

Chemical Weapon



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A Chemical Weapon Agent (CWA) is a device that uses chemicals to inflict death or harm. It is a chemical substance whose toxic properties are used to kill, injure or incapacitate. About 73 different chemicals have been used or stockpiled as chemical weapon agents up till now. These agents may be classified as weapons of mass destruction though are separate from biological weapons (diseases), nuclear and radiological weapons (which use radioactive decay of elements). Chemical weapons can be widely dispersed in gas, liquid and solid forms and may easily afflict others than the intended targets. Nerve gas and tear gas are two modern examples.

In general, chemical weapon agents are organized into several categories according to the physiological manner in which they affect the human body. The names and number of categories vary slightly from source to source, but in general, types of chemical warfare agents are as follows:

1- Harassing agents

These are substances that are not intended to kill or injure. They are often referred to as Riot Control Agents (RCAs) and may be used by civilian police forces against criminals and rioters, or in the military for training purposes. These agents also have tactical utility to force combatants out of concealed or covered positions for conventional engagement, and preventing combatants from occupying contaminated terrain or operating weapons. In general, harassing agents are sensory irritants that have fleeting concentration-dependent effects that resolve within

minutes after removal. Casualty effects are not anticipated to exceed 24-hours nor require medical attention. They include:

a- Tear agents:

These sensory irritants produce immediate pain to the eyes and irritate mucous membranes (also known as *lachrymatory agent* or *lachrymator*).

b- Vomiting agents:

These sensory irritants are also termed sternators or nose irritants. They irritate the mucous membranes to produce congestion, coughing, sneezing and eventually nausea.

c- Mal-odorants:

These are compounds with a very strong and unpleasant smell, which produce powerfully aversive effects without the toxic effects of tear agents or vomiting agents. Some military forces such as those of Israel and USA have developed mal-odorant weapons in the belief that they fall outside the accepted definition of Riot Control Agents, and therefore represent a loophole in the Chemical Weapons Convention.

2- Incapacitating agents

These are substances that produce debilitating effects with limited probability of permanent injury or loss of life. The casualty effects typically last over 24 hours, and though medical evacuation and isolation are recommended, it is not required for complete recovery. These, together with harassing agents, are sometimes called non-lethal agents. There may be as high as 5% fatalities with the use of these agents.

a- Psychological agents:

These are substances that produce casualty effects through mental disturbances such as delirium or hallucination.

b- Other incapacitating agents:

These substances have also been investigated as

incapacitates, though they operate more through interactions outside the central nervous system.

3- Lethal agents

These substances are for producing chemical casualties without regard to long-term consequences or loss of life. They cause injuries that require medical treatment.

a- Blister agents:

A *blister agent* is a chemical compound that irritates and causes injury to the skin. These substances also attack the eyes, or any other tissue they contact.

- Vesicants: the vesicants are substances that produce large fluid-filled blisters on the skin:
- Nitrogen mustards
- Sulfur mustards
- Arsenicals
- Urticants: the urticants are substances that produce a painful wheal on the skin. These are sometimes termed as skin necrotizing and are known as the most painful substances produced.

4- Blood agents

These substances are metabolic poisons that interfere with the life-sustaining processes of the blood:

- a- Cyanogen chloride (CK)
- b- Hydrogen cyanide (AC)
- c- Arsine (SA)

5- Choking agents

These substances are sometimes referred to as *pulmonary agent* or *lung irritants* and cause injury to the lung-blood barrier resulting in Asphyxia.

6- Nerve agents

Nerve agents are substances that disrupt the chemical communications through the nervous system. One mechanism of disruption is caused by blocking the acetyl cholinesterase, an enzyme that normally destroys and stops the activity of acetylcholine, a neurotransmitter. Poisoning by these nerve agents leads to an accumulation of acetylcholine at the nerve axon, producing a perpetual

excited state (e.g., muscle contraction). The eventual exhaustion of muscles leads to respiratory failure and death. A separate class of nerve agents is related to Tetrodotoxin, frequently abbreviated as TTX, which is a potent neurotoxin with unknown antidote. Tetrodotoxin blocks action potentials in nerves by binding to the voltage-gated, fast sodium channels in nerve cell membranes, essentially preventing any affected nerve cells from firing by blocking the channels used in the process.

a- G series: these are low volatility nerve agents that are typically used from a non-persistent to semi-persistent effect.

- Tabun (GA)
- Sarin (GB)
- Soman (GD)
- Cyclosarin (GF)

b- GV series: these agents have volatility between the V and G agents and are typically used for a semi-persistent to persistent effect.

- Novichok agents
- GV (nerve agent)

c- V series: these agents have low volatility and are typically used for a persistent effect or liquid contact hazard.

- VE
- VG
- VM
- VX

d- T series: these agents are related to the puffer fish Tetrodotoxin

- Saxitoxin (TZ)

Chemical Weapon and the International Law

International law is the field of law governing the conduct of independent nations in their relationships with one another. International treaties are generally regarded as binding (for instance the Supremacy Clause of the United States Constitution says that treaties are “the supreme law of the land; and the judges in every state shall be bound thereby, anything in the constitution or laws of any state to the contrary notwithstanding.”). Treaties like the Geneva Conventions require nations’ assent to the terms, which often require acts of tribunal such as the European Court of Human Rights or the International Criminal Court.