, the governments of Hong Kong and Guangdong reached a consensus to reduce, on a best endeavour basis, the regional emissions of VOCs, sulphur dioxide, nitrogen oxides and respirable suspended particulates by 55%, 40%, 20% and 55% respectively by 2010, using the emission levels of 1997 as the base year. In 2012, both governments agreed to set an emission reduction plan for these four types of air pollutants in Hong Kong and the PRD region

for 2015 and 2020.[1] Under the plan, Hong Kong's VOC reduction targets are 5% by 2015 and 15% by 2020, with 2010 as the base year.

Air Pollution Control (Volatile Organic Compounds) Regulation

4. One of the key initiatives in achieving Hong Kong's VOC reduction targets was the introduction of the Air Pollution Control (Volatile Organic Compounds) Regulation (Cap. 311W) ("VOC Regulation") in 2007.[2] The main objective of the VOC Regulation is to prohibit the import and local manufacture of regulated products (except products manufactured locally solely for export), namely architectural paints/coatings, printing inks and selected consumer products, if their VOC contents exceed the relevant statutory limits.

5. In October 2009, the VOC Regulation was amended to extend the control to some other products containing high levels of VOCs, namely vehicle refinishing paints, vessel paints, pleasure craft paints, adhesives and sealants. At present, 170 types of products are under the control of the VOC Regulation.

Proposal to control volatile organic compounds in fountain solutions and printing machine cleaning agents

6. In 2012, the Administration commissioned the Hong Kong Productivity Council to identify feasible VOC reduction measures for the printing industry.[3] In view of the findings of the feasibility study (a summary of the tests and

---

1 The governments of Hong Kong and Guangdong started a joint mid-term review of the emission reduction plan in February 2015 with a view to concluding the emission reductions for 2015 and finalizing the targets for 2020. The review is expected to be completed in 2017.

2 The VOC Regulation was first published in the Gazette in November 2006 and subject to negative vetting by LegCo. A subcommittee was formed under the House Committee in December 2006 to study the subsidiary legislation. While the subcommittee generally supported the legislative proposal, there were technical issues that could not be resolved before the expiry of the extended scrutiny period. With the agreement of the Administration, the regulation was repealed by LegCo in January 2007. Subsequently, the Subcommittee to Study Issues Relating to the Air Pollution Control (Volatile Organic Compounds) Regulation was set up to expedite the examination of the policy aspects and drafting of a regulation under the same title. Taking into account the Subcommittee's deliberation, the Administration made some technical amendments and tabled the regulation in LegCo in February 2007 for negative vetting. The relevant regulatory requirements took effect in phases from 1 April 2007 onwards.

3 A Working Group on Reducing VOC – Printing Industry was formed to oversee the feasibility study. The Working Group comprised representatives of the Hong Kong Printers Association, the Graphic Arts Association of Hong Kong, and the Environmental Protection Department.

findings of the feasibility study is in **Appendix I**) and with reference to the VOC content limits of the South Coast Air Quality Management District ("SCAQMD"), California, the USA, the Administration proposes extending the statutory control to fountain solutions and printing machine cleaning agents, and adopting 80 grams per litre ("g/l") and 500 g/l respectively as their VOC content limits.[4] [5] The Environmental Protection Department ("EPD") conducted a public consultation from January to April 2016 to gauge stakeholders' views on the proposed control measures. Stakeholders were generally supportive of the proposals and did not give any adverse feedback. The Administration expects that the implementation of the new control proposal can reduce 370 tonnes of VOC annually.[6]

The Air Pollution Control (Volatile Organic Compounds) (Amendment) Regulation 2017

7. The Amendment Regulation was published in the Gazette on 13 October 2017 and tabled at the Legislative Council ("LegCo") on 18 October 2017 for negative vetting. It extends certain prohibitions and requirements under the VOC Regulation to fountain solutions and printing machine cleaning agents ("newly regulated products") with effect from 1 January 2018. The key prohibitions and requirements in relation to newly regulated products manufactured in or imported into Hong Kong are as follows:[7]

(a) prohibiting the manufacture and importation of the newly regulated products with VOC content in excess of the prescribed

---

[4] The average VOC content of conventional fountain solutions is 92 g/l, and organic solvents with an average VOC content of 780 g/l are used for cleaning printing machines. The feasibility study above confirmed that fountain solutions and printing machine cleaning agents with VOC contents not exceeding 80 g/l and 500 g/l respectively can perform well just like their conventional counterparts.

[5] SCAQMD's VOC content limits for fountain solutions (50 g/l) and printing machine cleaning agents (100 g/l) are one of the most stringent in use. The Administration does not consider these limits appropriate in the local context because the feasibility study has found that old printing machines using fountain solutions of such a low VOC level could have unsatisfactory printing performance, and printing machine cleaning agents meeting the SCAQMD standard could not remove stains satisfactorily.

[6] According to the Administration, 1 500 tonnes of VOCs were emitted from fountain solutions and printing machine cleaning agents used for printing in Hong Kong in 2014.

[7] The Amendment Regulation is not applicable to a newly regulated product that is goods in transit, in the course of transhipment or solely for export or re-export and manufactured or imported prior to the effective date.

limits (i.e. 80 g/l for fountain solutions and 500 g/l for printing machine cleaning agents);

(b) requiring the manufacturers and importers of the newly regulated products to disclose certain specified information in certain documents relating to the products or on the packaging or containers of the products; and

(c) requiring the manufacturers and importers of the newly regulated products to submit annual written reports containing certain specified information to the Air Pollution Control Authority (i.e. the Director of Environmental Protection).

Major views and concerns expressed by Members

8. On 28 November 2016, EA Panel discussed the Administration's proposal to extend the control under the VOC Regulation to newly regulated products. The major views and concerns expressed by members are summarized in the ensuing paragraphs.

Regulatory scope

9. Members asked if the Administration would consider further extending the control to related end products of printed materials imported into Hong Kong. The Administration explained that VOCs were emitted during the printing process when fountain solutions and printing machine cleaning agents were applied, hence regulating the VOC contents of these two products would suffice in reducing VOC emissions associated with printed materials.

Impact on the trade

10. Members sought the Administration's assessment of the potential impact of the proposal on the printing industry. The Administration advised that it had engaged the printing industry when formulating the proposed control for the newly regulated products, with a view to ensuring its feasibility including a ready supply of compliant products. Subsequent to the feasibility study (paragraph 6 above refers), the Administration had consulted several major suppliers and a survey had also been conducted to confirm the availability of these products on the local market.

Emission limits and regional collaboration in emission reduction

11. Members sought comparison between the VOC content limits proposed to be adopted in Hong Kong for newly regulated products and those adopted in the Mainland. They also enquired about the progress of regional efforts in reducing VOC emissions.

12. According to the Administration, the Guangdong Provincial Government issued the "Emission standard of volatile organic compounds for printing industry" (DB44/815-2010) in 2010 which stipulated, among other things, the VOC content limits for printing inks and the VOC emission limits for the printing processes. The standard however did not prescribe the VOC content limits for fountain solutions and printing machine cleaning agents. Nevertheless, the Ministry of Environmental Protection of China had implemented a voluntary environmental labelling products scheme for printing since 2011 to encourage the use of more environment-friendly printing techniques and materials including low-VOC fountain solutions and printing machine cleaning agents.

13. On regional collaboration, the Administration advised that the governments of Hong Kong and Guangdong had all along been collaborating on improving regional air quality, including setting emission reduction targets for major air pollutants such as VOCs, and putting in place control measures targeted at major emission sources. In Hong Kong, due to lowered VOC contents in paints and a drop in their sales volume, VOC emissions had already been reduced by 14% from 2010 to 2016. Meanwhile, the Mainland authorities had implemented measures to control VOC emissions from industrial sources. Hong Kong and Guangdong had started a joint mid-term review of the emission reduction plan for the PRD region with a view to concluding the emission reductions for 2015 and finalizing the targets for 2020. The review was expected to be completed in 2017.

Enforcement and prosecution

14. Members enquired about the number and details of prosecutions instituted under the VOC Regulation since it had come into effect in 2007, and how enforcement on the VOC content limits of fountain solutions and printing cleaning agents would be conducted.

15. The Administration advised that EPD had conducted inspections and sample tests for enforcement of the VOC Regulation, and would take appropriate actions in response to reports of non-compliance. The sample test results could generally produce sufficient evidence for prosecution and conviction purposes. As at November 2016, the Administration had instituted 25 prosecutions in accordance with the VOC Regulation, among which there

had been 23 convictions. Of the convicted cases, three cases involved non-compliance with the requirement of product notification to be given to EPD by manufacturers or importers of regulated architectural paints prior to the sale or use of the paints in Hong Kong. Other cases mainly involved regulated products with VOC contents exceeding the prescribed limits.

Latest development

16. At the House Committee meeting on 20 October 2017, Members agreed to form a subcommittee to study the Amendment Regulation.

Relevant papers

17. A list of relevant papers is set out in **Appendix II**.

Council Business Division 1
Legislative Council Secretariat
6 November 2017

Appendix I

Feasibility Study on Measures to Reduce Volatile Organic Compounds Emissions from Printing

The Environmental Protection Department ("EPD") commissioned the Hong Kong Productivity Council ("HKPC") in 2012 to identify feasible volatile organic compounds ("VOCs") reduction measures for the printing industry in collaboration with the printing trade. A Working Group on Reducing VOC - Printing Industry comprising representatives of the Hong Kong Printers Association, the Graphic Arts Association of Hong Kong and EPD was formed to oversee the feasibility study. The study concluded that the use of fountain solutions and printing machine cleansing agents with low VOC content (i.e. not exceeding 80 grams per litre ("g/l") and 500 g/l respectively in a ready to use condition) are feasible with insignificant cost implication. Key findings of the trial use of low VOC fountain solutions and printing machine cleansing agents at local printing factories are elaborated in ensuing paragraphs.

2 Low VOC fountain solutions

2.1 Three trials were conducted in three different local factories on the use of low VOC fountain solutions. In the first test, a 20-year-old printing machine was used to print four batches of 5 000 standard printing plates (71 cm x 102 cm). Three of them were printed with three different brands of fountain solutions with a VOC content meeting the prevailing South Coast Air Quality Management District ("SCAQMD") limit of 80 g/l at the time of testing. The remaining batch of printing plates was printed with conventional fountain solution with a VOC content exceeding 80 g/l. The three different brands of low VOC fountain solutions were supposed to work with a VOC content below 50 g/l. However, two of them could only achieve satisfactory printing performance with VOC contents at 54 g/l and 68 g/l respectively. One brand could achieve satisfactory printing performance at a VOC content below 50 g/l.

2.2 The above test was repeated on a six-year-old printing machine in another printing factory. The test confirmed the satisfactory use of the low VOC fountain solutions with a VOC content below 50 g/l.

2.3 A third test was conducted in another new printing machine using different types of paper commonly used for printing in Hong Kong. A fountain solution with a VOC content below 50 g/l was used for performance comparison with a conventional fountain solution. Batches of 5 000 poster size gloss art papers, matt coated papers and woodfree papers were used for testing. It was found that all the technical performance parameters in using the low

VOC fountain solution were comparable to those with conventional fountain solution in all the three types of paper.

2.4 The three tests confirmed the feasibility and satisfactory performance of using low VOC fountain solutions with the VOC content capped at 80 g/l in local printing factories. The results did not support aligning the VOC content limit with the latest standard of SCAQMD (i.e. 50 g/l) because of the adverse implications for the printing performance of old printing machines. The cost of low VOC fountain solution is slightly higher than that of the conventional fountain solution. The average increase in cost was $3 per 5 000 sheets.

3. Low VOC printing machine cleansing agents

3.1 Three different brands of low VOC printing machine cleansing agents meeting the SCAQMD limit of 100 g/l and a conventional printing machine cleansing agent which contains 100% VOC were used for trial. The test was done in conjunction with the first low VOC fountain solution test as described in paragraph 2.1 above. The printing machine cleansing agents were used to clean the machine after each batch of printing was completed. Technical parameters of the low VOC printing machine cleansing agents such as cleansing power, drying speed, odour and flammability were evaluated against those with conventional printing machine cleansing agents. The cleansing power of all the three low VOC printing machine cleansing agents was considered not acceptable because stains could not be removed even after 10 wipes.

3.2 The above test was repeated by using another three printing machine cleansing agents with VOC contents between 300 g/l and 500 g/l with the second low VOC fountain solution test as described in paragraph 2.2 above. The stains were removed after 3-4 wipes by using the low VOC printing machine cleansing agents whereas only 1-2 wipes were needed if conventional printing machine cleansing agent was used. The cleansing power of the low VOC printing machine cleansing agents was considered acceptable though they took 1-2 more minutes to dry. The low VOC printing machine cleansing agents were less odorous and less flammable than the conventional printing machine cleansing agent. Their cleansing performance was considered satisfactory. Its use by the local factories is considered feasible because a reasonable balance of the time required and ease of cleansing could be reached.

3.3 The cost of low VOC printing machine cleansing agents is slightly higher than that of the conventional printing machine cleansing agents. The average increase in cost was $16 per 5 000 sheets.

[Source: Adapted from Annex I to LC Paper No. CB(1)158/16-17(06)]

Appendix II

Subcommittee on Air Pollution Control (Volatile Organic Compounds) (Amendment) Regulation 2017

List of relevant papers

Date	Event	Paper
28 November 2016	Meeting of Panel on Environmental Affairs	Administration's paper on "Proposal to Control Volatile Organic Compounds in Fountain Solutions and Printing Machine Cleansing Agents" (LC Paper No. CB(1)158/16-17(06)) Administration's follow-up paper (LC Paper No. CB(1)424/16-17(02)) Minutes of meeting (LC Paper No. CB(1)369/16-17)
18 October 2017	The Air Pollution Control (Volatile Organic Compounds) (Amendment) Regulation 2017 was tabled at the Legislative Council	The Air Pollution Control (Volatile Organic Compounds) (Amendment) Regulation 2017 Legislative Council Brief Legal Service Division Report (LC Paper No. LS3/17-18)

Hyperlink to relevant document:

Government department	Document
Environmental Protection Department	Consultation paper on "Proposal to Control Volatile Organic Compounds (VOC) in Fountain Solutions and Printing Machine Cleansing Agents"