U.S. ARMY

U.S. ARMY CHEMICAL MATERIALS ACTIVITY

FACT SHEET

WHAT ARE CHEMICAL AGENTS AND CHEMICAL WEAPONS?

Chemical agents are toxic compounds contained in a munition delivery system or stored in steel bulk storage containers called ton containers. The United States chemical agent stockpile was developed in the early 20th century as a deterrent to enemy troops using similar weapons against our nation's troops.

Chemical weapons are chemical agent-filled munitions, including rockets, land mines, projectiles or bombs designed to disperse chemical agent, either from exploding weapons or through spray tanks attached to the underside of airplanes.

By 2012, the U.S. Army had destroyed 90 percent of the original U.S. chemical stockpile as mandated by the Chemical Weapons Convention, the international treaty banning the production, stockpiling and use of chemical weapons.

Until the 1970s, burial of chemical warfare materiel on military installations where chemical weapons were manufactured, tested, or stored was an internationally accepted means of disposal. Periodically, these items are recovered during range-clearing operations or during environmental remediation efforts at active installations and formerly used defense sites.

The CMA Recovered Chemical Materiel Directorate responds nationwide to planned and unplanned chemical munition recoveries. Chemical warfare materiel is most often recovered at military installations where chemical weapons were manufactured, tested or stored. Until the 1970s, burial was an internationally accepted method of chemical materiel disposal. Munitions are periodically recovered during environmental remediation of old burial sites. The most common recoveries are projectiles, which are artillery shells fired from cannons, mortar shells, and glass items from chemical agent identification sets.

REV: 20250723

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Nerve agents
GA, GB, VX

Nerve agents are fast-acting, lethal, organophosphate compounds similar to insecticides. They affect the body by inhibiting or deactivating the enzyme cholinesterase, an enzyme found throughout the body.

Inhibition of cholinesterase causes hyperactivity of the glands and muscles. Glands over-secrete, causing fluid to build up in the lungs and uncontrollable muscle convulsions. The hyperactivity continues until the muscles fatigue and enter a state of total relaxation. Death by nerve-agent poisoning is the result of respiratory failure.

Nerve agents were designed for use in weapons such as rockets, land mines, projectiles or bombs and would have been dispersed when these weapons exploded. VX was also designed for use in spray tanks in potential aerial missions against enemy troops and equipment.

TYPES OF MUNITIONS

M55 rocket

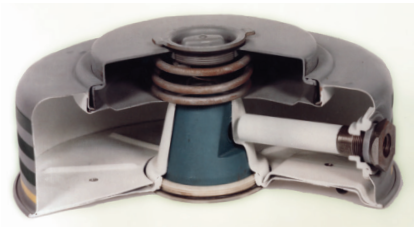
The M55 rocket was designed to disperse nerve agent upon impact. Each M55 rocket is made of aluminum and is more than six feet long. Containing a little more than one gallon of either GB or VX, the M55 was packed in its own fiberglass shipping and firing tube and stored in protective wooden pallets. The rocket consists of a fin-nozzle assembly, motor, warhead and fuze.

Projectiles
105mm, 155mm, 8-inch

Projectiles are artillery shells that are fired from cannons. Each projectile contains a fuze and an explosive burster. Upon impact, the fuze ignites the burster charge in the center of the shell, causing it to explode and disperse the agent. There are two types of 105mm projectiles: the M60, which contains HD blister agent, and the M360, which contains GB nerve agent. There are five types of 155mm projectiles, which contain GB and VX nerve agents and H/HD blister agents. The 8-inch projectile contains either GB or VX.

M23 mine

One of the Cold War-era munitions, the M23 mine was filled with about 10 pounds of nerve agent and intended for actions against enemy tanks and personnel. The land mine consists of a steel body, burster, side-initiator charge and fuze. As a safety precaution, fuzes and activators were packed separately from land mines in 16-gallon storage and shipping drums, with each drum containing three land mines.



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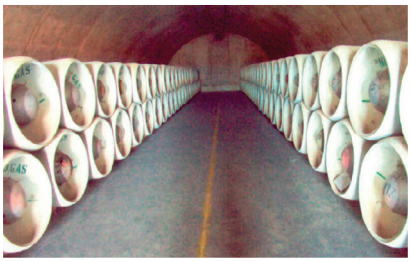
Blister agents
H, HD, HT, L

Blister agents are liquid, oily substances that are amber to dark brown in color with an odor similar to garlic, horseradish or mustard – a common name for the compounds. Blister agents cause chemical burns or blisters and can also destroy cells of living tissue, particularly in eyes and lungs. Blister agent symptoms can be delayed from two to 24 hours after exposure.

Blister agents were designed to prohibit movement of enemy soldiers during battle. Munitions that contain blister agents include the 105mm and 155mm projectiles. Blister agents not put into munitions were stored in ton containers.

Ton containers

Ton containers have been used since the 1930s to store and transport bulk chemicals, including chemical agent. The steel containers measure approximately seven feet in length and weigh approximately 1,600 pounds. Ton containers are equipped with fittings to permit the closed-system transfer of chemical agents.



Spray tanks
TMU-28/B

The TMU-28/B liquid agent spray tank is not a weapon, because it does not explode; rather, it is designed to disperse liquid nerve agent VX from underneath an aircraft. The tank's four major components are the agent container, aircraft suspension system, tail cone section and agent-dispersal nozzle. Spray tanks were designed to force air through nozzles to disperse agent as a fine mist.

Bombs
MC-1, MK94

The MC-1 and MK-94 bombs consist of a heavy steel body, central burster tubes and fuzes. Both bombs contain GB nerve agent. When the fuze detonates, the burster charge ruptures the bomb, which heats GB and disperses it as an aerosol mist.

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AGENT	COLOR	ODOR	RATE OF ACTION	EFFECT ON BODY
BLISTER AGENTS				
Mustard (H/HD/HT)	Colorless to pale yellow or brown	Garlic or horseradish	Delayed – within two to 24 hours	Blistering of skin and mucous membranes on contact; Skin, eyes and respiratory tract irritation when exposed to vapor
Lewisite	Colorless to amber or black	Geraniums	Rapid	Skin, eyes, respiratory tract, and circulatory system irritation; stomach ailments; low blood pressure
CHOKING AGENTS				
Phosgene	Colorless	New-mown hay	Mild irritation within minutes; more serious symptoms within hours of high-level exposure	Mild eye, nose, throat and respiratory tract irritation; coughing, shortness of breath; dramatic blood pressure drop; fluid in lungs; heart failure
Chloropicrin	Colorless	Sharp, sweet, irritating	Rapid symptoms after high-level exposure; Symptoms from low-level exposure subside within 15 minutes of removal from exposure	Severe inflammation of eyes, nose and throat; injury to respiratory tract; coughing, shortness of breath; dizziness, nausea, vomiting; headache
NERVE AGENTS				
GA (Tabun)	Colorless	Slightly fruity	Rapid, within seconds to minutes when inhaled; skin exposure produces health effects within minutes	Eye redness and pain, blurred vision; nausea and vomiting; fluid in lungs, shortness of breath; seizures; involuntary muscle movement; loss of consciousness
GB (Sarin)	Colorless	Odorless	Rapid	Runny nose; difficulty breathing; nausea, vomiting; involuntary muscle movement; convulsions; involuntary urination and defecation
VX	Colorless	Odorless	Rapid	Runny nose; difficulty breathing; nausea, vomiting; involuntary muscle movement; convulsions; involuntary urination and defecation
PRECURSOR AGENTS				
DF	Colorless	Acidic	DF served as one of the non-lethal chemicals designed to mix in flight to a target to form the lethal nerve agent sarin (GB).	
QL	Colorless	Strong fishy	QL served as one of the non-lethal chemicals designed to mix in flight to a target to form the lethal nerve agent VX.	

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