

# TRAINING



# BULLETIN

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Use of Chemical Agents

*“Department Training Bulletins shall be used to advise members of current police techniques and procedures and shall constitute official policy.”*

## CHEMICAL AGENTS

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## I. INTRODUCTION

### A. Overall Description

1. Chemical agents used by the Oakland Police Department are divided into three classes: duty aerosol to distract and confuse threats (discussed in Part II), chemical agents to disperse crowds (discussed in Part III), and chemical agents to detect and dislodge barricaded subjects (discussed in Part IV).
2. Some chemical agents are used for more than one purpose and fall into more than one category.
3. When used correctly, chemical agents are highly effective, but their effects dissipate quickly when a subject leaves a contaminated area.
4. Members shall report all incidents when a chemical agent is applied to a subject in accordance with Department General Order (DGO) K-4, REPORTING AND INVESTIGATING THE USE OF FORCE.

### B. Contamination Levels

1. Level 1: Direct physical contact with a chemical agent.  

A Level 1 contamination is the result of a chemical agent being applied directly to a person.
2. Level 2: Indirect or secondary contact with a chemical agent.  

Level 2 contamination may occur when person attempts to control an individual who has Level 1 contamination and the chemical agent is transferred through physical contact.
3. Level 3: Area contamination.  

Level 3 contamination refers to the location or the site where a chemical agent has been dispersed. An individual traveling through a contaminated area may be affected by the chemical agent present.

### C. Delivery & Dissemination Methods

Chemical agents are deployed in five ways:

1. Aerosol Delivery  

A chemical agent laden liquid is forced through the nozzle of an aerosol container by a compressed gas.
2. Blast Dispersion  

A fine chemical powder is expelled into the atmosphere in one of three ways: a detonator device, a compressed inert gas device, or a primer/black-powder cartridge. Because they offer very little fire hazard, these devices are ideal for indoor use.



3. Fogging

A chemical is discharged into the atmosphere by introducing a chemical laden formula into an area of hot exhaust. This process produces a high volume of smoke heavily permeated with the chemical. Fogging devices are used outdoors when large areas require contamination.

4. Launching

A chemical agent is delivered to a specific location by means of a launching device. The Department uses the Defense Technologies 37mm, double action, single shot, smooth-bore launcher. This launcher is capable of delivering chemical agent projectiles at distances up to 150 yards, providing officers with maximum standoff capability.

5. Pyrotechnic Release

A chemical is released by mixing the chemical with smoke produced by a burning fuel. These devices are designed for outdoor use and should not be thrown into or onto a building without proper flame containment.

D. Effects of Chemical Agents Used by the Oakland Police Department

1. Oleoresin Capsicum (OC)

- a. When OC is properly applied, the contaminated person involuntarily closes his/her eyes and is not able to reopen their eyes until the effects dissipate. Contaminated persons experience a burning sensation, redness, and a slight swelling at affected areas; a burning sensation and slight swelling to mucous membranes; excessive nasal mucous secretion; and shortness of breath.
- b. Allergic reactions to OC are rare. Although most allergic reactions are not life threatening, medical treatment must be provided. Signs of an allergic reaction may include itching, hives, difficulty in swallowing, and facial swelling (particularly around the eyes, lips, or nose).
- c. Exposure to OC may cause some individuals to become disoriented and confused. Due to the physical discomfort, some individuals may experience anxiety and panic.
- d. Most individuals react to OC within 1-5 seconds, providing the eyes and facial area have been sufficiently contaminated. OC is most effective on individuals who are lucid and have a normal pain threshold.
- e. An individual's mindset may influence OC's effectiveness. Goal oriented and mentally focused subjects may still accomplish their goals even though they cannot see and are experiencing significant pain and discomfort.
- f. Many OC failures are a result of operator error.



- g. Failure may also occur when OC is applied to individuals under the extreme influence of drugs/alcohol and/or with mental disturbances. Officers should never rely solely on a chemical agent, and alternate plans should be in place if the chemical agent does not produce the desired effect.
- h. Animals used in police work, such as dogs and horses, are affected by exposure to OC.
- i. Any powder or liquid OC chemical device which is delivered by a hand-held aerosol, or is hand-thrown or launched is color-coded with an ORANGE label or with ORANGE printing.

2. Orthochlorobenzalmalononitrile (CS)

- a. When CS is properly applied, the contaminated individual feels a prickly, burning sensation on the skin, especially around the moist areas of the body such as the eyes, mouth, nose, throat, and armpits. CS causes excessive tearing and mucous discharge from the nasal passages. The contaminated person involuntarily closes and is not able to keep open his/her eyes. Breathing CS may create a feeling of tightness in the chest, shortness of breath, coughing, and/or sneezing. Extended and extreme exposures may result in nausea and vomiting.
- b. Exposure to CS may cause some individuals to become disoriented and confused. Due to the physical discomfort, some individuals may experience anxiety and panic.
- c. Most individuals react to CS within 3-7 seconds, depending on contamination concentration and the subject's mental state and physical condition. CS is most effective on individuals who are lucid and have a normal pain threshold.
- d. Failure may occur when CS is applied to individuals under the extreme influence of drugs/alcohol and/or with mental disturbances. No deaths have been attributed to the use of CS.
- e. Animals used in police work will suffer very little, if at all, from the effects of CS.
- f. Any CS chemical device is color-coded BLUE.

3. Hexachloroethane (HC)(White Smoke)

- a. Smoke munitions produce dense clouds of white-gray smoke.
- b. Smoke is not a chemical agent; however, it may cause coughing and slight nasal and throat irritation. Smoke is used to mask the movement of personnel, plot wind direction and speed for chemical agent deployment, and to distract attention from other activities.
- c. Smoke can only be deployed in the pyrotechnic form and is primarily designed for outdoor use.



## II. DESCRIPTION AND OPERATION OF DUTY AEROSOL

### A. Description of Duty Aerosol

1. Officers carry Oleoresin Capsicum (OC) aerosol spray on their duty belts for immediate deployment as a force option.
2. Officers consistently carry OC in the same location on their duty belt, facilitating a quick draw. What may work for one officer may not work for others.
3. The canister should lend itself to retention techniques if a subject attempts to remove the canister from an officer's belt. Officers ensure the positioning of an OC canister behind a firearm does not interfere with unsnapping and drawing the firearm from its holster.
4. Officers carry OC canisters in a manner that eliminates the possibility of accidental discharge.
5. The Oakland Police Department authorizes two sizes of aerosol canisters for duty carry; the size an officer carries is his or her discretion.
6. The First Defense/Federal Laboratories MK6 is a hand held aerosol device that contains .68 fluid ounces of liquid OC. The OC is dissolved in a non-flammable, water-based liquid carrier that is propelled by compressed nitrogen. The small size of the canister and the built-in belt clip make this canister ideal for plainclothes carry. The MK6 delivers a ballistic stream to a distance of 10 feet. The hydraulic needle effect range (explained below) is 3 feet. Under exigent circumstances, this canister may be deployed at distances closer than 3 feet.
7. The First Defense/Federal Laboratories MK4 is a hand held aerosol device that contains 3.0 fluid ounces of liquid OC. As with the MK6, the OC is dissolved in a non-flammable, water-based liquid carrier that is propelled by compressed nitrogen. The MK4 delivers a ballistic stream to a distance of 10 feet. The hydraulic needle effect range is 3 feet. Under exigent circumstances, this canister may be deployed at distances closer than 3 feet.
8. OC may have little or no effect on individuals who have a high pain threshold, are under the influence of alcohol or narcotics, or are mentally disturbed.
9. The hydraulic needle effect is the consequence of solid particulates traveling at high velocity and damaging soft tissue. Under normal conditions, the minimum safe distance for OC application is 36 inches. Although no documented cases exist in which the hydraulic effect has caused injury, officers are reminded that the possibility of injury, although rare, exists.

### B. Operation of Duty Aerosol

1. The primary target areas for OC are the eyes, eyebrows, and forehead. The secondary target areas are the nose and mouth. It is recommended that officers spray the target areas using a one to three second burst to ensure sufficient agent direct contamination. Officers need to be prepared to use multiple bursts as subjects often move as they are being sprayed and the subject may not react to the effects of the OC immediately. Like any other force option, only the proper application of OC ensures its effectiveness. The majority of OC application failures are due to applying OC to non-target areas.



2. Wind, rain, fans, hats, glasses, and other forms of shielding may affect the successful delivery of the ballistic stream.
3. Officers should never rely solely on one course of action. A preplanned alternate course should be readily available should the delivery of OC fail.
4. Officers shall attempt to avoid the use of OC on the following persons unless there is an imminent threat of injury to the officer, third party, or the subject:
  - a. The elderly
  - b. A subject known or reasonably known to be mentally disturbed
  - c. A subject known or reasonably believed to be suffering from obvious respiratory disabilities
  - d. A subject known or reasonably known to be pregnant
  - e. Young children
  - f. A handcuffed subject

### **III. CHEMICAL AGENTS FOR CROWD CONTROL**

#### **A. Introduction**

1. Chemical agents play a significant role in crowd control. Mobile field forces may be required to disperse or control non-compliant crowds, deny public areas, and clear structures that are being looted by rioters by using chemical agents.
2. When an unlawful assembly has been declared and the subjects do not voluntarily leave, the Incident Commander may decide to use chemical agents to disperse a non-compliant crowd. Officers shall only use chemical agents as a crowd dispersal tactic after receiving orders from the Incident Commander or supervisors. Crowd mentality, crowd distance, and environmental conditions dictate what type of chemical agent delivery system officers may use. Department approved chemical agents for crowd control are blast dispersion powder and pyrotechnic munitions.
3. Duty Aerosol OC shall not be used for crowd dispersal. During crowd control situations, Duty Aerosol OC may only be used against specific individuals who are engaged in specific acts of serious unlawful conduct or who are actively resisting arrest.
4. This Training Bulletin discusses how to deliver chemical munitions. For specific crowd control guidelines and tactics, refer to Training Bulletin III-G, Crowd Control and Crowd Management (28 Oct 05).



## B. Delivery of Pyrotechnic Chemical Munitions

Pyrotechnic chemical munitions are hand thrown grenades or munitions launched from a launching device.

### 1. Hand Deployed Grenades

#### a. Description

- 1) Hand-thrown munitions are primarily pyrotechnic grenades. There are many types of grenades, but all have the same basic operating characteristics. A standard grenade consists of a body, a fuse, burning and chemical agents, and a safety lever.
- 2) The body of a grenade is nothing more than a container holding the fuse and burning and chemical agents together.
- 3) Pyrotechnic grenades use a M201A1 mechanical fuse. This fuse has a burn time of approximately 2.0 seconds. After the safety lever is released, the delay element burns for approximately 2 seconds before the main burning agent ignites.
- 4) The burning agent is the fuel mixture that burns along with the chemical agent. The burning agent produces a smoke cloud that carries the chemical agent particles into the atmosphere.
- 5) The safety lever is the metal lever attached to the fuse. When attached to the fuse, the safety lever prevents the spring-loaded striker mechanism in the fuse from striking and igniting the delay element.
- 6) The deployment range of a grenade is dependent upon the throwing ability of the deploying officer.

#### b. Instruction for Deploying a Grenade by Hand

- 1) To deploy a grenade by hand, follow these steps:
- 2) Grip the grenade with the safety lever positioned in the web of the throwing hand. The pin should face the non-throwing side of the body.
- 3) Left-handed throwers may have to invert the grenade and grip it so that the fuse is pointed toward the ground. This grip facilitates the pin facing the non-throwing side of the body.
- 4) Prepare the pin by partially straightening the tail end of the safety pin.
- 5) Use the index finger of the non-throwing hand to hook the safety pin through the pin ring. Twist and pull the pin out of the fuse. Retain the pin until after the grenade has been deployed.
- 6) Visually check the target area for subjects that might be injured by the deployment or unable to escape the effects of the chemical agents, (e.g., elderly, physically disabled, or young children).



- 7) If you decide not to throw the grenade, you may re-insert the safety into the fuse (Expect some difficulty in re-inserting the safety pin.).
- 8) Throw the grenade toward the target area.
- 9) An officer may throw a grenade in three ways. The best way of throwing a grenade depends upon the preference of the individual officer.
- 10) Officers execute a straight-arm throw by extending their arm to the rear and throwing the grenade in a sweeping motion over their head. The free arm maintains balance and creates momentum for the throwing arm.
- 11) The overhand throw is similar to throwing a baseball. Officers cock their throwing arm behind their head while pointing their free hand toward the target area.
- 12) Officers execute an underhand lob by “lobbing” the grenade in the same fashion as lobbing a horseshoe or a slow-pitch softball. Officers may choose this throw when the target area is only a short distance away.

c. Types of Grenades Used by the Department

- 1) #2/Spede-Heat
  - a) The #2/Spede-Heat is a metal-bodied grenade shaped like a soda can. The grenade is 2.62 inches in diameter and 6.12 inches long. It contains 81.2 grams of chemical agent. The Department maintains an inventory of this grenade in both CS and HC (Smoke).
  - b) The #2/Spede-Heat is a long burning, high volume, continuous discharge grenade. It has a 30 – 40 second burn time. The chemical agent is discharged through 4 gas ports located at the top of the grenade, 3 gas ports on the sides, and 1 gas port on the bottom.
  - c) The long burn time may allow for “throwback” by individuals using burn protection on their hands. This device should not be deployed onto rooftops, in crawl spaces, or indoors due to its fire producing capability.
- 2) The #4/Triple Chaser
  - a) The #4/Triple Chaser is a metal-bodied grenade shaped like a soda can. The grenade is 2.70 inches in diameter and 6.5 inches long. It contains 92 grams of chemical agent. The Department maintains an inventory of this grenade in both CS and HC (Smoke).





- b) The #4/Triple Chaser is a fast burning, medium volume grenade that separates into three sub-munitions on deployment. When the grenade is deployed, a small charge between the sections causes the sub-munitions to separate, creating approximately 20 feet between the sub-munitions. The #4/Triple Chaser has a 20 – 30 second burn time.
  - c) This device should be thrown under-hand to keep the grenade moving towards the target area. This method assists the sub-munitions to deploy on a line from left to right.
  - d) The separating sub-munitions and quick burn time minimize “throw-back” potential. This device should not be deployed onto rooftops, in crawl spaces, or indoors due to its fire producing capability.
- 3) #15 Han-Ball
- a) The #15 Han-Ball grenade is a rubber-bodied grenade shaped like a baseball. The grenade is 3.10 inches in diameter and 4.8 inches long. It contains a total of 45.4 grams of chemical agent. The Department maintains an inventory of this grenade in both CS and HC (Smoke).
  - b) The #15 Han-Ball is a fast burning, high volume continuous discharge grenade. It has a 15-20 second burn time. The chemical agent is discharged through 3 ports located on the equator of the grenade body.
  - c) The location of the ports minimizes the grenade’s “throw-back” potential. This device should not be deployed onto rooftops, in crawl spaces, or indoors due to its fire producing capability.
- 4) #98 Pocket
- a) The #98 Pocket grenade is a metal-bodied grenade that is cylindrical shaped. The grenade is 1.4 inches in diameter and 4.75 inches long. It contains a total of 25.2 grams of chemical agent. The Department maintains an inventory of this grenade in both CS and HC (Smoke).
  - b) The #98 Pocket grenade is a small, lightweight, easily carried, quick burning, reduced volume, continuous discharge grenade. It has a 20-25 second burn time.
  - c) The #98 Pocket grenade is not specifically intended as a crowd control device. It was designed with the tactical team in mind for distraction, concealment, rescue, or signaling. This device should not be deployed onto rooftops, in crawl spaces, or indoors due to its fire producing capability.



- 5) #15 Rubber CS Blast Dispersion
  - a) The #15 Rubber CS Blast Dispersion grenade is a rubber-bodied grenade shaped like a baseball. The grenade is 3.10 inches in diameter and 4.8 inches long and contains 8.0 grams of flash powder and 2.0 grams of powdered CS chemical agent.
  - b) When the #15 Rubber CS Blast Dispersion grenade is deployed, the grenade has an initial 1.5 second delay that initiates fuse assembly separation, followed by another .5 second delay before the grenade discharges.
  - c) Unlike other grenades, the #15 Rubber CS Blast Dispersion grenade is a non-pyrotechnic grenade. Instead, this grenade produces 3 stimuli for psychological and physiological effect: light, sound, and chemical agent in the form of powdered CS.
  - d) Upon discharge, a bright white light is emitted along with a loud report sufficient to disperse the powdered chemical agent in a 50-foot radius.
  - e) This grenade may be deployed for ground or aerial bursts at the discretion of the officer deploying the munition. The #15 Rubber CS Blast Dispersion grenade may also be used in tactical situations.

2. Launched Pyrotechnic Munitions

a. Description and Use

- 1) Launched chemical munitions enhance officer safety in crowd control situations by providing officers with standoff capability while delivering chemical agents from a distance.
- 2) The Department Tactical Team maintains three configurations of the Defense Technologies Model L1, 37mm Launcher: the full stock configuration, the tactical model, and the pistol model.
- 3) The L1 Launcher is a single shot, smooth bore launcher. It has a double action trigger and a top latch breech lock that, when lifted, may be opened for loading and un-loading.
- 4) The launcher has a bladed front sight and a rear leaf sight.
- 5) The sights are configured so that, when the rear sight is folded down, the front sight may be used for precision fire to a range of 50 yards. When the rear leaf sight is raised, the lower aperture of the rear sight is used for precision fire to a range of 50-75 yards. The upper aperture on the rear leaf sight is used for precision fire onto targets that are at a range of 75-100 yards.



- 6) The launchers are cleaned in the same fashion and using the same equipment and solvents as are used for cleaning a firearm. Only trained personnel who maintain qualification standards may use the launcher.
- b. Types of Launched Munitions Used by the Department
- 1) Spede-Heat 37
    - a) The Spede-Heat 37 is a 37mm pyrotechnic munition designed to deliver one chemical or smoke canister down range to a target at a distance of up to 150 yards. The Department maintains this munition in the CS configuration.
    - b) The canister is 1.5 inches in diameter and 4.75 inches long. It contains 25.2 grams of CS and has a burn time of 20-30 seconds.
    - c) The canister may be fired in the air at an angle of 25-30 degrees to achieve maximum standoff distance. The canister may also be skip-fired into the target area from lesser distances.
    - d) The Spede-Heat 37 is designed for outdoor use and is not intended for barricade penetration. A spotter should ensure launched canisters do not ignite fires. Because serious injury may result, do not fire this canister directly at persons.
  - 2) Skat Shell 37
    - a) The Skat Shell 37 is a 37mm munition designed to deliver multiple pyrotechnic chemical or smoke canisters down range to a target at a distance of up to 75 yards. The Department maintains this munition in the CS configuration.
    - b) The cartridge is 1.5 inches in diameter and 5.5 inches long. The cartridge contains five separate sub-munitions with 34 grams of chemical agent. The burn time for the sub-munitions is 20-30 seconds.
    - c) The Skat Shell 37 allows for a broad deployment of chemical agents by one grenadier. The five separate sub-munitions function individually once the cartridge is discharged. The small scattering effect and the rapid burning of the sub-munition canisters provide a wide area of coverage and minimize the “throwback” potential.
    - d) The cartridge may be fired at an angle of 25-30 degrees to achieve maximum standoff distance. The cartridge may also be skip-fired into the target area from lesser distances.



- e) The Skat Shell 37 is designed for outdoor use and is not intended for barricade penetration. A spotter should ensure the sub-munitions do not ignite fires. Because serious injury may result, do not fire this canister directly at persons.
  
- c. 37mm Muzzle Blast
  - 1) The 37mm Muzzle Blast is designed to deliver chemical agent laden powder from a 37mm launcher to a distance of 30 feet. The Muzzle Blast is not a pyrotechnic device.
  - 2) The cartridge is 1.5 inches in diameter and 5.5 inches long. The CS cartridge contains 19.6 grams of CS agent. The OC cartridge contains 2.5 grams of OC agent. The Department maintains this munition in both CS and OC configurations.
  - 3) The 37mm Muzzle Blast is used as a crowd control tool for the immediate and close deployment of chemical agent. The 37mm Muzzle Blast is an excellent round for deploying chemical laden powder directly onto subjects at ranges up to 30 feet.
  - 4) The 37mm Muzzle Blast has also proved successful during tactical operations. It may be used for room clearing, space denial, and contaminating crawl and attic spaces to deny a subject access or to dislodge barricaded subjects.
  - 5) It is recommended that the grenadier and all personnel in the immediate vicinity of deployment wear protective masks.

#### **IV. CHEMICAL AGENTS FOR TACTICAL OPERATIONS**

##### **A. Introduction**

1. Chemical agents play a significant role in tactical operations.
2. Subjects barricaded inside a structure present a clear and identifiable hazard to officers.
3. When negotiations do not resolve an incident, chemical agents serve as an intermediate option. Chemical agents can be deployed to dislodge a subject from a structure, deny a subject's ability to enter advantageous spaces, and/or to detect a subject's location by the subject's coughing and/or moving from a contaminated area.
4. Success depends upon the proper application and escalation of chemical agents and a tactical team's patience to allow the chemical agent(s) to take effect.
5. In cases in which the subject is not dislodged, the continual application of chemical agent often wears the subject down, diminishing his or her will to fight and resist. In some incidents, the systematic application of chemical agents minimizes a subject's freedom of movement.
6. Some subjects may have the will and/or ability to cope with the effects of chemical agents. Others may be well prepared with protective masks or other improvised methods for defeating their effects.



B. Preparation for Delivery

1. Before the delivery of chemical agents in tactical operations, the complete evaluation of an area is required. Information gathering is one of the keys to preparation. Several key factors may prove advantageous.
2. Floor Plan – It is advantageous to know the structure’s floor plan and the location of the subject before deployment of munitions.
3. Agent Selection – Based on the tactical situation and objectives, select the type and form of agent to use.
4. Method of Deployment – Based on the tactical situation and Department policy, decide the method of deployment. This method may be simultaneous deployment affecting the entire structure or a methodical deployment targeting particular areas.
5. Precautions – Because of their potential danger and contamination properties, indiscriminate use of chemicals must be avoided. Medical and fire fighting personnel and equipment should be readily accessible.
6. Perimeter Control – Ensure the inner and outer perimeter are secure. Ensure that the area is clear of bystanders and traffic.
7. Communications – Alert all officers on the scene that chemical munitions will be deployed. This alert informs officers chemical munitions, not weapons, are fired and allows officers within the immediate area to don protective masks.
8. Personnel – Make specific assignments for which officer(s) is to deploy chemical munitions and which officer(s) is to provide over-watch for the deployment.
9. Delivery – Establish the order of locations within the structure to be contaminated. Also establish the quantity of chemical munitions to be delivered into each target area and the frequency at which chemical agents should be re-deployed into the structure.
10. Systematic Gas Out – This operation is a typical barricaded subject deployment. Munitions are systematically inserted into a structure top to bottom, room by room, in an effort to deny space and force the subject to evacuate by a predetermined escape route.
11. Total Gas Out – This operation is the full simultaneous deployment of chemical agents into an entire structure in an effort to force the subject to leave the structure.

C. Types of Chemical Munitions for Tactical Operations

1. Launched Munitions: 37mm T-14 Barricade Penetrating Projectile (Ferret)
  - a. The Department maintains the 37mm T-14 Barricade Penetrating Projectile (Ferret) as a staple tool for resolving barricaded subject incidents.



- b. Although the chemical agent payload is low, the benefit of the Ferret is its ability to penetrate barriers and disperse agent beyond the barrier. The Ferret round penetrates windows, particleboard, doors, and interior walls. Upon impact, the nose cone breaks apart and instantaneously delivers the agent payload inside the structure.
- c. The Ferret is a launched chemical munition designed for penetrating physical barriers and is not suitable as a specialty impact munition (SIM). These munitions shall not be direct fired at a subject unless lethal force is authorized.
- d. The Ferret uses the 37mm Launcher as the launching device.
- e. The Ferret is a fin stabilized, frangible projectile filled with .28 oz of liquid CS. The plastic projectile itself is 1.5 inches in diameter and 4.8 inches long.
- f. Spin stabilization affords maximum standoff distance. The Ferret has a maximum range of about 200 yards and is highly accurate at ranges of 50 yards or closer.
- g. The Ferret round is non-burning and suitable for indoor use.
- h. Additional considerations before deployment of the Ferret:
  - 1) Trajectory considerations – The Ferret must be fired so that the trajectory is low to high. This trajectory reduces the possibility of the Ferret striking any subject standing on the other side of a window or door.
  - 2) Dispersal considerations – For the agent to disperse, the Ferret’s impact must be hard enough to fracture the projectile. Double paned windows, heavy window coverings, and hard wood doors will interfere with the dissemination of the agent from this round.
  - 3) Deployment considerations – As a rule of thumb, initially deploy two liquid projectiles per room. If the first deployment does not dislodge the suspect, wait 5 – 15 minutes and repeat the procedure. Remember that each time you make an insertion with the Ferret round, you are ventilating the structure and allowing for chemical agent to be released.
  - 4) Performance – After the munitions have been deployed, exercise patience. Allow the agent to contaminate the area and affect the subject. Although the subject may not evacuate the structure, he/she may be reacting in a way that displays his/her location within the structure. Further containment may then be possible at that location.
  - 5) Force Options– Liquid Ferret projectiles do not produce the intense effects that other chemical munitions produce due to the small payload the Ferret carries. Beginning with Ferret projectiles affords officers ample time to evaluate whether more Ferret projectiles or another form of chemical agent delivery system is required.



6) Penetration factors for the 37mm Barricade Penetrating Projectile

**Direct 90 degree impact**

Barricade material	Range
5/8" CDX Plywood	50 yards
3/4" CDX Plywood	35 yards
1/4" OSB	50 yards
1/2" Drywall	50 yards
5/8" Drywall	50 yards
Hollow Core Door	50 yards

**Indirect 45 degree impact**

Barricade material	Range
5/8" CDX Plywood	35 yards
3/4" CDX Plywood	15 yards
1/4" OSB	50 yards
1/2" Drywall	50 yards
5/8" Drywall	50 yards
Hollow Core Door	50 yards

2. Hand Thrown Chemical Munitions for Tactical Operations

- a. A majority of grenades designed for indoor use operate by dispersing a powdered chemical agent into the atmosphere through a non-fire blast or compressed air expulsion.
- b. Unable to contaminate a large structure, these non-burning grenades are ideal for contaminating small enclosed areas such as crawl spaces, attics, hallways, and closets.

3. T-16 Flameless Expulsion Grenade

- a. The T-16 Flameless Expulsion Grenade is 1.65 inches in diameter and 7.5 inches long and has a payload of 4.5 grams of CS powder or .5 grams of OC powder.
- b. The grenade uses a M201A1 fuse to create a 1.5 second delay. Upon activation of the onboard CO2 cartridge, the chemical agent powder is expelled within seconds through two ports in the body of the grenade.
- c. The extremely light powder remains airborne for extended periods of time depending on draft conditions.

4. The Multi-Purpose Grenade (MPG)

- a. The MPG is designed for indoor and outdoor use and alleviates the potential dangers associated with fire or fragmentation grenades. The grenade can be hand thrown or launched.



- b. The MPG is 3.3 inches in diameter and 6.4 inches long and has a payload of 54.3 grams of powdered CS. The fuse has a variable delay mechanism of either two or five seconds, depending on the choice of delivery.
  - c. When hand throwing this device, the deploying officer must exercise caution and ensure the discharge port is pointed at the intended target.
5. #514 Instantaneous Blast Grenade
- a. The payload of the #514 Instantaneous Blast Grenade is a powdered chemical agent expelled upon initiation of a small internal detonator that has sufficient force to split the canister at the six machined grooves on the outside of the grenade body.
  - b. The grenade is 2.62 inches in diameter and 6.12 inches long. The grenade uses a M201A1 standard fuse with a 1.5 second delay. The payload is 44.0 grams of CS or 9.2 grams of OC.
  - c. This grenade is most effective when used in confined areas and close to the target area.
6. #517 Tri-Chamber Flameless Grenade
- a. This pyrotechnic grenade is specifically designed for indoor use.
  - b. The grenade's internal combustion allows the chemical-laden smoke to release through three ports on the outer canister side while the grenade's two internal canisters safely contain the fire producing properties.
  - c. The grenade is 2.62 inches in diameter and 6.62 inches long and contains 20 grams of CS agent; it has a burn time of 30 – 40 seconds. The grenade uses a M201A1 standard fuse with 1.5–second delay. The fuse is shrouded to protect surrounding materials from fire.
  - d. The Tri-Chamber Flameless grenade delivers a pyrotechnic chemical device indoors to maximize the chemical's effectiveness through heat and vaporization while minimizing the chance of fire. As with all pyrotechnic carriers, contamination is greater than contamination produced by powders or liquids.
  - e. The smoke and chemical content is minimal enough that oxygen displacement concerns and lethal concentration levels are rarely reached.
  - f. This grenade is an option when chemical laden powders or liquids are ineffective or inappropriate for the situation.





## V. SAFETY PRECAUTIONS DURING USE OF CHEMICAL AGENTS

### A. Description and Use of Chemical Protective Mask

#### 1. Description of Chemical Protective Mask

- a. A protective mask offers the user respiratory and eye protection against chemical agents in the atmosphere. Protective masks generally have an external canister and a full-face cover protecting the eyes, nose, and mouth.
- b. The Department uses the following chemical protective masks: the Phalanx #68, the Advantage 1000, and the Millennium #70.
- c. Military issued chemical protective masks such as the M17, M17A1, M17A2, and Model 40 & Model 40A are not National Institute for Occupational Safety and Health (NIOSH) approved for CN/CS/OC. Although the military masks are effective against these agents, Occupational Safety and Health Administration (OSHA) requires law enforcement personnel to use NIOSH approved canisters.
- d. The term gas mask is inaccurate to describe these chemical protective masks, for the chemical agents officers use are not gases but micro-pulverized particulates that are burned and vaporized and then disseminated as blast dispersion or released in an aerosol or fog.
- e. Members should periodically inspect the following areas of their masks to ensure serviceability:
  - 1) *Head harness* – Check for frays, crimps, cuts, rips, or holes.
  - 2) *Fasteners* – Check for chips, cracks, bends, or rust.
  - 3) *Nose cups* – Determine if one is installed. If so, make sure it is installed properly. Check for visible damage.
  - 4) *Face piece* – Check for cracks or irregular shape or form. Look for tears, cracks, or holes in the lens. Make sure the lens is sealed properly to the face piece.
  - 5) *In-take\Out-flow Valves* – Check for dryness, cracks, and proper seating.
  - 6) *Canisters* – Make sure the correct canister for the mask is installed and that it has no cracks, dents, or holes.

#### 2. Donning and Clearing a Chemical Protective Mask

- a. To don a chemical protective mask, follow these steps:
  - 1) Hold your breath.
  - 2) Remove the protective mask from the carrier and grab the temple straps with your middle index fingers. Grab the bottom straps with your thumbs.



- 3) Insert your chin into the protective mask, followed by your nose, then your forehead.
  - 4) Pull the head harness assembly over your head, affixing your face in the mask. Tighten the bottom chinstraps first, then the temple straps, and finally the head straps. Adjust until the fit is snug but comfortable.
  - 5) Make certain that hair (including facial hair) is not compromising the mask's face seal. Do not pull straps out and away from your head but rather pull to the rear of your head. Do not pull the straps too tight!
- b. To clear a chemical protective mask, follow these steps:
- 1) Once the mask is properly donned, inhale deeply. Using the right or left hand, take your palm and cover the in-take valve and the out-flow valve. With your other hand, cover the canister in-take and QUICKLY BLOW OUT. The protective mask will release a small amount of air past the temple area and part slightly from the face, allowing bad air to escape the inside of the mask.
  - 2) Leaving the hand on the canister, QUICKLY INHALE good air into the mask completing the seal. The mask should slightly collapse against the face and remain collapsed until the wearer uncovers the filter.
  - 3) Readjust the face piece to correct for any leakage and repeat steps 2 and 3. Wearing a helmet or other protective headgear may require some adjustments. If the seal has been broken in a contaminated environment, clear and seal the mask 2-3 times to purge the mask as well as possible.
3. Performance of Chemical Protective Mask
- Filters reduce a user's ability to breathe normally. Using dual filters improves performance. Breathing efficiency becomes continuously reduced as the filter(s) becomes clogged with contaminants. Labored breathing place extra burden on the heart and lungs, thus hastening fatigue.
4. Storage of Chemical Protective Mask
- The life of a protective mask and canister is dependent on proper storage. When not in use, a properly maintained mask with an attached sealed canister (using protective tape) should be stored in its carry case. Storing a chemical protective mask in a dry area with a moderate constant temperature minimizes deterioration of the rubber and the canister's absorption of moisture. When inserting the mask into its carry case, avoid folding or creasing the mask so it will not retain the memory of the crease or fold. Do not stretch the head harness over the face piece and lens.



5. Maintenance of Chemical Protective Mask

Remove the filter and perform a tap-test by tapping the filter against a hard surface in order to free any residual materials. Thoroughly wash the rubber and plastic parts of the mask with a small amount of mild, non-oil based soap dissolved in warm water. Rinse the mask thoroughly. Allow the mask to air dry. Do not use items such as a heat lamp or hair dryer to dry the mask because the direct, intense heat will cause the rubber to dry out and become brittle. Avoid exposing the mask to direct sunlight.

Do not allow the filter to become wet. Should the filter become exposed to water or any other liquid, replace it. If you have a respiratory illness, the filter may become contaminated. Replace it after use. Standard filters are rated for 4 hours in a heavily contaminated atmosphere. If breathing becomes very labored after 4 hours, replace the filter.

B. Steps to Decontaminate a Person Exposed to a Chemical Agent

1. Steps to Decontaminate a Person Exposed to Level 1 and Level 2 Contamination

Perform the following steps to help decontaminate a person exposed to level 1 and 2 contamination:

- a. Remove the contaminated individual from the contaminated environment.
- b. Calm the subject and remind the subject to breathe normally and relax.
- c. Monitor the subject's condition.
- d. Summon medical attention to the scene for the purpose of flushing the contaminated areas. Any subject exposed to chemical agents must receive medical assistance as soon as practical.
- e. Flush the contaminated area with copious amounts of cool water.

The effects of the chemical agent should dissipate within 30 to 45 minutes

- 1) **Do Not** rub the affected area. **Do Not** use creams, salves, or lotions to ease the pain.
- 2) **Do Not** leave the individual un-attended.

2. Steps to Decontaminate a Level 3 Area Contamination

- a. Mark the contaminated area and remove spent chemical agent devices, if present.
- b. Open all doors and window to ventilate the building and remove airborne particulates. Fans may used to increase ventilation.
- c. Clean surfaces using non-ionic, non-oil based detergents such as Tide or Ivory liquid.



- d. If powdered chemical agents were used, use an HEPA –filtered vacuum cleaner to collect the residual powder. A household vacuum may stir the powder rather than trap it.
- e. Close all doors and windows if the chemical agent is still present. Heat the building as hot as practical (at least 4 hours at a minimum of 95 degrees). After 4 hours, open a window at each end of the building and ventilate with fans. Continue heating the building and ventilating until the agent is removed.
- f. Wash / dry clean clothing and fabrics. More than one treatment may be necessary.
- g. Discard all food in plastic containers or wrapped in plastic wrap. Foods stored in sealed metal cans may be used after the containers have been thoroughly washed.

Some or all of the above steps may be repeated a number of times to remove lingering traces of chemical agents in heavily contaminated areas. Some furniture and fabrics may have to be replaced.

C. Medical Considerations

Although there have been no deaths attributed to the use of CS, several cases of in-custody death involved the use of OC. Although there is no evidence that OC directly caused these deaths, officers must be aware of their duty to care for subjects on whom they have applied a chemical agent.

Individuals who have ingested cocaine are at risk because cocaine constricts the blood vessels, elevates the heart rate, raises blood pressure, and increases body temperature.

After officers handcuff a subject, the subject should be turned on his/her side or placed in a seated position. Medical assistance should be summoned as soon as practical. The subject should not be left unattended while waiting for medical response.

***Approved by Chief Tucker***