

Visualising and Reading Molecular Structures

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Colour Code for Chemical Elements typically used in models

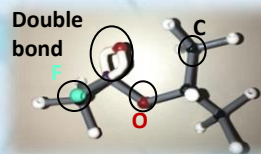
Carbon (C)	●	Hydrogen (H)	●	Sulfur (S)	●
Nitrogen (N)	●	Phosphorus (P)	●	Arsenic (As)	●
Chlorine (Cl)	●	Fluorine (F)	●	Oxygen (O)	●

— Single bond

== Double bond

Models

Representation of chemical structures using plastic models. Each “ball” represents an atom of a chemical element identified by colour. The atoms are linked by single (in grey) or double (in white) bonds.



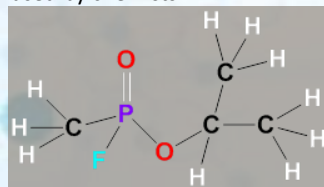
Sarin



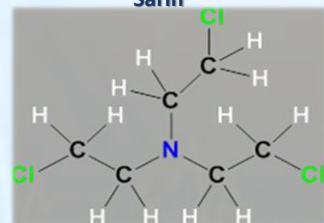
Nitrogen mustard (HN-3)

Translation

Graphical representation. These pictures translate the colour of the atoms into the chemical element associated to it, and illustrate the connection between the atoms. This is an intermediate representation to the “shorthand” used by chemists.



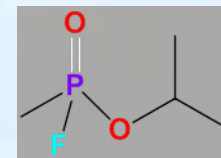
Sarin



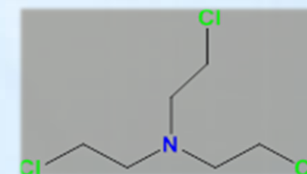
Nitrogen mustard (HN-3)

“Shorthand” structures

This is a format often used by chemists. It allows bonds between carbon atoms (C) to be shown as connected lines: C atoms are located at each point where a line connects to other lines or where a line terminates. Additionally, bonds between C and H are not shown for easier visualisation of the structure. Only C-H bonds are hidden, all other bonds are shown.



Sarin



Nitrogen mustard (HN-3)

In the Structures of Relevance to the Annex on Chemicals:

- Carbon atoms (C) have four bonds
 - If less than four bonds are shown in shorthand, the missing bonds are always C to H
- Chlorine and Fluorine atoms (Cl and F) have one bond
- Hydrogen atoms (H) have one bond
- Nitrogen atoms (N) have three or four bonds
 - four bonds are only for the “salt” form
- Oxygen atoms (O) have two bonds
- Phosphorus and Arsenic atoms (P and As) can have three, four, five or six bonds
 - In the form of a nerve agent P has five bonds - three single bonds and one double bond
- Sulfur (S) can have two, four or six bonds

Scheduled Chemicals under the Chemical Weapons Convention

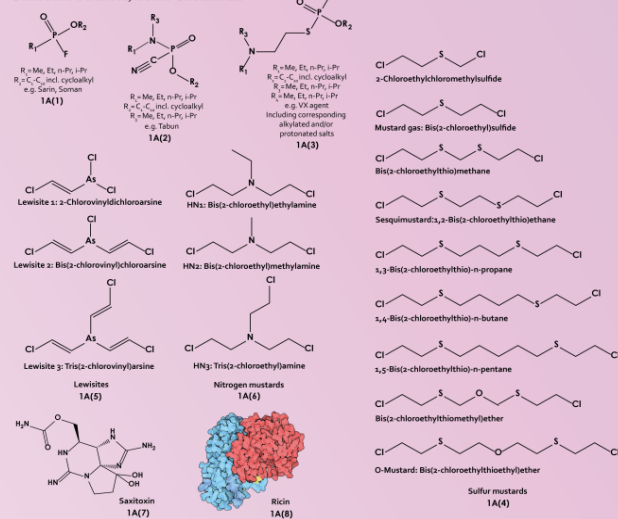
Schedule 1

Guidelines for Schedule 1

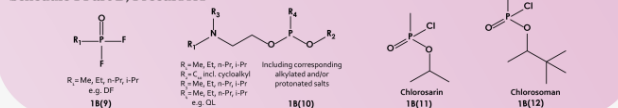
The following criteria shall be taken into account in considering whether a toxic chemical or precursor should be included in Schedule 1:

- It has been developed, produced, stockpiled or used as a chemical weapon as defined in Article II;
- It poses otherwise a high risk to the object and purpose of this Convention by virtue of its high potential for use in activities prohibited under this Convention because one or more of the following conditions are met:
 - It possesses a chemical structure closely related to that of other toxic chemicals listed in Schedule 1, and has, or can be expected to have, comparable properties;
 - It possesses such lethal or incapacitating toxicity as well as other properties that would enable it to be used as a chemical weapon;
 - It may be used as a precursor in the final single technological stage of production of a toxic chemical listed in Schedule 1, regardless of whether this stage takes place in facilities, in munitions or elsewhere;
- It has little or no use for purposes not prohibited under this Convention.

Schedule 1 Part A, Toxic Chemicals



Schedule 1 Part B, Precursors



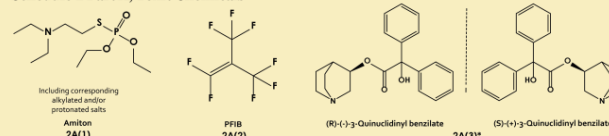
Schedule 2

Guidelines for Schedule 2

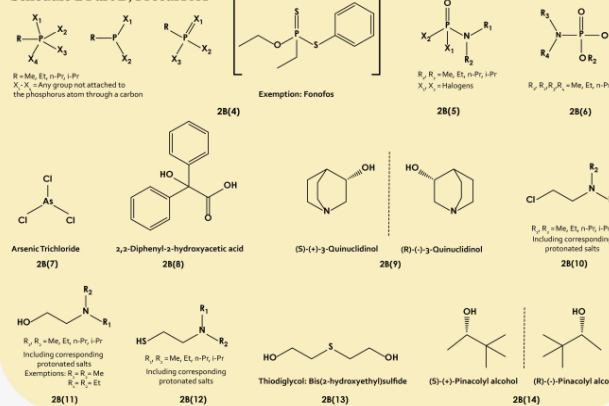
The following criteria shall be taken into account in considering whether a toxic chemical not listed in Schedule 1 or a precursor to a Schedule 1 chemical or to a chemical listed in Schedule 2, part A, should be included in Schedule 2:

- It poses a significant risk to the object and purpose of this Convention because it possesses such lethal or incapacitating toxicity as well as other properties that could enable it to be used as a chemical weapon;
- It may be used as a precursor in one of the chemical reactions at the final stage of formation of a chemical listed in Schedule 1 or Schedule 2, part A;
- It poses a significant risk to the object and purpose of this Convention by virtue of its importance in the production of a chemical listed in Schedule 1 or Schedule 2, part A;
- It is not produced in large commercial quantities for purposes not prohibited under this Convention.

Schedule 2 Part A, Toxic Chemicals



Schedule 2 Part B, Precursors



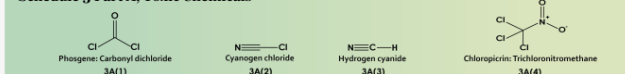
Schedule 3

Guidelines for Schedule 3

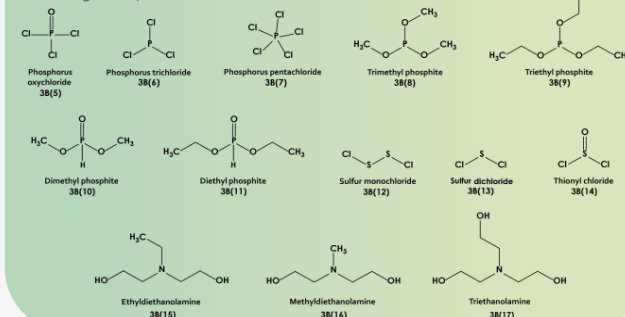
The following criteria shall be taken into account in considering whether a toxic chemical or precursor, not listed in other Schedules, should be included in Schedule 3:

- It has been produced, stockpiled or used as a chemical weapon;
- It poses otherwise a risk to the object and purpose of this Convention because it possesses such lethal or incapacitating toxicity as well as other properties that might enable it to be used as a chemical weapon;
- It poses a risk to the object and purpose of this Convention by virtue of its importance in the production of one or more chemicals listed in Schedule 1 or Schedule 2, part B;
- It may be produced in large commercial quantities for purposes not prohibited under this Convention.

Schedule 3 Part A, Toxic Chemicals



Schedule 3 Part B, Precursors

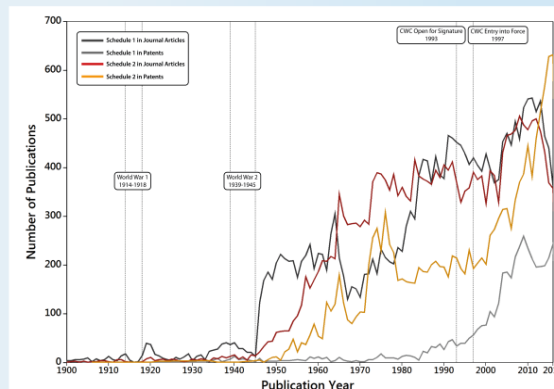
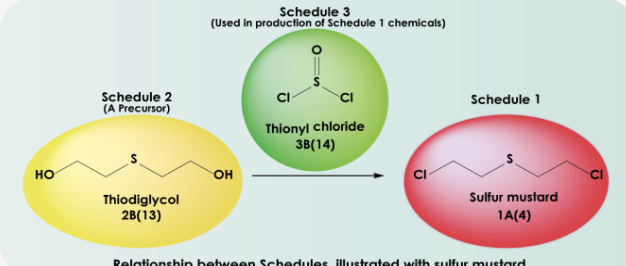


ORGANISATION FOR THE
PROHIBITION OF CHEMICAL WEAPONS

Working Together for a World Free of Chemical Weapons



Relationship between Schedules, illustrated with sulfur mustard.



Scheduled chemicals, including those in schedules 1 and 2, can have scientifically and economically important uses. This chart captures the number of yearly scientific publications that refer to them.