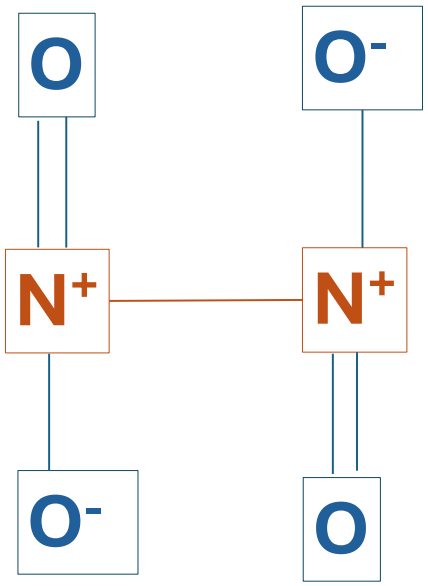
Chemical of the Week – Part 2

Hazard Profile	
Chemical Name and Pseudonyms	Nitrogen tetraoxide, Dinitrogen tetroxide
UN Number	1067
Chemical Formula	N_2O_4
Hazards	Toxic, water reactive, air reactive
NFPA Hazard Class (H-F-R-Ⓞ)	3 – 0 – 0 – OX
PPE Considerations	CPC or SFPC with SCBA based on assignment
Fire Fighting Considerations	CO_2, Dry chemical
Decontamination	Ventilation
Detection and Monitoring	Colorimetric, spectroscopy, PID (IP = 9.75-11.8 eV), electrochemical sensor
Chemical and Physical Properties	
Physical State	Colorless to brownish gas that is pressurized into a brown liquid
Vapor Pressure	720-1551 mm/Hg
Boiling Point	70.1°F
Vapor Density	3.2
Specific Gravity	1.45
Miscibility	Reacts with water
Flash Point	-
LEL/UEL	- / -%
Autoignition Temp	-
pH	-
Toxicity	
IDLH	20 ppm
LC50	105 mg/m^3
LD50	-
AEGL1/AEGL 2/AEGL (10 Min)	.25/10/17 4572 ppm
Emergency Response Planning Guide (ERPG) 1/2/3	- / - / -
Protective Action Criteria (PAC) 1/2/3	.25 / 6.2 / 10 ppm
PEL/REL/STEL	5 / 1/ - ppm
Radioactive (Yes/No)	No
Medical	
Toxicological Considerations	Toxic inhalation by inhalation, ingestion, and contact
Signs/Symptoms of Exposure	Respiratory/skin/eye irritation, CNS s/s, headache, confusion, nausea & vomiting

Medical Treatment	Fresh air, water flush, treat symptomatically, consider antidote kit

Other Information

Liquid NITROGEN TETROXIDE is an oxidizing agent consisting of an equilibrium mixture of colorless dinitrogen tetraoxide (N2O4) and red-brown nitrogen dioxide (NO2). Vaporizes readily to give NO2, also an oxidizing agent. Noncombustible but can accelerate the burning of combustible materials. Reacts with reducing agents to generate heat and gas. Reacts with alkalis to form nitrates and nitrites. Corrodes steel if wet. Reacts explosively with liquid ammonia even at very low temperatures. Reacts energetically with boron trichloride. Mixtures with metal carbonyls are hypergolic (enflame immediately). Mixtures with halocarbons, hydrazine derivatives, heterocyclic bases (pyridine), isopropyl nitrite/propyl nitrite, active metals (magnesium, calcium, etc.), nitroaromatics, nitrogen trichloride, phosphorus, triethylamine, unsaturated hydrocarbons may react explosively. Mixing with hot cyclohexane caused an explosion. A mixture with acetonitrile and indium showed no evidence of change for a time and then detonated when shaken. Mixture with alcohols produces a violent explosion. Vapor reacts with barium oxide. A slow reaction between the vapor and formaldehyde is explosive. Manganese and potassium both ignite in the vapor. The vapor and ozone react with the evolution of light and often explode when mixed.

Chemical Structure