

## Definitions

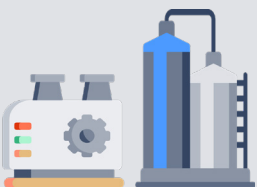


### Chemical weapons

Toxic chemicals and their precursors



Munitions and devices



Equipment

### Destruction of chemical weapons

All States Parties to the Chemical Weapons Convention have undertaken to destroy all chemical weapons they own or possess.



Destruction is the “process by which chemicals are converted in an essentially irreversible way to a form unsuitable for production of chemical weapons, and which in an irreversible manner renders munitions and other devices unusable as such”.



Dumping in any body of water, land burial, or open-pit burning may not be used.

## Challenges

The destruction of chemical weapons is a highly complex and technical process and includes a number of significant challenges:

- high toxicity and wide variety of agents
- aging and leaking munitions
- generation of toxic by-products
- strict environmental standards
- prevention of diversion
- ensuring verifiability
- handling and transportation
- building public trust

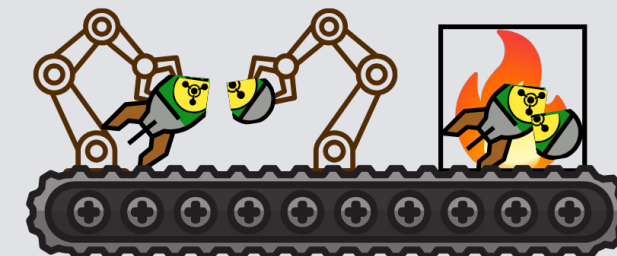
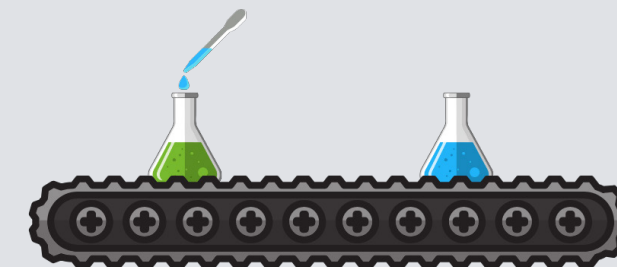
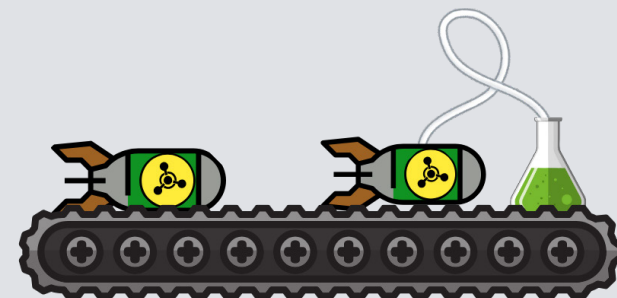
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# Chemical Weapons Destruction

## Declare – Destroy – Verify

When a country joins the Chemical Weapons Convention, it is required to submit information in its declarations on any chemical weapons it owns or possesses.

These chemical weapons must be destroyed in a specifically designated facility and meet a specified timeline. There are various different technologies available for the destruction of chemical weapons and selection depends on the agent type and weapon design. These technologies are often classed as high-temperature or low-temperature methods. It is the responsibility of the possessor state to choose a suitable destruction method and bear the costs.



When choosing a destruction method, considerations include technical feasibility, efficiency, effectiveness, and cost. States Parties are also required to assign the highest priority to ensuring the safety of people and to protecting the environment during the destruction process.

Chemical weapons destruction facilities must be designed and built in a way that allows verification by the OPCW. During destruction operations, the OPCW normally maintains a continuous physical presence to ensure that all chemical weapons are verifiably destroyed.

## High-temperature methods

A wide range of chemical warfare agents can be destroyed using high-temperature destruction technologies. High temperatures ensure the complete breakdown of the chemicals to relatively harmless products. Incineration, pyrolysis, and explosion chambers are examples of these technologies. The off-gases from these processes require secondary treatment to ensure complete detoxification.



### Incineration



Thermal breakdown of chemical warfare agents in the presence of oxygen.

### Pyrolysis



Thermal breakdown of chemical warfare agents, often in the absence of oxygen.

### Detonation chambers

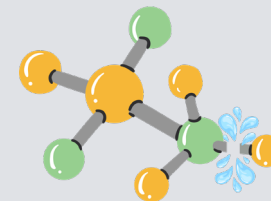


Thermal and/or pressure-induced breakdown of chemical warfare agents through detonation in a sealed, armoured vessel.

## Low-temperature methods

Chemical warfare agents may be reacted with other chemicals (often water) to form less toxic products. This chemical reaction is known as a neutralisation reaction and the chemicals formed are called neutralisation products.

To ensure that chemical warfare agents cannot be regenerated and that the final breakdown products are relatively harmless, the neutralisation products undergo secondary treatment. Examples include incineration, biodegradation, bituminisation, and cementation.



### Biodegradation

Breakdown of neutralisation products using microbes.



### Bituminisation

Irreversibly immobilises the neutralisation products in a bitumen-based solid matrix by mixing them with bitumen.

