



DUBAI AVIATION CITY CORPORATION OHSE CODE OF PRACTICES



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DACC CODE OF PRACTICE – CHLORINE AND
HYDROCHLORIC ACID WORKS



CHLORINE AND HYDROCHLORIC ACID WORKS
DACC (DUBAI SOUTH) Code of Practice
Document Reference No.: DACC.DS.OPS.OHSE.OPS.03.CH

1.0	INTRODUCTION	3
1.1	Definition	4
2.0	COMPETENCE, TRAINING AND AWARENESS	4
3.0	REQUIREMENTS	5
3.1	Roles and Responsibilities	5
3.2	Emission Limit and Controls	5
3.3	Exposure Controls	6
3.4	Emergency Management	8
4.0	RECORD KEEPING	9
5.0	REFERENCES	9



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1.0 INTRODUCTION

- (a) This Code of Practice (COP) is mandatory to all duty holders, entities or organizations operating within the Dubai South jurisdiction. This COP is designed to incorporate requirements set by Dubai Aviation City Corporation (DACC) – Dubai South Occupational Health, Safety and Environment (OHSE) Department and Dubai South Management. If requirements of this document conflict with requirements set by another regulatory authority, duty holders / organizations are required to follow the more stringent requirement.
- (b) Operational facilities means the business operating in Dubai South such as Offices, Educational Institutions, Medical Facilities, Logistics and Warehouse Facilities, Factories, Recreational Facilities, Multi Store Apartments, Retail Facilities, etc. and all other facilities which are registered under Dubai South License.
- (c) A duty Holder is defined as;
 - (i) the person(s) who owns or is in control, through contact or tenancy, of non-domestic premises;
 - (ii) With regard to multiple tenanted premises, the duty holder shall be the person who owns or is in control of the building, including access and egress
 - (iii) All other persons shall cooperate with the with the duty holder to allow them to comply with their duties requirements under this COP.
- (d) The aim of this COP is to ensure that all Businesses within the Jurisdiction of Dubai South are in full compliance with the requirements of Dubai South and other local & federal authorities with regards to chlorine and hydrochloric acid works. Nothing in this COP shall relieve the duty holder from the compliance/requirements of any other local or federal regulatory agencies.
- (e) Hydrochloric acid is a highly corrosive, strong inorganic/mineral acid. If not stored and handled properly, this can pose a serious threat to the health and safety of facility personnel. Hence, it is important to follow safety protocols to handle this chemical. Hydrochloric acid is used in the chemical industry as a chemical reagent in the large-scale production of vinyl chloride for PVC plastic, and MDI/TDI for polyurethane. It has numerous smaller-scale applications, including household cleaning, production of gelatin and other food additives, descaling, and leather processing.
- (f) Chlorine and hydrochloric acid works are taken together because chlorine is often generated as an intermediate in the manufacture of hydrochloric acid. The classis mercury cell electrolysis produces both chlorine and hydrogen and these are then mixed and burnt to form hydrochloric acid gas, hydrochloric acid gas can also be formed from the use of chlorides in chemical processes, especially when a chloride and an acid react together. In all cases, the hydrochloric acid gas is absorbed in water to form liquid hydrochloric with an acid strength of 33-35 percent. Air pollution problems can also arise when chlorine or hydrochloric acid are used in other processes.



CHLORINE AND HYDROCHLORIC ACID WORKS
DACC (DUBAI SOUTH) Code of Practice
Document Reference No.: DACC.DS.OPS.OHSE.OPS.03.CH

1.1 Definition

1.1.1 Chlorine Works

Chlorine works are defined as “works in which chlorine is made or used in any manufacturing processes.”

1.1.2 Hydrochloric Acid Works

Hydrochloric acid works are defined as “works where hydrogen chloride gas is evolved either during the preparation of liquid hydrochloric acid, or for use in any manufacturing process, or as the result of the use of chlorides in a chemical process.”

2.0 COMPETENCE, TRAINING AND AWARENESS

- (a) Duty holders shall ensure that OHSE training complies with the requirements of:
 - (i) *Dubai Aviation City Corporation (DACC) – Dubai South OHSERF - Regulations 6 – Competence, Training and Awareness;*
- (b) Duty holder shall ensure that employees and other persons required to implement the requirements of this COP or those who have a direct role in the management, supervision or monitoring of the requirement of this COP are trained and competent to fully understand the requirements.
- (c) The requirements for specific training needs within the facility shall be identify, assess and in accordance with *Dubai Aviation City Corporation (DACC) – Dubai South OHSERF – Regulation 6 – Competence, Training and Awareness.*
- (d) Duty holder shall ensure that employees have received job specific training for chlorine and hydrochloric acid works.
- (e) Duty holder shall maintain a record of the required training that contains the following:
 - (i) Company, name and company employee ID number;
 - (ii) Emirates ID number / Dubai South ID Pass;
 - (iii) Topic / subject of training;
 - (iv) Training provider;
 - (v) Date of training; and
 - (vi) Person conducting the training.



CHLORINE AND HYDROCHLORIC ACID WORKS
DACC (DUBAI SOUTH) Code of Practice
Document Reference No.: DACC.DS.OPS.OHSE.OPS.03.CH

3.0 REQUIREMENTS

3.1 Roles and Responsibilities

Duty holders shall undertake their roles and responsibilities in accordance with the general requirements of;

“Dubai Aviation City Corporation (DACC) – Dubai South OHSERF – Regulation 5 – Leadership, Roles, Responsibility and Self-Regulation.”

Duty holders shall ensure that all of the specific requirements listed below are complied with;

- i) To carry out a risk assessment for chlorine and hydrochloric acid works as per *Dubai Aviation City Corporation (DACC) – Dubai South OHSERF – Regulation 2 – Risk Management*.
- ii) To ensure that control measures are properly maintained, examined and tested at the appropriate intervals. (Note, this duty applies even if the control measures are physically maintained, inspected, etc by a third party.)
- iii) Monitor the exposure of employees to chlorine and hydrochloric acid, where this is necessary.
- iv) To ensure that employees who may need health surveillance are undergone health surveillance program.
- v) To provide information, instruction, training and supervision in relation to work with chlorine and hydrochloric acid
- vi) To ensure that a person does not work with chlorine and hydrochloric acid alone unless training has proven they are competent to do so.
- vii) To ensure that any personal protective equipment provided is suitable for the person and the job, and is properly used and maintained.
- viii) To be prepared for any possible emergencies involving the hazardous substances in their area

3.2 Emission Limits and Control

- i) In all cases where chlorine is made or used, the concentration of chlorine shall not exceed ten (10) ppm (v/v).
- ii) In mercury cell facilities, the concentration of mercury in strong hydrogen shall not exceed 0.5 mg/m³ and in weak hydrogen (i.e., air extracted from the process vents and containing hydrogen at less than the lower explosion limit) shall not exceed two (2) mg/m³.
- iii) The concentration of hydrochloric acid or chlorine gas in all emissions to the air shall not exceed twenty (20) mg/m³.



CHLORINE AND HYDROCHLORIC ACID WORKS

DACC (DUBAI SOUTH) Code of Practice

Document Reference No.: DACC.DS.OPS.OHSE.OPS.03.CH

- iv) Emissions to the air from all sources shall be substantially free from persistent mist or fume, and free from droplets.
- v) The concentration of particulates in emissions to air shall not exceed one hundred fifty (150) mg/m³.

3.3 Exposure controls

3.3.1 Engineering Controls

- i) If the place where the hydrochloric acid mist is produced and the place cannot be naturally ventilated, discharge the contaminated air using an exhaust system.
- ii) Secondary containment of all storage and use is required if an exposure risk to personnel or the environment is present.
- iii) Where hydrogen chloride gas is being generated for use in a further process, a standby absorber, capable of absorbing the maximum rate and quantity of hydrogen chloride expected to be evolved during breakdown conditions, shall be installed.
- iv) All chlorine production facilities shall be designed to achieve quick and effective shut down.
- v) Emergency absorption systems shall be provided to take all chlorine produced during the shutdown, with an adequate margin of safety. Power to implement shut down and emergency absorption shall be available at all times, independent of the electricity supply for chlorine production.
- vi) Use electrical facilities that are as airtight and corrosion resistant as possible. For the wiring, use plastic-coated wire, or use airtight metal conduits protected by acid-resistant paint or plastic conduits in accordance with *Dubai Aviation City Corporation (DACC) – Dubai South COP - DACC.DS.OPS.OHSE.OST.02.ES – Electrical Safety at Work*.

3.3.2 Administrative Controls

Duty holders shall develop procedures for the safe use and handling of chlorine and hydrochloric acid in all applications. Provide information and guidance. Personnel working with the materials must receive detailed training on the hazards, safe use and handling of chlorine and hydrochloric acid. It is also important to train supervisors concerning the following, and regularly carry out training drills for dealing with disasters as per *Dubai Aviation City Corporation (DACC) – Dubai South COP – DACC.DS.OPS.OHSE.OST.03.EP – Emergency Preparedness*.

Initial medical examination of the employees may be carried out to detect any pre-existing conditions and establish a baseline for future monitoring.



CHLORINE AND HYDROCHLORIC ACID WORKS
DACC (DUBAI SOUTH) Code of Practice
Document Reference No.: DACC.DS.OPS.OHSE.OPS.03.CH

3.3.3 Personal Protective Equipments

Duty holders shall ensure that appropriate Personal Protective Equipment's are provided to the employees according to the requirements of *Dubai Aviation City Corporation (DACC) – Dubai South COP – DACC.DS.OPS.OHSE.OST.10.PP – Personal Protective Equipment* to prevent skin/eye contact. If the airborne exposure limit may be exceeded and engineering controls are not feasible, in conditions of 50ppm or less a chemical cartridge respirator may be used with an acid gas cartridge or wear an appropriate self-contained breathing apparatus with full face-piece operated in the pressure demand or other positive pressure mode.

3.3.4 General Characteristics of Hydrochloric Acid

- i) Hydrochloric acid is a non-flammable, transparent and colorless or light yellow liquid. When it has a concentration of 25% or more, it is a fuming (hydrogen chloride gas, hydrochloric acid gas) strong acid.
- ii) Hydrochloric acid reacts with a chromate, permanganate, or per sulfate to generate chlorine; and reacts with a metal peroxide to form its chloride and chlorine.
- iii) Hydrochloric acid gas has a strong pungent odor, and is highly corrosive.
- iv) Hydrochloric acid is harmful to humans and animals. The inhalation of a large quantity of hydrochloric acid will cause intoxication and result in death.
- v) When hydrochloric acid is heated, it generates a large quantity of hydrochloric acid fumes.
- vi) Although hydrochloric acid itself is non-explosive or non-flammable, it corrodes various metals to generate hydrogen. If the hydrogen is mixed with the air, an explosion may occur.
- vii) Examples of materials resistant to corrosion by hydrochloric acid include acid resistant glass, acid-resistant ceramics, acid-resistant rubber linings, rigid vinyl chloride and polyethylene.

3.3.5 Storage

Duty holders shall ensure that storage arrangements of chlorine and hydrochloric acid are in accordance with the requirements of *Dubai Aviation City Corporation (DACC) – Dubai South COP- DACC.DS.OPS.OHSE.CGF.01.SH – Control of Substances Hazardous to Health and Dangerous Goods*.

- i) Place containers containing hydrochloric acid outdoors. If they are placed indoors, it is desirable that acid-resistant paints and acid-resistant mortar be used, and the floor should be coated with asphalt, acid-resistant blocks, or sodium-silicate-treated concrete, because the buildings will be corroded by hydrochloric acid mist, It is necessary for the storage place to be equipped with a drainage, and any spilt hydrochloric acid should be flushed away using a large quantity of water. For this, a water supply that can provide a large quantity of water should be located near the drain. It is not recommended to store hydrochloric acid in any basement area.



CHLORINE AND HYDROCHLORIC ACID WORKS
DACC (DUBAI SOUTH) Code of Practice
Document Reference No.: DACC.DS.OPS.OHSE.OPS.03.CH

- ii) To prevent health hazards caused by hydrochloric acid mist, and to avoid the danger that the room will be filled with hydrogen generated by the corrosion of metals, the building should be of an open structure and well ventilated.
- iii) Store hydrochloric acid apart from oxidants (in particular, nitric acid or chlorates) and combustibles, as well as cyanides or sulfides.
- iv) Avoid direct sunlight and close proximity to a heat source. In addition, avoid passageways and places where there is a risk of something falling.
- v) The containers must be mechanically strong and corrosion resistant, and should not allow the contents to leak out.
- vi) The containers must be tightly sealed, and an appropriate head space (5% by volume or greater) must be left when the container is filled with hydrochloric acid.
- vii) When hydrochloric acid is stored in a tank, always check the quantity of the remaining hydrochloric acid to prevent any danger of its overflowing.
- viii) Do not store in/with combustible packing material; such as cardboard, Styrofoam, plastic and paper.

3.3.6 Environmental and Health Effects

- a) Hydrochloric acid is corrosive to the eyes, skin, and mucous membranes. Acute inhalation exposure may cause coughing, hoarseness, inflammation and ulceration of the respiratory tract, chest pain, and pulmonary edema in humans. Acute oral exposure may cause corrosion of the mucous membranes, esophagus, and stomach, with nausea, vomiting, and diarrhea reported in humans.
- b) Chronic occupational exposure to hydrochloric acid has been reported to cause gastritis, chronic bronchitis, dermatitis, and photosensitization in workers. Prolonged exposure to low concentrations may also cause dental discoloration and erosion.

3.3.7 Employees Responsibilities

Employees also have health and safety responsibilities for themselves and colleagues. They must:

- Work in accordance with the training and instruction given by their employer
- Report situations they believe to be unsafe; and
- Not do anything that could endanger themselves or other people.

3.4 Emergency management

Duty holders shall ensure that emergency arrangements comply with the requirements of:



CHLORINE AND HYDROCHLORIC ACID WORKS

DACC (DUBAI SOUTH) Code of Practice

Document Reference No.: DACC.DS.OPS.OHSE.OPS.03.CH

Dubai Aviation City Corporation (DACC) – Dubai South OHSERF – Regulation 13 – Emergency Management

Emergency plans shall be established to deal with emergencies arising from the accidental discharge of chlorine and hydrochloric acid. Adequate fire-fighting, safety, and spill control equipment shall be readily available. Personnel shall be trained to handle emergency procedures. In the case of bulk storage of corrosive chemicals, adequate supplies of neutralizing agents shall be kept on hand. The contingency plan should also be developed so as to provide for coordination with the Authority and other government agencies.

4.0 RECORD KEEPING

Duty holder shall ensure record keeping in accordance with the requirements of *Dubai Aviation City Corporation (DACC) – Dubai South OHSERF – Regulation 8 – Document Control and Record Management*. In all documents relating to dangerous goods the correct technical name of the goods shall be used and the correct description given in accordance with the UN goods classification.

5.0 REFERENCE

NO.	DOCUMENT NAME	DOCUMENT NO.
1	Risk Management	DACC OHSERF – Regulation 2
2	Leadership, Roles, Responsibilities and Self-Regulations	DACC OHSERF – Regulation 5
3	Competence, Training and Awareness	DACC OHSERF – Regulation 6
4	Document Control and Record Management	DACC OHSERF – Regulation 8
5	Emergency Management	DACC OHSERF – Regulation 13
6	Personal Protective Equipment	COP - DACC.DS.OPS.OHSE.OST.10.PP
7	Control of substances hazardous to health and Dangerous Goods	COP – DACC.DS.OPS.OHSE.CGF.01SH
8	Electrical Safety at work	COP – DACC.DS.OPS.OHSE.OST.02.ES
9	Conducting EIA Study	COP – DACC.DS.OPS.OHSE.ENV.01.EI
10	Fire and Life Safety	COP – DACC.DS.OPS.OHSE.FLS.01.FL
11	Emergency Preparedness	COP – DACC.DS.OPS.OHSE.OST.03.EP
12	Federal Regulation for Handling Hazardous Materials, Hazardous Wastes and Medical Wastes	Issued by Cabinet Decree No. 37 of 2001
13	Code of Practice for the Management of Dangerous Goods in the Emirate of Dubai	Dubai Municipality
14	Environment Protection Regulations in Dubai	Local Order No. 61/1991
15	Defining Works that are Hazardous or in which it is Permissible to Reduce the Legally Decided Working Hours	Ministerial Resolution No. 4/1 of 1981