DRY CLEANING PLANTS

REQUIREMENTS FOR INSTALLATION AND OPERATION

Notice to Shipowners, Masters, Shipbuilders and Repairers

1. It has come to the notice of this Department that dry cleaning plants are now being fitted in United Kingdom registered ships. Because of the hazards associated with solvents used for dry cleaning the Department considers it is necessary to issue requirements for the installation and operation of dry cleaning plants, applicable both to new ships and existing ships, with a view to limiting the risk to operators of such plant and to personnel on board. The requirements are framed around the characteristics of halogenated solvents now generally used in dry cleaning plants, such as perchloroethylene and trichlorotrifluoroethane, which are non-flammable.

2. The principal hazards associated with dry-cleaning solvent are that it is volatile and the vapor is an anesthetic. The vapor is capable of inducing drowsiness, followed by unconsciousness and eventually death if the concentration is high enough and the affected person is not removed to fresh air. It is therefore important that effective mechanical ventilation is provided in any compartment containing dry-cleaning plant. The purpose of such ventilation and the following requirements is to ensure that the vapor concentration never exceeds the "threshold limit value", which is the airborne concentration of vapor under which it is believed that nearly all persons may be repeatedly exposed without adverse effects.

3. Another hazard is that the vapor, if allowed to contact naked flames or red-hot surfaces, decomposes into toxic and corrosive substances which are dangers both to health and structure. Smoking should therefore be prohibited in compartments where the solvent is present.

4. The liquid solvent, if handled without protective clothing, is a potential cause of de-fatting of the skin, leading to skin cracking with the possibility of infection from other sources.

5. The vapor is heavier than air, and may therefore buildup in the bottom of a compartment in the absence of thermal currents.

6. The requirements set out in the Appendix to this Notice should be followed. These have been agreed with industry.

7. A copy of this Notice should be kept with the manufacturers' instructions. It should be brought to the attention of the responsible officer and the operator when a change of personnel takes place.

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Marine Division
London WC1V 6LP
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APPENDIX

1. **Position and Access**

The plant compartment should be:

(a) above the freeboard deck with an entrance from the open deck. There should be no direct communication with crew or passenger accommodation or passageways leading thereto;
(b) totally separated from other enclosed spaces by steel gaslight divisions;
(c) not used for any other purposes than dry cleaning.

2. **Ventilation**

2.1. A mechanical exhaust fan providing at least 20 changes of air per hour should be fitted to the plant compartment, separate from all other ventilation systems and exhausting to a position in the open air, clear of other access, ventilation or window/sidelight openings. The trunk within the compartment is to be equally divided to draw air from:

(a) a high level, and
(b) a level near the deck, as close as practicable to the plant still,

and so positioned that the normal flow of air is directed away from the operator, past the plant and any airing space (see paragraph 6) and thence outboard. If the trunking passes through other compartments then joints within those compartments should be kept to a minimum, care being taken to make them gastight by welding.

2.2. The exhaust fan should be positioned as close to the outboard end of the trunking as practicable, the outboard end being protected from the weather by a fixed baffie.

2.3. The exhaust fan should be arranged so that in the event of a stoppage of the airflow for any reason, the dry cleaning plant becomes inoperable *except* for the purge fan of the plant, which should be independently controllable. (There is however no necessity to provide the exhaust fan with an emergency source of power.) The exhaust fan should also be capable of being started at a position outside the compartment.

2.4. Because high concentrations of solvent vapor may be discharged from the dry cleaning plant during the purge cycle, the purge fan of the plant should be trunked independently outboard. The same considerations as in paragraph 2.1 should be observed for the siting of the outlet and the routines of the trunk through other compartments.

2.5. A balancing vent to atmosphere should be fitted, adequate in size an4 so sited and diffused that it will not "short circuit" the main extraction system as described in paragraph 2.1. The outboard end of the balancing vent should be as remote as possible from the mechanical exhaust from the compartment and the purge outlet. Any mechanical supply ventilation should be separate from all other systems.

3. **Drainage**
A scupper should be fitted, led directly overboard with no connections to any other drainage system. Scuppers and drain pipes should be of solvent resistant material. Access doors should be provided with sills of 150 mm minimum height.

4. **Water Services**
Any connections with the ship's fresh water system should be suitably protected against contamination by backflow.

5. **Flooring**
The deck of the compartment should be finished in terazzo, tiles or other material which is impervious to liquids, and resistant to dry-cleaning solvents. The decking should be coved up at all sides.

6. **Clothes Airing Arrangements**
6.1. It is important to provide hanging space with rails where newly cleaned articles should be thoroughly aired before being available for re-use, to remove any solvent fumes. An arrangement of airing space within the plant compartment is acceptable provided such space is adjacent to the exhaust ventilation grilles (both upper and lower), but not so close as to impede the extraction of air from the compartment.

6.2. If a separate airing room is provided then the only access to it should be through the plant compartment. Ventilation of the airing room should be fitted as described in paragraph 2, and may utilise the same trunking as:

(a) the mechanical exhaust and
(b) the natural balance vent for the plant compartment.

7. **Other Services**

7.1. Heating, lighting and heat and sound insulation should be to the standards appropriate to a laundry as specified in the current Merchant Shipping (Crew Accommodation) Regulations.

7.2. Where the plant has a pressure release device which operates if the still overheats, arrangements should be made for the ejected solvent or vapour to be conducted directly to the open air, clear of ventilation openings.

8. **Security**

8.1. An officer who has been instructed in the operation of the plant should be appointed to take overall responsibility for the security and operation of the plant.

8.2. The responsible officer is to ensure that the plant compartment is locked at all times when the plant is not in use, and that only the operator or him/herself normally has access to it.

9. **Operations**

9.1. The operator is to inform the responsible officer, or a nominated deputy who is on duty at the appropriate time, whenever it is intended to open the plant compartment for any purpose, and is to report back as soon as the plant compartment is re-secured.

9.2. The responsible officer is to be satisfied that the machine operator is fully aware of:

(a) the operating and maintenance procedures as laid down in the manufacturer's instruction manual, a copy of which should be kept on board the ship;
(b) action necessary in the event of a malfunction of the plant;
(c) the precautions to be taken in handing the solvent, dealing with spillages, routine servicing and the removal of sludge. Appropriate protective clothing should be made available, including cotton-lined PVC gloves, and a second person should be present to assist the operator in case an emergency arises. Sludge removal should be done only when the plant is cold;
(d) the inherent dangers of excessive concentrations of solvent vapor;
(e) the meaning of cautionary notices displayed in the plant compartment;
(f) the need to keep ventilation openings clean and clear of obstructions.

9.3. Warning notices appropriate to the particular solvent used should be permanently displayed in a prominent place in the plant compartment. Such notices should be obtained from the solvent manufacturer and should include instructions in first aid for persons overcome by solvent vapour.

9.4. Dry cleaning operations are to be strictly limited to articles of protective clothing, overalls and boiler suits which are of materials suitable for dry cleaning. Items that are thick or padded, and bedding, are not to be dry cleaned.

10. **Storage of Solvents**

10.1. Solvent containers should be kept in a cool place, out of direct sunlight.

10.2. No objection will be raised to the storage of three months' supply of solvent in the plant compartment. The solvent should be kept in the manufacturer's containers unless a special bulk storage tank is provided with outside filling arrangements. The manufacturer's containers are to be positively located, in strong close-fitting racks to prevent displacement in rough weather, and should be kept sealed until required for use.

Containers should not be left open longer than necessary.

10.3. If larger quantities of solvent are stored on board ship then a separate compartment should be provided and used for no other purpose. Its position, access, integrity, drainage, security and solvent containment arrangements should be as described above. If the storage capacity either in containers or in purpose-built storage tanks is 20 gallons or more an independent mechanical exhaust ventilation system should be installed, together with a fresh air inlet. Otherwise natural ventilation may be employed comprising a supply to the top of the compartment and an exhaust as low and direct as possible, remote from other vent or access openings. The access door to the compartment should in any case have the least possible sill height. A closed vessel should be provided for transferring solvent to the plant compartment.

10.4. Each storage position should be provided with a permanent notice identifying the type of solvent suitable for the dry cleaning plant, with a list of the manufacturers and trade names of suitable products. The notice should prohibit the use of other solvents in the plant.

11. **Emergency Equipment**

An approved fire extinguisher of suitable type should be kept in the plant compartment, together with a bucket of dry sand with a close fitting lid and a shovel for dealing with minor spillages.