

Date: 23 July 2018

Ref: DSTL/PUB110092, Advice to Offensive Weapons Bill

A paper to summarise the scientific advice provided to the Home Office on the malicious use of chemical substances and their toxicological properties, to inform and support the Offensive Weapons Bill (2018).

The scientific advice provided to the Home Office on the malicious use of chemical substances in support to the Offensive Weapons Bill 2018 was provided in two phases between 2016 and 2018. Findings from a Centre for Applied Science and Technology (formerly CAST now part of the Defence Science Technology Laboratory (Dstl)) report commissioned by the Home Office Anti-social Behaviour and Crime Types Team (now the Serious Violence Unit), in 2016 summarised limited police data available at the time, relating to chemical substances used in malicious attacks.

The report provided details of the type and identity of substances used, chemical properties, applications of use and availability of commercial products. Discussions with experts from both the policing and medical fields on the existing legislation associated with these types of attacks and the medical symptoms associated with contamination of human tissues was captured.

Notable findings from the report included the following.

- A broad range of chemical substances had been implicated in malicious attacks in the UK including both acids and alkalis.
- From limited data collated from six police forces between 2012 and 2015 hydrochloric acid, ammonium hydroxide and bleach (hypochlorite) were recorded as having been used as weapons. However, in some cases the chemical substance used in an attack was not identified or a generic term was used e.g. cleaning fluid.
- Sulfuric acid was not cited in the data but battery acid, which is 30-50% sulfuric acid, was reported to have been used as a weapon overseas, particularly in the Indian sub-continent.
- A range of acid and alkali concentrations were widely available commercially in the UK for legitimate purposes i.e. cleaning, DIY and industry. For example, highly concentrated sulfuric acid (97%), a more hazardous acid than hydrochloric acid from a medical perspective, was, and still is, available commercially for cleaning drains.
- No immediate operational or medical requirement to identify substances used in attacks was apparent. However, it was recommended that this information was gathered to assess the scale of the problem and enable consideration for the control of any widely used substances or commercial products. Since the publication of the report further data has been collected.
- Chemical substances are known to have been decanted into containers to facilitate delivery to the victim.

In 2018 Dstl provided additional advice to the Home Office on the most hazardous chemical substances and concentrations at which they should be considered corrosive from a medical perspective following a risk-based approach. This advice was provided by Dr. Paul Rice, OBE BM FRCPath FRCP FRSB, Chief Medical Officer, Dstl.

Memo



The following databases were used to inform this advice.

Hazardous Substances Database:

<https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm>

Household Products Database

<https://hpd.nlm.nih.gov/index.htm>

The Merck Index Online

<https://www.rsc.org/merck-index>

NIOSH Pocket Guide to Chemical Hazards

<https://www.cdc.gov/niosh/npg/>

It should be noted that where corrosive substances were already controlled under other legislation, for example nitric acid and the Poisons Act 1972, the existing controls were used with the exception of formic acid. It is confirmed that from a medical perspective all substances listed in the current draft of the Offensive Weapons Bill would be corrosive at the stated concentration. In the case of hydrofluoric acid any concentration is deemed hazardous.

A table summarising the rationale behind the chemicals listed in Schedule 1 of the Offensive Weapons Bill is shown below.

Memo



Chemical substance	Concentration / % (weight in weight)	Rationale for inclusion in the schedule
Ammonium hydroxide	10%	Corrosive at concentrations of 10% and greater. The chemical substance is widely available commercially.
Formic acid	10%	Corrosive at concentrations of 10% and greater. The chemical substance is widely available commercially. Controlled under the Poisons Act - reportable poison at 25%.
Hydrochloric acid	10%	Corrosive at concentrations of 10% and greater. The chemical substance is widely available commercially and there is precedent for use. Controlled under the Poisons Act - reportable poison at 10%.
Hydrofluoric acid	0%	Corrosive difficult to set a minimum threshold due to high corrosivity. Controlled under the Poisons Act - reportable poison with no threshold.
Nitric acid	3%	Corrosive at concentrations of 3% and greater. The chemical substance is widely available commercially. Controlled under the Poisons Act – regulated explosive precursor at 3%.
Phosphoric acid	70%	Corrosive at concentrations of 70% and greater. The chemical substance is widely available commercially and there is precedent for use. Controlled under the Poisons Act - reportable poison with no threshold.
Sodium hydroxide	12%	Corrosive at concentrations of 10% and greater. The chemical substance is widely available commercially and there is precedent for use. Controlled under the Poisons Act - reportable poison at 12%.
Sodium hypochlorite	10%	Corrosive at concentrations of 10% and greater. The chemical substance is widely available commercially and there is precedent for use.
Sulfuric acid	15%	Corrosive at concentrations of 10% and greater. The chemical substance is widely available commercially. Controlled under the Poisons Act (recent amendment) – regulated explosive precursor at 15%.