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ACE Paper 29/2008
For advice

A Proposal to Control the Contents of Volatile Organic Compounds in Vehicle Refinishing Paints, Marine Vessel Paints, Pleasure Craft Paints, Adhesives and Sealants

PURPOSE

This paper seeks Members' advice on the proposal to limit the contents of volatile organic compounds (VOCs) in vehicle refinishing paints, marine vessel paints, pleasure craft paints, adhesives and sealants, and to control emissions from paint works.

PROPOSAL

2. We propose to extend the coverage of the Air Pollution Control (Volatile Organic Compounds) Regulation (the Regulation) to vehicle refinishing paints, marine vessel paints, pleasure craft paints, adhesives and sealants (collectively referred hereafter as newly regulated products) for limiting their VOC contents.

3. The proposed maximum VOC content limits for the newly regulated products will be implemented in phases, starting from 1 January 2010 to 1 April 2012. The respective maximum VOC content limits and their effective dates are set out at **Annexes A to E**.

4. In addition, the following existing provisions of the Regulation will also be extended to the importers and local manufacturers of the newly regulated products for local sale and use, after the respective VOC content limits have taken effect -

(a) prohibition of importation or local manufacture of the newly regulated products whose VOC contents exceed the prescribed maximum limits;

(b) requirement to display the product information of the newly regulated products, including the VOC content, in their Material Safety Data Sheets or trade catalogues or packaging or containers;

(c) requirement to report annual sales quantities and particulars of the newly regulated products for the preceding calendar year, by 31 March of each year, starting in the year immediately after the year the relevant VOC content limits have taken effect; and

(d) requirement to keep for at least three years documents containing the particulars and sales quantities of the regulated products imported and manufactured, and to produce them upon request for inspection by the Authority.

5. Same as the existing regulated products, the proposed control will not apply to the newly regulated products for export, re-export, transhipment or in transit, or if they are manufactured or imported prior to the effective dates of the relevant VOC content limits. Claims for exemption will be considered if the product is irreplaceable in serving a vital public health or security function or it is a trade sample not for sale in Hong Kong, or the exemption would be in the public interest.

6. In addition to the above, we propose, for the sake of completeness, to activate the specified process provision of the Air Pollution Control Ordinance (APCO) on control of paint works to ensure any large paint manufacturing plants, if any, will have proper VOC and emission control even though there is no such plants in Hong Kong at present. We would also like to take the opportunity to add "a registered professional engineer in the environmental engineering discipline under the Engineer Registration Ordinance (Cap. 409)" as a "qualified engineer" defined under the Air Pollution Control (Specified Processes) Regulations for preparing the application of a licence to conduct this and other specified processes.

JUSTIFICATIONS

7. VOCs play a significant role in the formation of ozone and respirable suspended particulates (RSPs), which are major pollutants giving rise to the smog problem and reduced visibility in the Pearl River Delta Region. Ground level ozone is a highly reactive gas, and when in high concentration can irritate the eyes and cause symptoms of upper and lower respiratory illness to healthy people. It may also provoke asthmatic attacks in people who already have asthma. There is also evidence that prolonged exposure to high concentration of ozone may cause permanent damage to lung tissue and interfere with functioning of the immune system. RSPs can penetrate deeply into the lung and interfere with functioning of the respiratory system.

8. In the consensus reached in April 2002 between the Hong Kong Special Administrative Region Government and Guangdong Provincial Government, both governments will endeavour to reduce the regional emissions of VOCs, among other air pollutants, by 55% in 2010 with reference to the 1997 emission level. To achieve this reduction target, we have implemented a comprehensive programme to reduce VOC emissions, including -

(a) tightening the emission standards of newly registered motor vehicles in tandem with the European Union;

(b) requiring the recovery of petrol vapour from unloading and refuelling processes in petrol filling stations; and

(c) implementing the Regulation to limit the contents of VOCs in architectural paints/coatings, printing inks and selected consumer products, and to require installation of emission reduction devices on certain printing machines.

9. The proposal seeks to include in the Regulation the remaining VOC-containing products, which are also regulated by California, USA, which is most advanced in controlling VOC emissions for better air quality. The inclusion can further reduce our VOC emissions and is essential for securing the achievement of VOC emission reduction target.

10. In formulating the proposal, we have already taken into account the stringency of the VOC content limits as well as the cost, availability and performance of the newly regulated products that can comply with the VOC content limits.

11. Under the APCO, production of paints, varnishes and lacquers is classified as one of the specified process, namely, the "paint works". The control of this specified process has not yet been activated as there has been no such operation in Hong Kong since the moving out of the paint production industry from Hong Kong in the early nineties. To avoid any loophole in control on VOC and emission control in the event that large paint manufacturing plant returns to Hong Kong, we consider it appropriate to activate the relevant provision for the sake of completeness. In 1994, the Hong Kong Institution of Engineers has established a new "environmental engineering discipline" under the Engineer Registration Ordinance (Cap. 409). As registered professional engineers with adequate training and experience in environmental protection and control, they should also be included as "qualified engineers" for preparing the licence applications for paint works and other specified processes.

IMPLICATIONS

Financial and Civil Service Implications

12. Since the Regulation became effective on 1 April 2007, we have earmarked $2.7 million per year for setting up a dedicated team to enforce the Regulation. In addition, the Government Laboratory has also set aside $3.1 million within its own resources for acquiring the testing equipment for providing the testing service. We shall absorb the additional workload by the existing provisions.

Economical Implications

13. Adhesives and sealants are commonly used by the renovation, furnishing and construction industry. Depending on the product types, the increase in cost of compliant products may range from less than 10% to about 200%. The cost is expected to be reduced when more compliant products are introduced into the local market. Since the cost of adhesives and sealants usually accounts for about 1% of the total project cost including labour, the increase in cost of these products should not have any major impact on the total project cost.

14. As for motor vehicle refinishing paints, the additional capital cost for a typical motor repairing shop to replace its painting facility for using water-based or low-VOC compliant paints is estimated to be in the range of $5,000 to $30,000. As the replacement cost is one-off, the proposal should not have any major financial implications for the trade.

15. Similarly, any added paint cost should not be a major concern for the shipyards and boatyards, as the estimated increase in paint cost would only result in about 3% increase in the total cost for ship body maintenance works.

Environmental Implications

16. The limits of VOC contents proposed are on a par with the requirements in California, which is most advanced in controlling VOC emissions. When the proposed control is fully implemented, about 700 tonnes of VOC emission a year will be reduced. The emission reduction will help us secure the achievement of the VOC emission reduction target in 2010.

17. In addition, using compliant regulated products, particularly in indoor or confined areas, should be welcomed both by the occupants and workers as it would help safeguard them from the adverse health effects of exposure to high concentration of VOCs.

CONSULTATION

18. We consulted the relevant trades and stakeholders, including professional bodies, manufacturers, suppliers, major users and utility companies on our proposal in May 2008. We held a number of in-depth discussions with the trades with a view to formulating a practicable control and implementation plan that could effectively reduce the VOC emissions and yet minimise the impacts on the affected parties. The proposal in paragraphs 2 to 5 has already taken into account their views, in particular on the applicable VOC content limits and the effective dates. The trades should therefore be able to comply with the proposal.

19. At present, the existing market share of compliant products is small. According to manufacturers of newly regulated products, more compliant products

will be introduced into local market. Taking into account the time needed for development of compliant products, we propose to implement the proposal in phases starting from 1 January 2010 to 1 April 2012. We expect that the affected trades and the public should have sufficient time to adapt to using such compliant products before the proposal takes effect.

20. As for the proposal in paragraph 6 to bring paint works under control as specified processes by mid-2009, no objection was received from the consultation.

WAY FORWARD

21. Subject to Members' support for the proposal, we will start the legislative procedures aiming at introducing the amendment regulation into the Legislative Council in around mid-2009 so that the control on newly regulated products can take effect in phases starting from 1 January 2010. We also aim to make the order to bring paint works under control as a specified process by mid-2009.

ADVICE SOUGHT

22. Members are invited to comment on the proposal to further control emissions of VOCs set out in paragraphs 2 to 6 above.

Environmental Protection Department
November 2008

Annex A

Proposed VOC Control on Vehicle Refinishing Paints

(a) Effective Date: 1 October 2010

(b) VOC Content Limit

Regulated Vehicle Refinishing Paint Type	Maximum Limit of VOC Content in Ready to Use Condition* (grams/litre of paint, less water and less exempt compounds)
(1) Adhesion Promoter	540
(2) Clear Coatings	250
(3) Colour Coatings	420
(4) Multi-Colour Coatings	680
(5) Pretreatment Coatings	660
(6) Primers	250
(7) Single-Stage Coatings	340
(8) Temporary Protective Coatings	60
(9) Truck Bed Liner Coatings	310
(10) Underbody Coatings	430
(11) Uniform Finish Coatings	540
(12) Other Vehicle Refinishing Coatings[#]	250

* For the purpose of compliance check, the VOC content in ready to use condition would be the maximum VOC content when the paint is in a condition ready to be applied to the surface, i.e. no more dilution or conditioning of the paint is required, in accordance to the manufacturer's recommendations for application. For example, when a range of ratios is recommended for dilution with organic solvent, the highest dilution ratio should be used to give the maximum VOC content.

[#] Any vehicle refinishing coating not regulated by Type (1) to Type (11) shall comply with the limit of Type (12).

Annex B

Proposed VOC Control on Marine Vessel Paints

(a) Effective Date

Phase I: 1 January 2010
Phase II: 1 April 2012

(b) VOC Content Limit

Regulated Marine Vessel Paint Type	Maximum Limit of VOC Content in Ready to Use Condition* (grams/litre of paint, less water and less exempt compounds)
Phase I: 1 January 2010	
(1) Antenna Coatings	530
(2) Elastomeric Adhesives with 15% or more by Weight Natural or Synthetic Rubber	730
(3) Extreme High-Gloss Coatings	490
(4) Heat Resistant Coatings	420
(5) High Gloss Coatings	340
(6) High Temperature Coatings	500
(7) Low Activation Interior Coatings	420
(8) Marine Maintenance Coatings	450
(9) Metallic Heat Resistant Coatings	530
(10) Navigational Aids Coatings	340
(11) Pretreatment Primers	550
(12) Pretreatment Wash Primers	780
(13) Repair & Maintenance Thermoplastic Coatings	550
(14) Sealant Coatings for Wire-Sprayed Aluminium	610
(15) Shop Primers	700
(16) Solvent-based Inorganic Zinc Coatings	650
(17) Special Marking Coatings	490
(18) Tack Coatings	610
(19) Tank Lining Coatings	500
(20) Undersea Weapons Systems Coatings	340
(21) Other Marine Vessel Coatings[#]	340

Regulated Marine Vessel Paint Type	Maximum Limit of VOC Content in Ready to Use Condition* (grams/litre of paint, less water and less exempt compounds)
Phase II: 1 April 2012	
(22) Antifouling Coatings	400
(23) Antifouling Sealer Coatings	420

* For the purpose of compliance check, the VOC content in ready to use condition would be the maximum VOC content when the paint is in a condition ready to be applied to the surface, i.e. no more dilution or conditioning of the paint is required, in accordance to the manufacturer's recommendations for application. For example, when a range of ratios is recommended for dilution with organic solvent, the highest dilution ratio should be used to give the maximum VOC content.

Any marine vessel coating not regulated by Type (1) to Type (20) or Type (22) to Type (23) shall comply with the limit of Type (21).

Annex C

Proposed VOC Control on Pleasure Craft Paints

(a) Effective Date

Phase I: 1 January 2011
Phase II: 1 April 2012

(b) VOC Content Limit

Regulated Pleasure Craft Paint Type	Maximum Limit of VOC Content in Ready to Use Condition* (grams/litre of paint, less water and less exempt compounds)
Phase I: 1 January 2011	
(1) Topcoats: Extreme High Gloss	600
(2) Topcoats: High Gloss	420
(3) Pretreatment Wash Primers	780
(4) Finish Primers/Surfacers	600
(5) High Build Primers/Surfacers	340
(6) Teak Primers	775
(7) Clear Wood Finishes: Sealers	550
(8) Clear Wood Finishes: Varnishes	490
(9) Other Pleasure Craft Coatings[#]	420
Phase II: 1 April 2012	
(10) Antifouling Coatings (Aluminium Substrate)	560
(11) Antifouling Coatings (Other Substrates)	330
(12) Antifouling Sealer Coatings	420
(13) Self-polishing Copolymer Antifouling	400

* For the purpose of compliance check, the VOC content in ready to use condition would be the maximum VOC content when the paint is in a condition ready to be applied to the surface, i.e. no more dilution or conditioning of the paint is required, in accordance to the manufacturer's recommendations for application. For example, when a range of ratios is recommended for dilution with organic solvent, the highest dilution ratio should be used to give the maximum VOC content.

[#] Any pleasure craft coating not regulated by Type (1) to Type (8) or Type (10) to Type (13) shall comply with the limit of Type (9).

Annex D

Proposed VOC Control on Adhesives

(a) Effective Date:

Phase I: 1 January 2010
Phase II: 1 April 2012

(a) VOC Content Limit

Regulated Adhesive Type	Maximum Limit of VOC Content in Ready to Use Condition*
Phase I: 1 January 2010	
(1) Architectural Applications	
(a) Carpet Pad Adhesive	50
(b) Ceramic Tile Adhesive	65
(c) Cove Base Adhesive	50
(d) Dry Wall and Panel Adhesive	50
(e) Indoor Carpet Adhesive	50
(f) Multipurpose Construction Adhesive	70
(g) Outdoor Carpet Adhesive	150
(h) Rubber Flooring Adhesive	60
(i) Single-Ply Roof Membrane Adhesive	250
(j) Structural Glazing Adhesive	100
(k) Subfloor Adhesive	50
(l) VCT and Asphalt Tile Adhesive	50
(m) Wood Flooring Adhesive	100
(2) Adhesive Specialty Applications	
(a) ABS Welding	325
(b) Adhesive Primer for Plastic	550
(c) Adhesive Primer for Traffic Marking Tape	150
(d) Computer Diskette Manufacturing	350
(e) Contact Adhesive	250**
(f) CPVC Welding	490
(g) Elastomeric Adhesive with 15% or more by Weight Natural or Synthetic Rubber	730
(h) Graphic Arts Adhesive	150

Regulated Adhesive Type	Maximum Limit of VOC Content in Ready to Use Condition*
(i) Paper, Fabric, and Film Coating Adhesive	265
(j) Plastic Cement Welding	250
(k) PVC Welding	510
(l) Sheet-Applied Rubber Lining Operations	850
(m) Special Purpose Contact Adhesive	250
(n) Structural Wood Member Adhesive	140
(o) Top and Trim Adhesive	250
(p) Tyre Retread Adhesive	100
(q) Wood Flat Stock Adhesive	250
(3) Adhesive Substrate Specific Applications[#] For adhesives, adhesive bonding primers, adhesive primers or any other primers not regulated by Category (1) and (2) above and applied to the following substrates, the following limits shall apply:	
(a) Fiberglass	80
(b) Metal	30
(c) Plastic Foams	50
(d) Porous Material (except wood)	50
(e) Wood	30
(4) Any adhesives, adhesive bonding primers, adhesive primers, or any other primers not falling within Category (1) to (3) above	250
Phase II: 1 April 2012	
(5) Adhesive Specialty Applications	
(a) Contact Adhesive	80

* For low-solids adhesives, the VOC limit is expressed in grams of VOC per litre of adhesive while for other adhesives, VOC limits are expressed in grams of VOC per litre of adhesive less water and less exempt compounds. For the purpose of compliance check, the VOC content in ready to use condition would be the maximum VOC content when the adhesive is in a condition ready to be applied to the surface, i.e. no more dilution or conditioning of the adhesive is required, in accordance to the manufacturer's recommendations

for application. For example, when a range of ratios is recommended for dilution with organic solvent, the highest dilution ratio should be used to give the maximum VOC content.

** This limit will be tightened to 80 g/l in Phase II effective from 1 April 2012.

If an adhesive is used to bond dissimilar substrates together, the applicable substrate type with the highest VOC content shall apply.

Annex E

Proposed VOC Control on Sealants

(a) Effective Date: 1 January 2010

(b) VOC Content Limit

Regulated Sealant Type	Maximum Limit of VOC Content in Ready to Use Condition*
(1) Sealants (excluding sealant primers)	
(a) Portable Sealant or Caulking Compounds # (except roof cements and roof sealants; insulating foams; removable caulking compounds; clear/paintable/water resistant caulking compounds; floor seam sealers; products represented exclusively for vehicle uses; or sealers that are applied as continuous coatings)	50
(b) Architectural	250
(c) Marine Deck	760
(d) Nonmembrane Roof	300
(e) Roadway	250
(f) Single-Ply Roof Membrane	450
(g) Others	420
(2) Sealant Primers	
(a) Architectural (Non-Porous)	250
(b) Architectural (Porous)	775
(c) Marine Deck	760
(d) Modified Bituminous	500
(e) Others	750

* For low-solids sealants, the VOC limit is expressed in grams of VOC per litre of sealant; while for other sealants, VOC limits are expressed in grams of VOC per litre of sealants less water and less exempt compounds. For the purpose of compliance check, the VOC content in ready to use condition would be the maximum VOC content when the sealant is in a condition ready to be applied to the surface, i.e. no more dilution or conditioning of the sealant is required, in accordance to the manufacturer's recommendations for application. For example, when a range of ratios is recommended for dilution with organic solvent, the highest dilution ratio should be used to give the maximum VOC content.

\# Other sealants not regulated as "Portable Sealant or Caulking Compounds" shall comply with the limits for Type (b) to (g) of Category (1) or Category (2) except sealers that are applied as continuous coatings.