



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. Army chemical stockpile as required by international treaty. The remaining stockpile is securely stored at two locations – Pueblo Chemical Depot, Colorado, and Blue Grass Army Depot, Kentucky – pending destruction as required by international treaty.

Historically, burial of chemical warfare materiel on military installations where chemical weapons were manufactured, tested or stored was an acceptable 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.

Types of Chemical Agents

The nation's stockpile consists of two principal chemical agent types: **blister** and **nerve**.

AGENT	COLOR	ODOR	RATE OF ACTION	EFFECT ON BODY
Mustard (H/HD/HT) blister agent	Colorless to pale yellow	Garlic or horseradish	Delayed – hours	Irritates skin, eyes and respiratory tract
Lewisite (L) blister agent	Colorless	Geraniums	Rapid – within 30 seconds	Irritates eyes, skin, respiratory tract and circulatory system
Sarin (GB) nerve agent	Colorless	None in pure form	Very rapid – seconds to minutes	Inhibits nerve conduction
Tabun (GA) nerve agent	Colorless	Slightly fruity	Very rapid – seconds to minutes	Inhibits nerve conduction
VX nerve agent	Colorless to amber	None	Very rapid – seconds to minutes	Inhibits nerve conduction





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.

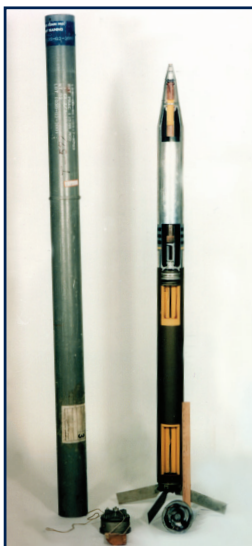
Inhibition of cholinesterase causes hyperactivity of the glands and muscles. Glands over-secrete, causing fluid to build up in the lungs and uncontrollable muscle convulsions. The hyperactivity continues until the muscles fatigue and enter a state of total relaxation. Death by nerve-agent poisoning is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



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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