List of compounds nominated to be detected according to bulk explosive recognition guide including homemade explosives (HME)

As proven at EDA Meeting:

SOKKS products
can be applied as universal training aids

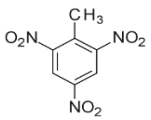
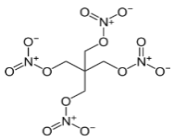
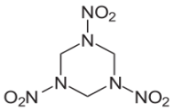
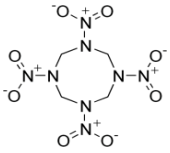
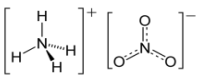
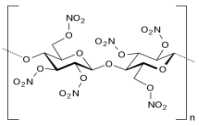
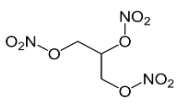
European Defence Agency (EDA)

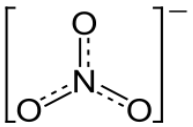
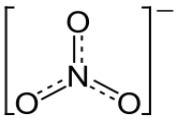
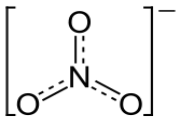
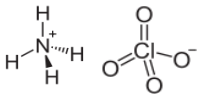
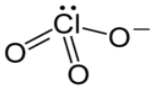
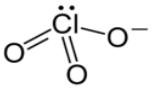
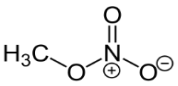
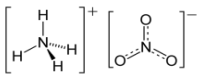
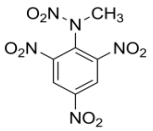
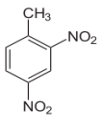
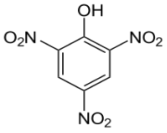
Nato Partner military working dogs counter-IED operations at the Military Center at Kaiser-steinbruch MilHus, in Austria (2015).

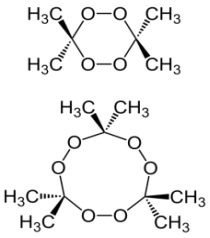
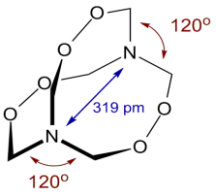
Important: Each of the 22 participants from Austrian, Germany, Hungary, Italy, Sweden and the Netherlands **detected SOKKS products** - **unknown to the dog handlers** - hidden within the test areas!

Compounds detected by SOKKS explosive conditioned canines

(please see comments below the table) by Prof Dr Wolf A Kafka *wolf.kafka@t-online.de*

	Name	Synonyms	Formula	Structure	CAS
x	**TNT**	**2-Methyl-1,3,5-trinitrobenzene**, 2,4,6-Trinitrotoluol, Trinitrotoluen, 2-Methyl-1,3,5-trinitrobenzol, 2-Methyl-1,3,5-trinitrobenzen (IUPAC), 1-Methyl-2,4,6-trinitrobenzol, TNT, Trotyl, AN, Tol, Tolit, Tritol, Tutol	C7H5N3O6		118-96-7
x	**Pentrite**	**Nitropenta**, Pentaerythrityltetranitrat (INN), 1,3-Bis(nitryloxy)-2,2-bis(nitryloxy-methyl)-propan (IUPAC), Pentaerythrittetranitrat, Pentaerythritoltetranitrat, PETN	C5H8N4O12		78-11-5
x	**Hexogene**	**Cyclotrimethylentrinitramin**, Cyclonit, T4 und RDX, Perhydro-1,3,5-trinitro-1,3,5-triazin, Hexahydro-1,3,5-trinitro-1,3,5-triazin, Cyclotrimethylentrinitramin, Cyclonit, RDX, T4	C3H6N6O6		121-82-4
x	**Octogene**	**Cyclotetramethylentetranitramin**, Cyclotetramethylentetranitramin, HMX, LX 14-0, HW 4	C4H8N8O8		2691-41-0
x	**Nitrat Ammonium**	**Ammoniumnitrat**, Ammonsalpeter, Ammoniaksalpeter, brennbarer Salpeter, salpetersaures Ammonium, Ammonnitrat, Ammonium nitricum	H4N2O3		6484-52-2
x	**Nitrocellulose**	**Cellulosenitrat**, Nitrozellulose, Schießbaumwolle, Blitzwatte	C6H7O11N3		9004-70-0
x	**Nitroglycerine**	**Propan-1,2,3-triyltrinitrat (IUPAC)**, Trisalpetersäureglycerinester, Glyceryltrinitrat, Trisalpetersäureglycerinester, Trisalpetersäurepropan-1,2,3-triolester, Blasting oil, Glycerinum trinitricum, Trinitroglycerol	C3H5N3O9		55-63-0

x	**Poudre Noire**	**Kaliumnitrat +** (selten) **Natriumnitrat**, Salpeter, Kalisalpeter, E 252,	KNO3(+NaNO3)		
x	**Nitrate Potassium**		NaNO3		
x	**Nitrate Sodium**		KNO3		
	Perchlorate D´Amonium		NH4ClO4		7790-98-9
x	**chlorate de sodium**		NaClO3		7775-09-9
	chlorate de potassium		KClO3		09.04.3811
	Nitrate de Methylene		CH3NO3		598-58-3
	Nitrate de U´uree	**AHL,** farblose flüssige Mischung aus **Ammoniumnitrat**, Harnstoff und Wasser. 7 % Nitratstickstoff, 7 % Ammoniumstickstoff und 14 % Amidstickstoff (aus dem Harnstoff)	H4N2O3		
	Tetryl	**N-Methyl-N-2,4,6-tetranitroanilin,** CE, N-Methyl-N-2,4,6-tetranitroanilin, Trinitrophenylmethylnitramin, Methylpikrylnitramin, Tetralit	C7H5N5O8		479-45-8
	Dinitrotoluol	2,4-Dinitromethylbenzene, 2,4-Dinitromethylbenzen, 2,4-DNT, Methyldinitrobenzo, Binitrotoluol	C7H6N2O4		121-14-2
	Melinite	**Pikrinsäure, 2,4,6-Trinitrophenol (TNP)**, 2,4,6-Trinitrophenol, Trinitrophenol, TNP, Weltersches Bitter	C6H3N3O7		88-89-1

TATP*	**Acetonperoxid (APEX), IUPAC: 3,3,6,6,9,9-Hexamethyl- 1,2,4,5,7,8-hexaoxonan (Trimer)**, trimeres Acetonperoxid, dimeres Acetonperoxid, Triacetontriperoxid (TATP), Tricycloacetonperoxid (TCAP), IUPAC: 3,3,6,6-Tetramethyl-1,2,4,5-tetraoxan (Dimer), 3,3,6,6,9,9-Hexamethyl- 1,2,4,5,7,8-hexaoxacyclononan	C6H12O4 (Dimer), C9H18O6 (Trimer)		1073-91-2 (Dimer) 17088-37-8 (Trimer)
HMDT*	**Hexamethylentriperoxiddiamin**, 1,6-Diaza-3,4,8,9,12,13-hexaoxa bicyclo[4.4.4]tetradecan (IUPAC)	C6H12N2O6		283-66-9

Note:

Compounds marked by x belong to relevant military explosives, as listed within the internal SOKKS instructions. However**, as reported by different users, SOKKS conditioned canines detect at least all of the listed by Munitique DEVIS**

Whilst contamination/purity is open in compounds offered by Munitique DEVIS SOKKS products are based on high level purity compounds.

Handling of compounds in g units **(merely spoon full amounts as offered - at very high price levels - by Munitique DEVIS)** are of less practical value: Contamination of hiding places, loss of material, etc.

For examinations under "real" field-conditions it seems therefore advantageous to apply explosive-asservates commonly applied in industrie and military operations.

In addition:

Examples of further primary high explosives - most of them not in the list offered by Munitique DEVIS - are detected by SOKKS conditioned canines (personal army reports).

Note in addition:

SOKKS explosive conditioning material is also directed for the detection of TATP (= APEX) (trimeric Acetonperoxide) by SOKKS explosive conditioned dogs.

This has been confirmed by military and police sectors (including the GIGN). Since handling of "sharpened" (= dried from water) TAPT is extremely impact-, touch and heat sensitive, it is still open, however, of whether the dogs detected TAPT or its precursors.

On base of this, TATP production will commonly be "started" shortly before application by mixing up the appropriate starting materials (for example: [acetone + hydrochloric acid] + hydrogen peroxide).

This may be seen to be confirmed by the fact that the terrorists in Brussels insisted on carrying their bags by themselves into the taxi. (It seems to be proven that terrorists used TAPT in Brussels and also in Paris).

Nevertheless SOKKS explosive conditioned dogs should detect as well "sharp" TAPT as TAPT in precursor state.

Recently developed technical TAPT sensors (based on differential micro-weight measurements of TATP-molecules annealed to specially pretreated surfaces), however, up to now, they do not reach the sensitivity of the dog's nose.

Chemicals::
• Acetone 50 % (conc.)• Hydrogenperoxide 50 % (30 %)
• hydrochloric acid 30 % from total volume (32 %)
• Cooling bath (for the conservation of 0 oC reaction temperature)
• Water for washing

Implementation:

• acetone and hydrochloric acid unite with stirring and at 0 degrees Celsius
• Slowly add hydrogen peroxide
• Acetone precipitates white

Special instructions:

• Fabric sublimated ; difficult to ensure safe storage ; drives plug from reservoir (bottle)
• must be dry to explode ; soaked by the fuse
• by sublimation is increased , the water concentration
• remaining hydrochloric acid within the material leads to the development of heat during wrapping in aluminum - foil

Explosives most relevant for the German Bundespolizei

Explosives

Trade name	Chemical nomenclature	Molecules $*10^{10}/cm^3$	formula
Ammongelit	Ammoniumnitrat + Nitroglycol	70000000	$NH_4NO_3 + CsH_8N_2O_6$
Ammonsalpeter	Ammoniumnitrat	70000000	NH_4NO_3
Hexogen (RDX)	Cyclotrimethylen-trinitramin	40	$C_3H_6N_6O_6$
Kaliumchlorat	Kaliumchlorat	100000	$KClO_3$
Kalisalpeter	Kaliumnitrat	10000	KNO_3
Natriumchlorat	Sodium Chlorat	100000	$NaClO_3$
Nitroglycerin	Trinitroglycerin	70000000	$C_3H_5N_3O_9$
Nitropenta **(PETN)**	Pentaerythritol tetranitrat	100	$C_5H_8N_4O_{12}$
Nitrozellulose **(NC)**		30	
Oktogen	Cyclotetramethylentetranitramin **HMX**	**1**	**$C_4H_8N_8O_8$**
Blackpowder	Kaliumnitrat + Schwefel + Holzkohle	10000	$KNO_3 + S + C$
Treibladungspulver	Nitrozellulose + -glycerin + -guanidin	400000	
Trinitrotoluol **(TNT)**	**2,4,6-Trinitrotoluol**	60000	**$CH_3H_5N_3O_6$**

Explosives: Molecules*10^{10}/cm^3 ppm-values **(Meyer, 1985** & EMC, Consulting Services Dr Hoffmann, Schramberg) due to calculations via Loschmidt-Konstant (N=2,686*10^{25}/m^3). **e.g. 1 Molecule Octogen in 10^9 Molecules air. SOKKS-explosive Material is nearly ca. x10000 less down !**

A detecting dog would thus detect a dilution factor of 1 to 10^{13}, he would detect 1 ml octogen in an air volume of a big lake 20x20x0,07 km.

Additional examples of primary high explosives are:

- Acetone peroxide
- Ammonium permanganate
- Azo-clathrates
- Chlorine azide
- Copper acetylide
- Cyanogen azide
- Diazodinitrophenol
- Dichlorine heptoxide
- Disulfur dinitride
- Hexamethylene triperoxide diamine Lead azide
- Hypofluorous acid
- Lead styphnate
- Lead picrate[4]
- Mercury(II) fulminate
- Nitrogen trichloride
- Nitrogen triiodide
- Nitroglycerin
- Octaazacubane
- Silver azide
- Silver acetylide
- Silver fulminate
- Sodium azide
- Tetraamine copper complexes Tetraazidomethane
- Tetrazine
- Tetranitratoxycarbon
- Tetrazoles
- Xenon oxytetrafluoride
- Xenon tetroxide
- Xenon trioxide