Updated in 2022

Guide on the Segregation, Packaging, Labelling and Storage of Chemical Wastes for Schools

(Prepared by the Environmental Protection Department)

1. Introduction

The Waste Disposal (Chemical Waste) (General) Regulation (hereafter, the Regulation) is introduced under the Waste Disposal Ordinance (Cap. 354) (hereafter, the Ordinance) to control the handling, collection, transport and disposal of chemical wastes.

This guide outlines the standards and essential requirements on the segregation, packaging, labelling and storage of chemical wastes from schools taking into account of the varied nature of such wastes and the relatively small quantities of their arisings. The Regulation should however be referred to for the detailed requirements. The information booklet "*Code of Practice on the Packaging, Labelling, and Storage of Chemical Wastes*" can also provide more general guidance for complying with the requirements of the Regulation, and is available at the Environmental Protection Department (EPD) website: http://www.epd.gov.hk/epd/english/environmentinhk/waste/guide_ref/guide_cwc_sub3.html.

2. Requirements of the Chemical Waste Regulation

2.1 Registration of Chemical Waste Producers

Laboratories and workshops of schools that generate chemical wastes are required under the Regulation to register as chemical waste producers with the EPD, and comply with the statutory requirements on the disposal of chemical wastes. Any school which intends to set up a laboratory / workshop has to register with the EPD before engaging in such operation. Schools with laboratories or workshops should register as chemical waste producers immediately if they have not done so.

2.2 Definition of Chemical Waste

The Regulation defines chemical waste as any scrap material, effluent, or an unwanted substance or by-product arising from the application of or in the course of any process or trade activity, and which is or contains any substance or chemical specified in Schedule 1 to the Regulation[1], and if such substance or chemical occurs in such form, quantity or concentration so as to cause pollution

[1] For the list of chemicals included in Schedule 1 to the Regulation, please refer to Annex I of the *Chemical Waste Handling Procedures for Secondary School Science Laboratories / School Workshops at https://cd1.edb.hkedcity.net/cd/science/laboratory/waste/cw_e.htm*.

or constitute a danger to health or risk of pollution to the environment.

2.3 Treatment and Disposal of Chemical Wastes

Laboratories and workshops of schools are required to arrange for their chemical wastes to be collected for treatment or disposal at licensed disposal facilities. In the situation where no licensed facility is available for the treatment and disposal of such waste, the Chemical Waste Manager[2] will have to make alternative arrangement for the proper disposal of the waste subject to the approval of the EPD.

Only licensed chemical waste collector may collect and transport the chemical waste from laboratories and workshops to licensed disposal facilities for disposal. The list of licensed collectors is available at the EPD website: https://cd.epic.epd.gov.hk/EPICDI/chemicalwaste/download/?lang=en.

To track all movement of chemical waste, a trip ticket system is used. During collection of waste at the premises by a licensed chemical waste collector, a trip ticket must be prepared and completed by both the school and the collector. The Chemical Waste Manager should ensure that all information on the trip ticket is correct. After collection, the school is required by law to keep one copy of each waste consignment record for 12 months, and provide it for inspection by EPD officers if so required.

2.4 Disposal of Chemical Waste listed in Part A of Schedule 1 to the Regulation

In the unlikely event that a school has to dispose of any substance listed in Part A of Schedule 1 to the Regulation[3] (e.g. Fire resistant substances containing asbestos materials such as fire blankets; asbestos containing equipment in laboratory / workshop; dangerous goods category 6 substances such as potassium and sodium metals; dangerous goods category 9 chemicals such as white or yellow phosphorus), the EPD must be notified using Form EPD 132 (the form is downloadable at the EPD website: https://www.epd.gov.hk/epd/english/application_for_licences/applic_froms/forms.html). The notification should reach the EPD at least ten working days before any intended waste disposal operation. The contact person in Part B of the Form EPD 132 should preferably be a graduate teacher with degree in Chemistry.

Upon notification, the EPD will issue a direction on disposal by Form EPD 131.

[2] Each school should appoint a Chemical Waste Manager to direct and co-ordinate the handling of chemical wastes. This person should normally be either a chemistry teacher or an experienced chemistry laboratory technician.

[3] For the list of chemicals included in Schedule 1 to the Regulation, please refer to Annex I of the *Chemical Waste Handling Procedures for Secondary School Science Laboratories / School Workshops at https://cd1.edb.hkedcity.net/cd/science/laboratory/waste/cw_e.htm*.

The direction will specify the appropriate disposal facility for the waste disposal. Each direction normally has a 1-month validity period, which can be extended once for another month upon written request to the EPD. Additional requirements on the handling and transport arrangements, and any other special precautions may also be specified on the direction. Once the school has obtained the direction from the EPD (Form EPD 131), if the Chemical Waste Treatment Centre (CWTC) Contractor is the specified authorised disposal facility as stated in the direction, the CWTC Contractor must be engaged to collect the Part A chemical waste.

The procedure is necessary because special care is required to handle Part A chemical waste, which is particularly hazardous, and the disposal facilities have to prepare in advance for the reception and disposal of these wastes. In addition, the asbestos wastes arising from renovation or construction activities in schools should also be handled as Part A chemical waste.

2.5 Packaging, Labelling and Storage of Chemical Waste

The Regulation requires chemical wastes to be properly packaged, labelled and stored temporarily at the producer's premises before collection for off-site treatment and disposal. The general requirements are set out in the "*Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes*".

3. Chemical Waste Storage Requirements for Laboratories and Workshops of Schools

3.1 Classification of Chemical Waste from Laboratories and Workshops

Chemical wastes generated from laboratories and workshops of schools are generally of very small quantities and relatively dilute in nature. However, a few common waste types are particularly hazardous and harmful, and are classifiable as chemical waste. They include the following:

(a) acids, alkalis and corrosive compounds (as defined in Schedule 1 to the Regulations);
(b) spent organic solvents; and
(c) other unwanted chemicals which meet the regulatory definition of "chemical waste".

Any laboratory or workshop which generates the above mentioned waste types has to comply with the Regulation in respect of the packaging, labelling and storage requirements, and engage licensed collector to collect and dispose of the waste.

3.2 Segregation of Chemical Waste for Storage

Given the varied nature of chemical wastes generated by school laboratories or workshops, laboratory workers should segregate their wastes according to the following classification:

A: acids plus wastes compatible with acids;
B: alkalis plus wastes compatible with alkalis;
O: organic solvents; and
S: wastes that require special handling. These include ammonia, hydrogen peroxide and hypochlorite solutions. Chemical wastes falling into this category must be segregated for storage and should be individually packaged and labelled.

For chemical waste which also contains other very reactive substances or chemicals (including strong oxidising and reducing agents), the waste should be stabilised prior to storage in the same container of compatible waste type.

The disposal of other unwanted chemicals in 3.1(c) above has to comply with the requirements of the Regulation in respect of packaging, labelling and storage. In general, they should also be segregated for storage, individually packaged and labelled.

(Note: Where the wastes will be collected by the CWTC Contractor, please also refer to para. 4 and 5 of the *Chemical Waste Handling Procedures for Secondary School Science Laboratories / School Workshops* at https://cd1.edb.hkedcity.net/cd/science/laboratory/waste/cw_e.htm)

3.3 Packaging

(a) Standard of containers

Chemical wastes should be packed and held in containers of suitable design and construction so as to prevent leakage, spillage or escape of the contents under normal conditions of handling, storage and transport.

(b) Number and capacity of containers

Laboratory workers and workshop staff should ensure that chemical waste containers are of such number and of such capacity as to be capable of holding all the chemical waste that may be generated or produced at their premises during such period prior to collection by a licensed waste collector.

(c) Containers to be securely closed and with clean external surface

Every chemical waste container should be properly closed or sealed and correctly placed. No chemical waste should adhere to the external

surface of the container.

(d) Containers to be in good condition

The containers should be in good condition and free from corrosion, contamination, damage or any other defects which may impair the performance of the container. Laboratory workers and workshop staff are required to check and ensure that the containers are in good condition before use.

(e) Separate containers for different waste categories

Laboratory workers and workshop staff should use separate containers for different waste categories. Inorganic wastes should be separated from organic wastes and separate containers should also be provided for the storage of acid or alkali wastes.

(f) No mixing of incompatible wastes

Laboratory workers and workshop staff should not mix or permit the mixing of incompatible types of wastes in the same container. Chemical wastes that are incompatible generally include those that will react with each other

- violently;
- with evolution of substantial heat;
- with evolution of toxic or harmful gases;
- to produce flammable products; or
- to produce toxic products.

For more detailed information, please refer to Appendix C of the "*Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes*" for the 'Hazardous Waste Compatibility Chart'. (Available at the EPD website: http://www.epd.gov.hk/epd/english/environmentinhk/waste/guide_ref/guide_cwc_sub3.html)

(g) Sufficient air space to be left when filling containers

When filling the container with liquid chemical wastes, sufficient ullage (air space) should be allowed for to ensure that neither leakage nor permanent distortion of the container occurs as a result of liquid expansion caused by changes in temperature or other physical conditions which are likely to occur under normal conditions of handling, storage and transport. Generally, 10 cm air space should be sufficient.

(h) Material of container to be resistant to its contents

The material of construction of containers and their closures for storage should not be affected by the chemical waste. The material should not be liable to any reaction with the chemical waste so as to form any product which would create any hazard or dangerous consequences.

Where necessary, the containers and their closures should be protected by an inner liner or coating to ensure compatibility with the chemical wastes (e.g. steel containers should be protected by plastic liner if used for acid storage).

(Note: Where the waste will be collected by the CWTC Contractor, suitable containers will be supplied by the Contractor to the school laboratories. Please refer to para. 4 of the *Chemical Waste Handling Procedures for Secondary School Science Laboratories / School Workshops* at https://cd1.edb.hkedcity.net/cd/science/laboratory/waste/cw_e.htm for the specifications of containers provided by the Contractor.)

3.4 Labelling

(a) Every container for chemical waste storage should bear an appropriate label in both English and Chinese in the form specified in the Regulation.

(b) The label should include the following particulars:

- the English words "CHEMICAL WASTE" and Chinese characters "化學廢物"；
- the name, address and contact telephone number of the waste producer;
- the chemical name(s) or common name(s), waste type(s) and waste code(s) (refer to the *Guide to the Registration of Chemical Waste Producers* issued by the EPD at https://www.epd.gov.hk/epd/english/environmentinhk/waste/guide_ref/guide_cwc_sub2.html);
- the appropriate hazard warning symbol;
- a statement of the risk(s) arising on contact with / exposure to or otherwise in relation to the chemical waste; and
- the safety precautions to be taken.

The dimensions of the label should not be less than 90 mm x 100 mm for containers of capacity less than 50 L. Please refer to Annex I for a sample of the label as required by the Regulation.

(c) The Chemical Waste Manager should ensure that the information contained on the label is accurate and sufficient so as to enable proper and safe handling, storage and transport of the chemical waste.

(d) The label should be securely attached to a suitable part of the container, which allows the information on the label to be easily read, be kept clean and positioned so that it is clearly visible and is not obstructed.

3.5 Storage of Waste

(a) Chemical wastes can be stored in a storage cupboard which is preferably located inside a laboratory or in a store room secured with a lock or with restricted access. The storage cupboard should be fitted with leak-proof sill or spill catcher trays in its base to retain, in case of spillage or leakage from the containers, the capacity of the largest container or 20% by volume of the total storage capacity in that cupboard, whichever is the greater.

(b) The material used for the construction of the leak-proof sill or spill catcher trays should be able to withstand the chemical action of the stored chemical waste. Examples of a stainless steel spill catcher tray to be used with containers of organic wastes, and a heavy-duty plastic spill catcher tray to be used with containers of inorganic wastes (including strong acids and alkalis), are shown in Sketches B and C of Annex IV respectively.

(c) Incompatible chemical wastes when in contact with one another may induce dangerous consequences. They should either be stored separately, or in a cabinet provided with compartments separated from each other by impermeable partitions.

(d) The storage cupboard should be provided with adequate ventilation by means of openings to prevent the accumulation of any dangerous or harmful vapour. An example of such a cupboard, and illustrations of how it could be used to store chemical wastes are shown in Sketches A, D and E of Annex IV.

(e) The storage cupboard should be used for chemical waste storage only.

(f) A Warning Sign should be displayed at the opening or entrance of the storage area. Please refer to Sketch A of Annex IV for specifications of the Warning Sign.

4. Provision of Collection Service

To assist school laboratories and workshops in complying with the requirements of packaging and storage of chemical wastes, the EPD has made the following arrangements with the CWTC Contractor on the storage and collection of chemical waste:

(a) Where the chemical waste will be collected by the CWTC Contractor, suitable containers with proper labels will be supplied by the Contractor to the school laboratories and workshops.

(b) Schools can make arrangement with the CWTC Contractor to collect the stored chemical wastes on a yearly basis or when the pails are full, as appropriate. Laboratories and workshops should contact the CWTC Contractor no less than two working days before the pail is expected to fill up. For small quantities of chemical wastes that need immediate disposal, special arrangement can be made with the CWTC Contractor for collection.

(c) Generally, the schools could agree a date for chemical waste collection with CWTC Contractor. For those waste producers who have very large or frequent arisings, alternative arrangement may be made with the CWTC Contractor.

(d) A trip ticket in triplicate must be used to record the collection service. The school would need to furnish all necessary information about the chemical waste to allow completion of the trip ticket by the CWTC Contractor. During collection of the chemical waste, the CWTC Contractor will provide trip tickets that have been filled out based on the information supplied by the school. The school should ensure that the waste to be collected is correctly classified, described, quantified and labelled, and certify that all information on the trip ticket is correct. Two copies of the certified trip ticket should be handed over to the CWTC Contractor. The school is required by law to keep a copy of the completed ticket for each waste consignment for a period of 12 months, and provide it for inspection by EPD officers if so required.

5. Safety Procedures

Necessary arrangements should be made and adequate supervision should be provided in school laboratories and workshops to prevent any danger or injury arising from the handling of chemical waste.

5.1 General Requirements

(a) Laboratory workers and workshop staff handling chemical waste should be competent and possess relevant training.

(b) Regular inspection of the storage cupboard, storage area and its access should be made to ensure that it is free from obstruction and is kept dry and clean.

(c) Containers should be checked for leakage or spillage before use, and regularly thereafter.

(d) Incompatible wastes should be stored separately.

(e) Inventory of the types and quantities of chemical wastes being stored should be kept and regularly updated.

(f) No person should be allowed to eat, drink or smoke in the chemical waste storage area or near the storage cupboard. Warning signs indicating "NO SMOKING, NO EATING, NO DRINKING" should be posted on the door of the storage cupboard or near the storage area.

(g) Unauthorised access to the storage cupboard should not be allowed.

5.2 Safety Training and Equipment

Adequate safety information and equipment for laboratory workers or any other persons responsible for the handling of chemical waste should be provided by schools.

(a) Make available the 'Safety Data Sheets (SDS)' of all the chemicals for these persons.

(b) Ensure that these persons understand the hazard symbols and the safety precautions in relation to the chemical wastes generated.

(c) Provide the necessary safety equipment and ensure that such equipment is used by these persons. Safety equipment should also be kept in good condition and be cleaned regularly. Adequate first aid equipment should also be kept near the storage cupboard or area. A list of essential safety equipment is given in Annex II.

(d) Laboratory workers and persons involved in the handling of chemical waste are encouraged to attend the "Safe Handling of Chemicals" course organised by the Occupational Safety and Health Council.

5.3 Emergency Procedures

Written procedures for dealing with emergencies due to spillage, leakage or accidents arising from the handling and storage of chemical waste should be prepared and made available. General guidance for dealing with spillage and leakage of chemical waste is given in Annex III. The person in charge of the school laboratory / workshop should ensure that all users of laboratories and workshops (including staff and students) have received adequate instruction for implementing the procedures in the event of such emergencies. The person in charge should also provide adequate and suitable equipment to deal with such emergencies (see Annex II).

Annex I

Sample of Label on Container for Chemical Waste

CHEMICAL WASTE 化 學 廢 物

Chemical name/Common name
化學名稱或普通名稱

Waste type and Code 廢物種類及代號

Particular Risks 危險情況

Safety Precautions 安全措施

Name, Address and Telephone No. of Waste producer
廢物產生者姓名、地址及電話

Annex II

Safety Equipment for Safe Handling of Chemical Waste in Schools

1. Personal Safety and Protective Equipment

Safety glasses or goggles

Chemical-resistant gloves or gauntlets

Rubber or plastic boots

Protective clothing or overalls

Appropriate respirators or gas masks

Eye-wash bottle or device

Face shield

First aid kits

2. Equipment for Handling Emergencies and Spillage

Fire extinguishers

Dustpan and brush

Dry soft sand

Mop and bucket

Paper tissue and towelling

Plastic bags, empty containers or drums

Absorbent (e.g. vermiculite, sawdust, etc.)

Scoop

Tweezers or forceps

Hand-operated pumps

Suitable sampling device

Annex III

General Guidance for Handling Chemical Waste Spillage / Leakage

1. Instruct students and untrained personnel to keep at a safe distance well away from the affected area.

2. If necessary, open windows, provide forced ventilation and close the door / doors of the room where the spillage / leakage has taken place.

3. If the spillage / leakage involves highly toxic, volatile or hazardous waste, initiate emergency evacuation and call the emergency service.

4. Only trained persons equipped with suitable protective clothing and equipment should be allowed to enter and clean up the waste spillage / leakage area.

5. (a) Spillage / leakage of liquid waste at storage area

   Where the spillage / leakage is contained in the enclosed storage area, the waste can be transferred back into suitable containers by suitable handheld equipment, such as hand operated pumps, scoops or shovels. If the spillage / leakage quantity is small, it can be covered and mixed with suitable absorbing materials such as tissue paper, dry soft sand or vermiculite. The resultant slurry should be treated as chemical waste and transferred to suitable containers for disposal.

   (b) Spillage / leakage at other areas

   For spillage / leakage in other areas, immediate action is required to contain the spillage / leakage. Suitable liquid absorbing materials such as tissue paper, dry soft sand or vermiculite should be used to cover the spill. The resultant slurry should be treated as chemical waste and transferred into containers for proper disposal.

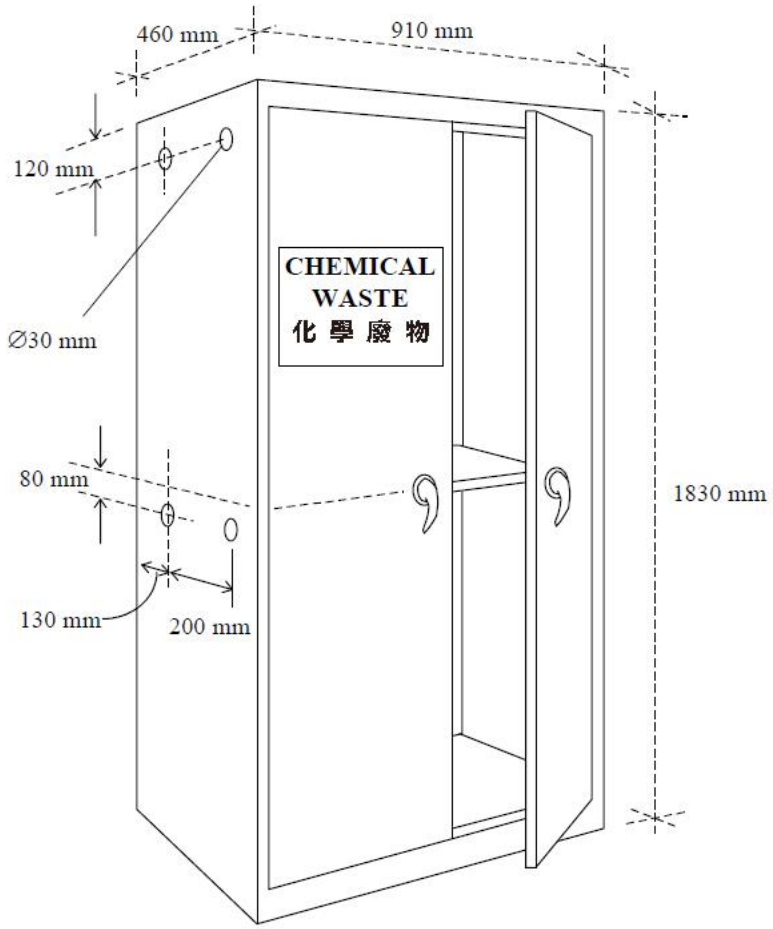
6. Areas that have been contaminated by chemical waste spillage / leakage should be cleaned. While water is a suitable solvent for aqueous chemical wastes and water soluble organic waste, kerosene or turpentine should be used for organic chemical wastes that are not soluble in water. The waste from the cleanup operation should be treated and disposed of as chemical waste.

7. In incidents where the spillage / leakage may result in significant contamination of an area or risk of pollution, dial 999 or contact the Fire Services Department for help. The EPD should also be informed immediately in case the services from the CWTC Emergency Response Team is required (Tel: 2838 3111).

Annex IV

Sketch A

An Example of Chemical Waste Storage Cupboard

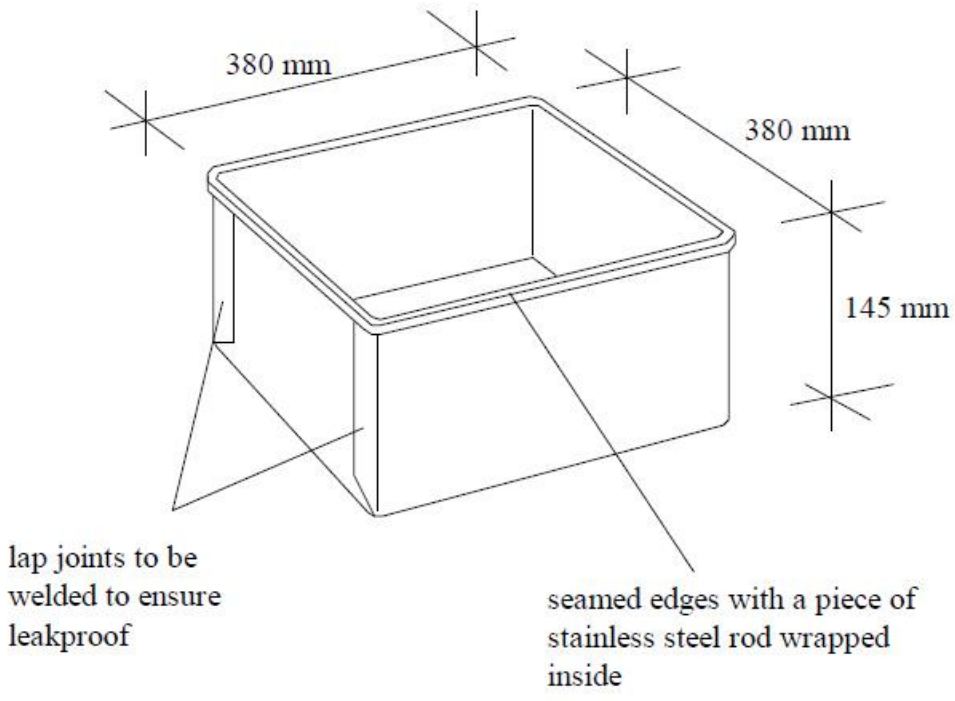


External Dimension	:	910 mm wide x 1830 mm high x 460mm deep
Doors and Sides	:	1.2 mm (minimum) thickness of steel
Ventilation Holes	:	4 holes of diameter 30mm on each side as shown
Marking	:	Words "CHEMICAL WASTE 化學廢物" should be printed clearly and boldly in red on a white background with letters/characters of not less than 60mm in height
Adjustable Shelf and Bottom	:	1.2 mm (minimum) thickness of steel, strengthened with two U-shape ribs welded along the width underneath the adjustable shelf and bottom of the cupboard, stiff and strong enough to stand the weight of at least 70 kilograms
Top and Back	:	0.7 – 0.8 mm thickness of steel
Finish	:	Rust proof with "FOSCOTE" or equivalent preparation and sprayed with three coats of cellulose lacquer

Annex IV

Sketch B

An Example of Stainless Steel Spill Catcher Tray

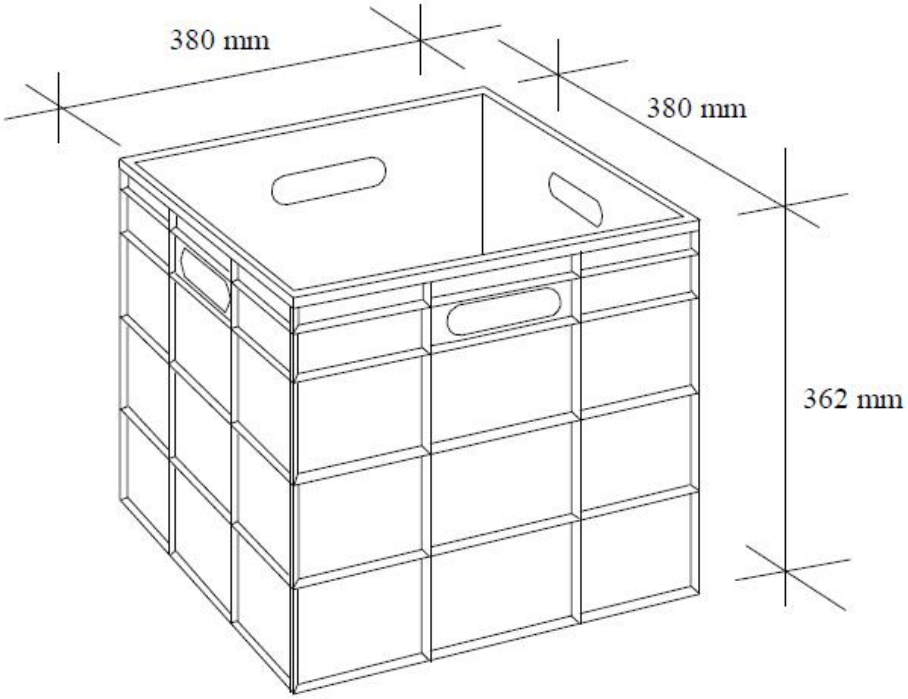


Overall dimension 380 mm x 380 mm x 145 mm, to be made of a SWG 24 stainless steel (type 316) sheet. All edges should be seamed with a piece of stainless steel rod (diameter 5 mm) to stiffen and avoid sharp edges. The lap joints should be welded to ensure that the whole tray is leak-proof.

Annex IV

Sketch C

An Example of Heavy-Duty Plastic Spill Catcher Tray

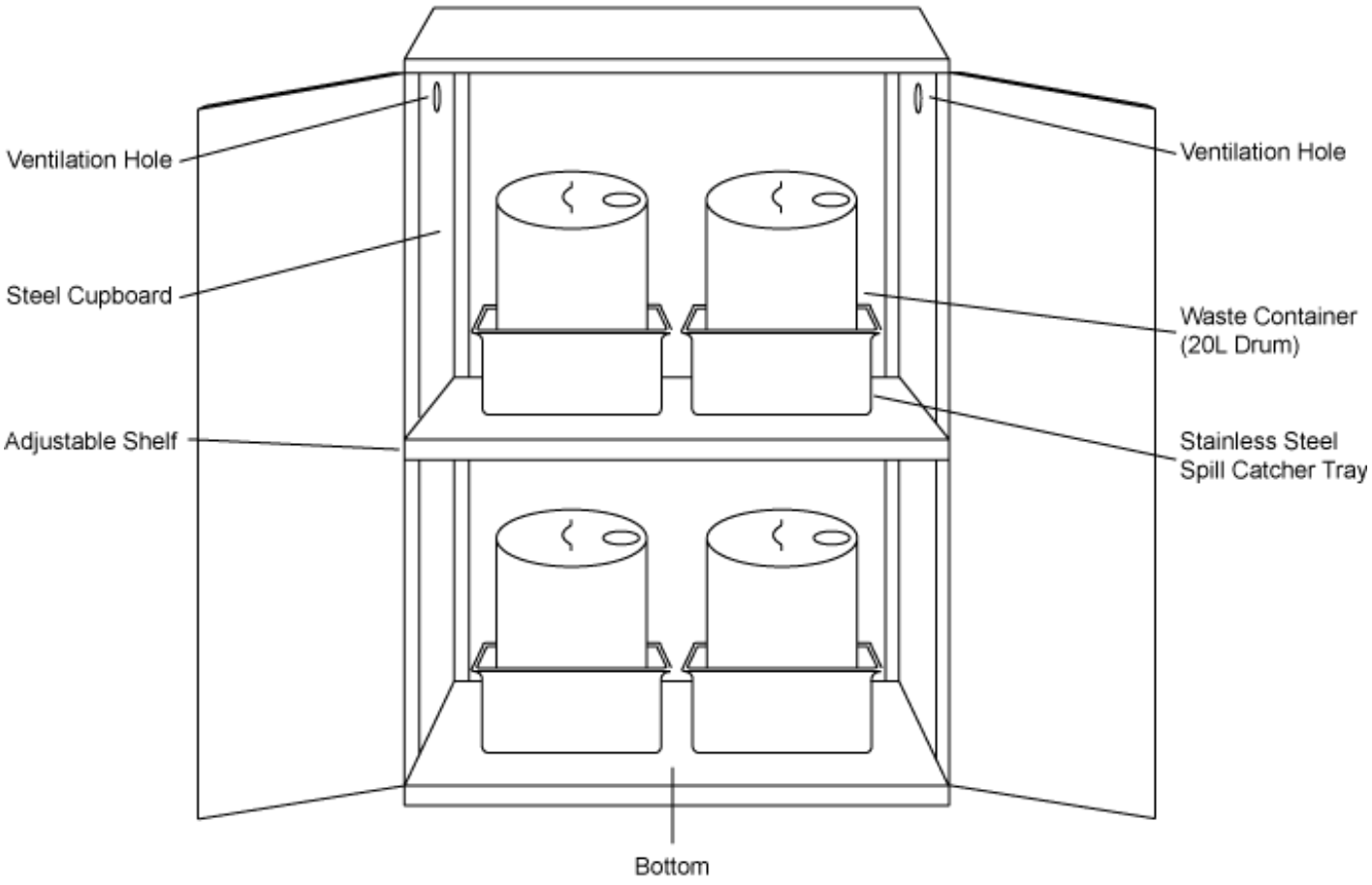


Overall dimension: 380 mm x 380 mm x 362 mm

Annex IV

Sketch D

Storage of Organic Chemical Wastes



Annex IV

Sketch E

Storage of Inorganic Chemical Wastes