

LEGISLATIVE COUNCIL BRIEF

**Air Pollution Control Ordinance (Cap. 311)
Air Pollution Control (Dry-Cleaning Machines)
(Vapour Recovery) Regulation**

INTRODUCTION

The Secretary for the Environmental and Food has made the Air Pollution Control (Dry-Cleaning Machines) (Vapour Recovery) Regulation, at Annex, under section 43 of the Air Pollution Control Ordinance (Chapter 311) to reduce perchloroethylene (PCE) emissions from dry-cleaning operations.

BACKGROUND AND ARGUMENT

Perchloroethylene

2. PCE is the most commonly used dry-cleaning agent both locally and overseas. It is a non-flammable and colourless liquid with a strong sweet odour. Exposure to very high concentrations of PCE may cause skin and eye irritation, dizziness, nausea, headaches and liver and kidney damage.

3. PCE is classified by the International Agency for Research on Cancer as a “probable human carcinogen”. That means long-term exposure to high concentrations of PCE may increase the risk of cancer in human bodies but that there has not yet been sufficient evidence on this. The risk, if actually exists, would be low compared to other cancer risks. For example, it would be 170 times lower than that of environmental tobacco smoke.

4. The annual ambient PCE level recorded by the Environmental Protection Department (EPD) in 1999 was 2.34 g/m³, which is comparable with some cities in North America such as Los Angeles, Montreal and Ottawa. It is lower than the recommended actionable level of 16.9 g/m³ of the California Air Resources Board. There is therefore no immediate threat to the public health.

5. The Laundry Association of Hong Kong has estimated that there are approximately 400 dry-cleaning machines operating in hotels and laundry shops and factories. The majority of these operations are located among residential buildings.

Dry-cleaning operation

6. Dry-cleaning operation involves three processes, namely, washing of fabrics in PCE solvent, spinning to extract excessive PCE solvent and drying with hot air stream. All the three processes are carried out inside the same dry-cleaning machine. Two types of dry-cleaning machines are used in Hong Kong: vented and non-vented. About half of the existing dry-cleaning machines in Hong Kong are vented.

7. For vented machines, PCE vapour is released into the air during the drying cycle. Non-vented machines have no exhaust and the PCE vapour from the drying process is recycled through a control device. Some PCE vapour will remain inside the non-vented machine after completion of the whole dry-cleaning cycle and will be released into the air when the door of the machine is opened. The amount of PCE vapour released varies between different models of machines, depending on how effective their vapour recovery system is.

8. Most European countries and the United States regulate the emission of PCE from dry-cleaning machines through phasing out vented machines and controlling the maximum residual PCE concentrations in non-vented dry-cleaning machines. Currently many European countries like Germany, Austria, Denmark, Norway and Sweden, and certain areas in the USA such as Los Angeles, San Francisco and New York adopt a maximum residual PCE concentration of 290 to 300 parts per million by volume (ppmv).

9. All the dry-cleaning machines in Hong Kong are known to be using PCE. Although there are other alternative dry-cleaning solvents, PCE is used because of its proven dry-cleaning performance. In overseas countries, trichlorotrifluoroethane (CFC113) was also used in the past as a dry-cleaning solvent but is now banned under the Montreal Protocol for Protecting the Ozone Layer. Importation of CFC 113 to Hong Kong is prohibited. Some petroleum-based solvents are also used overseas for dry cleaning, but they are not commonly used in Hong Kong due to their fire-risk and as the trade regard them as less effective than PCE in removing oil and grease stains.

THE REGULATION

10. Although the annual ambient PCE level is low as mentioned in paragraph 4 above and the emission of PCE from dry-cleaning machines does not pose an immediate threat to public health, we propose that Hong Kong should adopt a precautionary approach and follow other countries in reducing such emission. The proposed regulation made under the Air Pollution Control Ordinance is to –

- (a) require that all new dry-cleaning machines sold in Hong Kong shall be of the non-vented type with a maximum residual PCE concentration of below 300 ppmv (“the standard”). The EPD shall establish a list of approved machines that meet the standard and are certified so by the machine manufacturers. The list of approved machines will be updated by the Department from time to time to include new models that meet the standard and shall be made available for public inspection and reference. Sale of vented machines and non-vented machines which do not meet the standard and that are already in Hong Kong before the commencement of the proposed regulation shall be allowed during the grace periods mentioned in sub-paragraphs (b) and (c) below;
- (b) require existing vented dry-cleaning machines to be either modified to meet the standard or replaced with new approved machines within five years from the commencement of the proposed regulation;
- (c) require existing non-vented machines that do not meet the standard to be modified to meet the standard or replaced with new approved machines within seven years from the enactment of the regulation. A longer “grace period” is given to non-vented machines that do not meet the standard because they are generally newer and as by design they emit less PCE vapour than vented machines;
- (d) require all modification work to be certified by a competent examiner and registered with the EPD to ensure that it is properly completed. The certificate shall be displayed at the machine;
- (e) make it an offence to sell or lease new dry-cleaning machines that do not

meet the standard. The offence shall attract a maximum fine of \$100,000;

(f) make it an offence to operate dry-cleaning machines that do not meet the standard after the “grace periods”. The offence shall attract a maximum fine of \$100,000 and a further fine of \$20,000 each day for continuing operation of the machine; and

(g) make it an offence for failure to display the certificate of a modified machine. The offence shall attract a maximum fine of \$50,000.

The penalties proposed in (e) to (f) above are the same as those for similar offences under the Air Pollution Control Ordinance.

COMMENCEMENT DATE

11. Our intention is to commence the Regulation in November 2001.

FINANCIAL AND STAFF IMPLICATIONS

12. As there are only a few dry-cleaning machines being operated by some of the government departments and most of them comply with the new standard, there will be minimum financial implication to these departments. The proposed control scheme will incur some additional workload to Environmental Protection Department. The department will absorb the additional workload.

ECONOMIC IMPLICATIONS

13. The price of a non-vented dry-cleaning machine that meets the standard depends on its size and the make. A machine of the most commonly used size of 12 kg costs about \$200,000 to \$400,000 depending on the make. This is about \$40,000 to \$100,000 more expensive than a sub-standard non-vented machine of the same make. Most operators of vented machines may prefer to replace their machines before the end of the grace period, rather than modifying them. As machines complying with the standard will consume considerably less PCE, an

operator can make a saving of up to \$10,000 a year in PCE cost after switching to a new machine.

14. About 10% of the existing non-vented dry-cleaning machines comply with the standard. 40% of those which do not meet the standard are of newer design and can be modified to fully comply with the standard. The modification cost is approximately \$50,000 for each machine. The remaining ones are of older design and their operators may choose to replace rather than modifying them by the end of the 7-year grace period.

BASIC LAW IMPLICATIONS

15. The Department of Justice advises that the Regulation does not conflict with those provisions of the Basic Law carrying no human rights implications.

HUMAN RIGHTS IMPLCIATIONS

16. The Department of Justice advises that the Regulation is consistent with the human rights provisions of the Basic Law.

ENVIRONMENTAL IMPLICATIONS

17. Implementation of the Regulation will reduce the emissions of PCE from dry-cleaning operations. This will help to reduce the ambient PCE level and alleviate the exposure of residents living in the vicinity of dry-cleaning facilities.

PUBLIC CONSULTATION

18. We have consulted eight relevant trade associations and over 490 laundries. They generally support the introduction of the control scheme but have made the following comments –

- (a) the “grace periods” of five years for existing vented machines and seven years for non-vented machines that do not meet the standard should be

further extended; and

- (b) Government should subsidize the machine modification or replacement through financial assistance or low interest loan.

19. On paragraph 18(a), our initial proposal was a “grace period” of five years for both vented and non-vented machines that do not meet the standard. Following extensive consultation with the trade, we have revised our proposal to allow a longer “grace period” of five and seven years for vented and sub-standard non-vented machines respectively. We do not recommend further extending the “grace periods” because over 90% of the existing vented machines will approach their normal retirement age at the expiry of the 5-year grace period and would have to be replaced anyway even if the control scheme is not to be introduced. As for non-vented machines that do not meet the standard, about 86% of them will reach their normal useful life by the end of the 7-year grace period.

20. Regarding the trade’s request for financial assistance, Members may wish to note that a dry-cleaning machine that meets the standard will consume considerably less PCE as the majority of the chemical will be recycled. For a normal operation, the savings could be up to \$10,000 per machine per year depending on the intensity of its operation. Therefore, the operator would be able to lower his operating cost after modifying or changing his machine. As the proposed grace periods should cover the normal useful life of the majority of the existing machines, we are of the view that it would be inappropriate to use public money to subsidize the modification or replacement of the machines.

21. We have consulted the Advisory Council on the Environment (ACE) on our proposal and its members are generally supportive of it. Some have suggested that the Administration should consider offering technical and/or financial assistance to dry-cleaning operators so that the “grace period” could be shortened.

22. The proposed control scheme was also discussed in the Legislative Council Panel on Environmental Affairs (EA Panel) in January this year. Panel members asked the LegCo Secretariat to carry out an independent research into the health effects of PCE to see whether the proposed 5 and 7 years grace periods were reasonable. Some Panel members suggested offering some form of loans to help the dry cleaners for an early switch-over.

23. We have considered the ACE's and the EA Panel's suggestion carefully. For reasons set out in paragraphs 3 and 4 above, there does not appear to be an overriding urgency for modifying or replacing all existing machines and thus the need to use public money for an early switch-over is not justified. To assist members to better understand the background of this issue, we have provided the results of a trade study conducted by the Hong Kong Productivity Council and local academics' opinion for EA panel members' reference.

PUBLICITY

24. A press release on the proposed measures will be issued when the proposed Regulation is published in the Gazette on 1 June 2001. Letters will also be issued to the laundry industry to inform them of the control requirements.

ENQUIRY

25. For any enquiries about this brief, please contact Mr. Albert Leung, Assistant Secretary for the Environment and Food, at 2136 3308.

Environment and Food Bureau
May 2001

Air Pollution Control Ordinance (Cap. 311)

**Air Pollution Control (Dry-Cleaning Machines)
(Vapour Recovery) Regulation**

**AIR POLLUTION CONTROL (DRY-CLEANING MACHINES)
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**AIR POLLUTION CONTROL (DRY-CLEANING MACHINES)
(VAPOUR RECOVERY) REGULATION**

(Made under section 43 of the Air Pollution Control Ordinance
(Cap. 311) after consultation with the Advisory
Council on the Environment)

PART I

PRELIMINARY

1. Commencement

This Regulation shall come into operation on 1 November 2001.

2. Interpretation

In this Regulation, unless the context otherwise requires -

"Accredited Laboratory" (認可實驗室) means a laboratory accredited by HKAS managed by the Innovation and Technology Commission or by a body which has a mutual recognition agreement with HKAS Executive;

"approved" (核准) means approved under section 4;

"competent examiner" (合資格檢驗師) means a registered professional engineer in the building services, gas, chemical, environmental, marine and naval architecture or mechanical disciplines under the Engineers Registration Ordinance (Cap. 409);

"drum" (滾筒) means the rotating cylinder or wheel of a dry-cleaning machine that holds the materials being cleaned;

"dry-cleaning laundry" (乾洗場) means any premises in which is

installed (and howsoever it is installed) a dry-cleaning machine;

"dry-cleaning machine" (乾洗機) means a machine which uses perchloroethylene to remove soil, grease or paint or other unwanted substances from materials;

"drying cycle" (乾衣程序) means the process which -

- (a) is used to remove perchloroethylene remaining in the materials being dry-cleaned after washing and extraction in a dry-cleaning machine;
- (b) starts with a heated portion followed by the activation of the vapour recovery system; and
- (c) ends when the drum of the machine ceases rotation;

"existing machine" (現存乾洗機) means a dry-cleaning machine which is in Hong Kong before the commencement of this Regulation;

"fugitive control system" (逃逸性控制系統) means a device that collects perchloroethylene vapours from the door, button and lint traps, still, or other intentional openings of a dry-cleaning machine and routes those vapours to a device that reduces the mass of perchloroethylene prior to exhaust of the vapour to the ambient air;

"HKAS" (香港認可處) has the same meaning as it has in Regulations for Laboratory Accreditation (HOKLAS 002) of the Hong Kong Laboratory Accreditation Scheme under the charge of the Commissioner for Innovation and Technology on behalf of the Government;

"HKAS Executive" (香港認可處執行人員) has the same meaning as it has in

Regulations for Laboratory Accreditation (HOKLAS 002) of the Hong Kong Laboratory Accreditation Scheme under the charge of the Commissioner for Innovation and Technology on behalf of the Government;

"HOKLAS" (香港實驗所認可計劃) has the same meaning and objectives as it has in Regulations for Laboratory Accreditation (HOKLAS 002) of the Hong Kong Laboratory Accreditation Scheme under the charge of the Commissioner for Innovation and Technology on behalf of the Government;

"lease" (出租) includes -

- (a) offer or expose for lease;
- (b) lease without payment; and
- (c) offer or expose for lease without payment;

"materials" (物料) means wearing apparel, draperies, linens, fabrics, textiles, rugs, leather and other substances that are dry-cleaned;

"mutual recognition agreement" (相互承認協議) means any agreement or arrangement whereby the parties thereto have agreed or arranged to provide for the mutual recognition of testing laboratories which are accredited under the laboratory accreditation system administered by such parties;

"non-vented type" (密封型) means the type of dry-cleaning machine -

- (a) in which the processes of washing, extraction and drying cycle are all performed in the same single unit;
- (b) which recirculates perchloroethylene-laden vapour

through a vapour recovery system with no exhaust to the ambient air during the drying cycle; and

- (c) in which the vapour may only be vented to the ambient air -
 - (i) through a fugitive control system after the drying cycle is complete; and
 - (ii) when the machine's door is open;

"perchloroethylene" (全氯乙炔) means the substance with the chemical formula C_2Cl_4 and also known as tetrachloroethylene;

"refrigerated condenser" (冷凝器) means a closed loop vapour recovery device in which perchloroethylene-laden vapour is cooled and condensed by means of refrigeration;

"sell" (出售) includes -

- (a) offer or expose for sale;
- (b) supply without payment; and
- (c) offer or expose for supply without payment;

"specified period" (指明期間), in relation to an existing machine -

- (a) which is a vented type dry-cleaning machine, means the period of 5 years immediately following the commencement of this Regulation; and
- (b) which is a non-vented type dry-cleaning machine, means the period of 7 years immediately following the commencement of this Regulation;

"use" (使用) includes operate;

"vapour adsorber" (汽體吸附器) means a device covered with a layer of

activated carbon or other adsorbent into which perchloroethylene-laden vapour is introduced and trapped for subsequent desorption;

"vapour recovery system" (汽體回收系統) means a perchloroethylene vapour recovery system which reduces the perchloroethylene concentration in the drum of a dry-cleaning machine through the recovery of the perchloroethylene vapour in a totally enclosed system by -

- (a) both a refrigerated condenser and a vapour adsorber; or
- (b) a means which is equivalent to the means specified in paragraph (a);

"vented type" (非密封型) means the type of dry-cleaning machine in which -

- (a) fresh air is introduced into the drum during the drying cycle; and
- (b) the perchloroethylene-laden vapour is exhausted to the ambient air, either directly or through a control device.

3. Application

(1) Subject to subsection (2), this Regulation applies to every dry-cleaning machine.

(2) If any model of an existing machine becomes an approved machine, then the provisions of this Regulation applicable to

existing machines shall cease to apply to that model of existing machine.

PART II
APPROVED DRY-CLEANING MACHINE

4. Authority shall approve any model of non-vented type dry-cleaning machine which complies with certain requirements

The Authority shall approve any model of a non-vented type dry-cleaning machine if the Authority is satisfied that the machine -

- (a) is equipped with a vapour recovery system capable of reducing the perchloroethylene concentration in the drum to 300 ppmv (that is, 2 034 mg/m³ at 298 K and 101.325 kPa) or below at the end of the drying cycle, prior to the opening of the machine's door; and
- (b) is certified by the machine manufacturer to meet the requirement of paragraph (a).

5. Keeping of register

The Authority shall, in respect of each model of an approved machine, cause to be kept a register containing details of -

- (a) the name of the manufacturer;
- (b) the model; and
- (c) such other information, if any, as the Authority thinks fit for the purposes of this Regulation.

6. Inspection of register

The register shall be open for inspection by the public during normal office hours at such places as the Secretary thinks fit.

PART III

SALE, ETC. AND USE OF DRY-CLEANING MACHINE

7. Sale, etc. of dry-cleaning machine

(1) A person shall not sell or permit to be sold, or lease or permit to be leased, a dry-cleaning machine for use in Hong Kong unless it -

- (a) is an approved machine;
- (b) is an existing machine and the sale or lease is completed within the specified period; or
- (c) complies with the requirements specified in section 8(1)(b)(ii).

(2) For the avoidance of doubt, it is hereby declared that a person does not contravene subsection (1) by reason only of the fact that the person provides a financial service to facilitate the sale or lease of a dry-cleaning machine.

8. Use of dry-cleaning machine

(1) The owner of a dry-cleaning laundry shall not use, or permit any person to use, a dry-cleaning machine installed in the laundry unless -

- (a) the machine is an approved machine; or
- (b) the machine is an existing machine and -
 - (i) the specified period has not expired; or
 - (ii) the specified period has expired but -
 - (A) the machine is a non-vented type machine equipped with a vapour recovery system capable of reducing the perchloroethylene concentration in the drum to 300 ppmv (that is, 2 034 mg/m³ at 298 K and 101.325 kPa) or below at the end of the drying cycle, prior to the opening of the machine's door;
 - (B) a competent examiner has signed a certificate under section 9 in respect of the machine;
 - (C) the Authority has registered the certificate under section 10(2);
 - (D) the competent examiner has issued the certificate under section 10(3); and
 - (E) the certificate is displayed in a conspicuous position on the machine.

(2) The owner of a dry-cleaning laundry in which is installed a dry-cleaning machine which cannot be used by virtue of subsection (1) shall, as soon as is reasonably practicable after the machine cannot be used by virtue of that subsection but, in any case, not later than

14 days after the machine cannot be used by virtue of that subsection -

- (a) render the machine, or cause the machine to be rendered, permanently inoperable to the satisfaction of the Authority; or
- (b) remove the machine, or cause the machine to be removed, from the laundry.

9. Competent examiner to sign certificate

A competent examiner shall sign a certificate, in a form specified by the Authority, in respect of an existing machine if he is satisfied that -

- (a) an Accredited Laboratory has issued a test report in respect of the machine in accordance with the testing procedures as specified in the Schedule; and
- (b) the machine complies with the requirements specified in section 8(1)(b)(ii)(A).

10. Registration of certificate

(1) After a competent examiner has under section 9 signed a certificate, he shall submit an application to the Authority for the registration of the certificate under subsection (2), accompanied with the test report concerned issued by the Accredited Laboratory.

(2) Where the Authority receives the certificate and the test report under subsection (1), the Authority shall -

- (a) register the certificate by entering particulars of the certificate in a register kept by him for the purpose;
 - (b) keep the test report in the register;
 - (c) endorse on the certificate that it has been registered; and
 - (d) deliver the certificate as so endorsed to the competent examiner.
- (3) The competent examiner shall issue the endorsed certificate to the owner of the dry-cleaning laundry -
- (a) in which the dry-cleaning machine to which the certificate relates is installed; and
 - (b) within 14 days after the receipt of the certificate from the Authority.

PART IV OFFENCES AND PENALTIES

11. Offences and penalties

(1) Subject to subsection (2), a person who contravenes section 7(1) commits an offence and is liable on conviction to a fine at level 6.

(2) It shall be a defence for a person charged with an offence under subsection (1) to prove that at the time of the alleged offence he believed, and that it was reasonable for him to believe, that the

dry-cleaning machine to which the offence relates was not for use in Hong Kong.

(3) An owner of a dry-cleaning laundry who contravenes section 8(1) (other than section 8(1)(b)(ii)(E)) or (2) commits an offence and is liable on conviction to a fine at level 6, and to a further fine of \$20,000 for each day during the whole or part of which the court is satisfied that the offence has continued.

(4) An owner of a dry-cleaning laundry who contravenes section 8(1)(b)(ii)(E) commits an offence and is liable on conviction to a fine at level 5.

SCHEDULE

[s. 9]

TESTING PROCEDURES FOR PERCHLOROETHYLENE CONCENTRATION IN DRUM OF NON-VENTED TYPE DRY-CLEANING MACHINE

1. **Duties of Accredited Laboratory**

An Accredited Laboratory shall be responsible for the testing of the perchloroethylene concentration in the drum of a non-vented type dry-cleaning machine. It shall follow the testing conditions and testing methods as specified in this Schedule and shall issue a test report which shall bear the endorsement of HOKLAS or an accreditation body which has entered into a mutual recognition agreement with HKAS for the chemical analysis of air samples for perchloroethylene concentration.

2. **Testing conditions**

A testing programme consisting of a minimum of 3 tests shall be conducted on a dry-cleaning machine under normal operating conditions. Each test shall be conducted during the cleaning of a load of materials which shall be no less than 75% of the dry-cleaning machine's capacity. The weight of materials shall be recorded for each test.

3. **Testing methods**

The dry-cleaning machine shall be tested as follows -

- (a) a sampling port and valve shall be appropriately installed so that one can draw an air sample from the drum or the lint filter housing; any sampling pump used shall have Teflon diaphragms;
- (b) sampling of the perchloroethylene concentration in the drum shall be carried out only when the machine's door remains closed and any fugitive control system is not activated;
- (c) sampling shall -
 - (i) begin at the end of the drying cycle; and
 - (ii) be completed within 5 minutes of the completion of drying cycle;
- (d) the perchloroethylene concentration in the drum shall be determined in one of the following ways -
 - (i) the NIOSH Method 1003 (NIOSH Manual of

Analytical Methods, U.S. Department of Health and Human Services, August 15, 1994);

- (ii) the ARB Method 422 (17 CCR, Section 94132, December 31, 1991); or
- (iii) any alternative testing method as approved by the Authority.

Secretary for the Environment
and Food

24 May 2001

Explanatory Note

This Regulation is made under the Air Pollution Control Ordinance (Cap. 311) to introduce requirements for dry-cleaning machines in order to reduce the amount of perchloroethylene-laden vapour which is vented to the air from such machines. In particular, the Regulation -

- (a) defines the terms "dry-cleaning machine", "existing machine", "non-vented type", "specified period" and "vented type" used in the Regulation (section 2);

- (b) provides that the Regulation applies to every dry-cleaning machine (section 3);
- (c) prescribes the requirements subject to which the air pollution control authority ("Authority") shall approve any model of non-vented type dry-cleaning machine (section 4);
- (d) provides that the Authority shall cause a register to be kept of each model of approved dry-cleaning machines which shall be open for inspection by the public (section 5 and 6);
- (e) prohibits the sale or lease of certain dry-cleaning machines (section 7);
- (f) provides that the owner of a dry-cleaning laundry shall not use, or permit any person to use, a dry-cleaning machine installed in the laundry unless the machine is approved under section 4, or is an existing machine and the specified period has not expired, or is an existing machine which meets certain prescribed requirements after the expiration of the specified period. A dry-cleaning machine installed in the laundry which cannot be used must be rendered permanently inoperable or removed from the laundry (section 8);
- (g) specifies when a competent examiner shall sign a certificate that an existing machine complies with

- requirements specified in section 8 (section 9);
- (h) provides that the Authority has to register such a certificate submitted to him by the competent examiner (section 10);
 - (i) provides penal provisions for contraventions of sections 7 and 8 (section 11); and
 - (j) prescribes that an Accredited Laboratory has to follow the testing procedures for the perchloroethylene concentration in the drum of a non-vented type dry-cleaning machine (the Schedule).