

3. CHEMICAL AND PHYSICAL INFORMATION

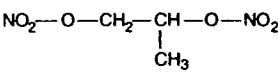
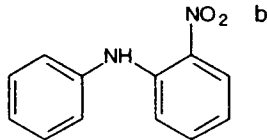
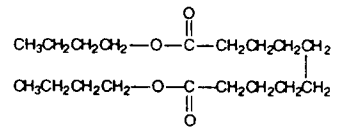
3.1 CHEMICAL IDENTITY

Information regarding the chemical identity of Otto Fuel II and its components is located in Table 3-1.

3.2 PHYSICAL AND CHEMICAL PROPERTIES

Information regarding the physical and chemical properties of Otto Fuel II and its components is located in Table 3-2.

TABLE 3-1. Chemical Identity of Otto Fuel II and Its Components^a

Characteristic	Otto fuel II	Propylene glycol dinitrate ^b	2-Nitrodiphenylamine ^c	Dibutyl sebacate
Synonym(s)	No data	PGDN; 1,2-propylene glycol dinitrate; 1,2-propanediol, dinitrate; propylene dinitrate; isopropylene nitrate; methylnitroglycol; propylene	2-nitrobenzenamine, 2-nitro-N-phenyl; <i>o</i> -nitro-N-phenylaniline; <i>o</i> -nitro-diphenylamine ^b	Bis (<i>n</i> -butyl) sebacate; butyl sebacate; decanedioic acid, dibutyl ester; sebacic acid, dibutyl ester; dibutyl decanedioate; di- <i>n</i> -butylsebacate ^a ; dibutylester kyseliny
Registered trade name(s)	No data	No data	Sudan yellow 1339; C.I. 10335 ^b	Kodaflex DBS; Staflex DBS; PX 404; Monoplex DBS; Polycizer DBS ^f
Chemical formula	Not applicable	C ₃ H ₆ N ₂ O ₆ ^g	C ₁₂ H ₁₀ N ₂ O ₂ ^b	C ₁₈ H ₃₄ O ₄ ^f
Chemical structure	Not applicable	 c	 b	 h
Identification numbers:				
CAS registry	106602-80-6	6423-43-4 ⁱ	119-75-5 ^b	109-43-3
NIOSH RTECS	No data	TY 630000 ^h	No data	VS 1150000
EPA hazardous waste	No data	No data	No data	878212204; 878221572; 878221503 ^j
OHM/TADS	No data	No data	No data	No data
DOT/UN/NA/IMCO shipping	No data	No data	No data	No data
HSDB	No data	No data	No data	309
NCI	No data	No data	No data	No data

^aAll information obtained from HSDB 1994 except where noted^bForman 1988^cArmy 1979^dNRC 1982^eRTECS 1994^fSax and Lewis 1989a^gACGIH 1986^hSANSS 1994ⁱSax and Lewis 1989b^jChemlist 1991

CAS = Chemical Abstracts Services; DOT/UN/NA/IMCO = Department of Transportation/United Nations/North America/International Maritime Dangerous Goods Code; EPA = Environmental Protection Agency; HSDB = Hazardous Substances Data Bank; NCI = National Cancer Institute; NIOSH = National Institute for Occupational Safety and Health; OHM/TADS = Oil and Hazardous Materials/Technical Assistance Data System; RTECS = Registry of Toxic Effects of Chemical Substances

TABLE 3-2. Physical and Chemical Properties of Otto Fuel II and Its Components^a

Property	Otto fuel II	Propylene glycol dinitrate	2-Nitrodiphenylamine	Dibutyl sebacate
Molecular weight	No data	166.1 ^b	214.23 ^c	314.52 ^d
Color	Reddish-orange ^e	Colorless ^f	Orange ^g	Clear ^d
Physical state	Oily liquid ^e	Liquid ^f	Solid (orthorhombic crystals) ^c	Liquid ^d
Melting point	-27.7 °C ^h	-27.7° C ^f	75-76 °C ^c	-10 °C
Boiling point	Decomposes at 121 °C ^h	Decomposes at 121 °C ^f ; 92 °C (10 mmHg) ^f	223 °C (20 mmHg) ^c	180 °C (3 mmHg) ^d ; 344-345 °C (pressure unspecified)
Density	1.232 g/mL (25 °C) ^h	1.232 g/mL (25 °C) ^f	1.366 g/mL ^c	0.936 g/mL (20 °C) ^d
Odor	Distinctive ^h	Disagreeable ^f	No data	No data
Odor threshold:				
Water	No data	No data	No data	No data
Air	No data	No data	No data	No data
Solubility:				
Water	Insoluble ^h	0.13 g/100 mL ^f	Insoluble ⁱ	Insoluble
Organic solvent(s)	Alcohols; benzene carbon tetrachloride; hexane; chloroform; toluene; dibutyl phthalate; acetone; trichloroethylene ^h	No data	Ethanol, 2 g/100 mL (25 °C) ^c ; Methanol, 2.4 g/100 mL (20 °C) ^c ; Acetone, 43.6 g/100 mL (20 °C) ^c ; Benzene, 51.7 g/100 mL (20 °C) ^c	Ether
Partition coefficients:				
Log K _{ow}	No data	No data	0.49 ^c	No data
Log K _{oc}	No data	No data	No data	No data
Vapor pressure	0.0877 mm Hg (25 °C) ^h	0.09844 mm Hg (25 °C) ^j	0.00001 mm Hg (25 °C) ^k	3 mm Hg (180 °C)
Henry's law constant	No data	No data	No data	No data
Autoignition temperature	121 °C ^l	No data	No data	No data
Flashpoint	130 °C ^{h,g}	No data	No data	178 °C
Flammability limits	Monopropellant ^l	No data	No data	Slight potential when exposed to heat or flame
Conversion factors	No data	1 ppm = 7.14 mg/m ³ m	No data	No data
Explosive limits	No data	No data	No data	No data

^aAll information obtained from HSDB 1994 unless otherwise noted^dSax and Lewis 1989a^gDean 1974ⁱCrater 1929^bSax and Lewis 1989b^eForman 1988^hAir Force 1985a^kBaughman and Perenich 1988^cArmy 1979^fACGIH 1986ⁱAmerican Cyanamid 1982^lRivera 1974

