



Safety Data Sheet

1. PRODUCT IDENTIFICATION

Name Surfactant NP-4
Synonyms nonylphenol ethoxylate NP-4; alpha-(nonylphenyl)-omega-hydroxy-poly(oxy-1,2-ethanediyl); nonoxynol-4
CAS# 9016-45-9 – also 127087-87-0 & 26027-38-3
Europe EC# 500-024-6
Product Uses surfactant

2. HAZARDS

Quick Guide: may irritate skin & eyes; biodegradation products may be reproductive hormone mimics in aquatic & bird life

Canada – WHMIS

Key:

D 2B

B 2 – Flash Point <38°C, B 3 – Flash Point >38°C & <93°C

D 1 – Immediately Toxic, D 2 – Chronic Toxicity

C – Oxidising Substance, E – Corrosive, F – Reactive Substance

U.S.A. – HMIS

Key:

Health – 1/2, Fire – 2, Reactivity – 0

0=minimal, 1=slight, 2=moderate, 3=serious, 4=severe

3. COMPOSITION

	%	TWAEV / TLV mg/m ³	LD ₅₀ (mg/kg) ORAL	LD ₅₀ (mg/kg) SKIN	LC ₅₀ ppm INHALATION
Nonylphenol Ethoxylate – NP-4 CAS#s above	97-99%	not listed	960	2000	1150
Dinonylphenyl Polyoxyethylene CAS# 9014-93-1	1-3%	not listed	not known	not known	not known
Polyethylene Glycol CAS# 25322-68-3	<3%	10	17,000	not known	not known

4. FIRST AID

SKIN: Wash with soap & plenty of water. Remove contaminated clothing and do not reuse until thoroughly laundered.

EYES: Wash eyes with plenty of water, holding eyelids open. Seek medical assistance promptly if there is irritation.

INHALATION: Remove from contaminated area promptly. **CAUTION: Rescuer must not endanger himself!** If breathing stops, administer artificial respiration and seek medical aid promptly.

INGESTION: Give plenty of water to dilute product. Do not induce vomiting (NOTE below). Keep victim quiet. If vomiting occurs, lower victim's head below hips to prevent inhalation of vomited material. Seek medical help promptly.

Inadvertent inhalation of vomited material may seriously damage the lungs. The danger of this is greater than the risk of poisoning through absorption of this relatively low-toxicity substance. The stomach should only be emptied under medical supervision, and after the installation of an airway to protect the lungs.

5. FIRE FIGHTING & FLAMMABILITY

Flash Point 218°C / 425°F (Pensky-Martens closed cup)
Autoignition Temperature not known
Flammable Limits not known
Combustion Products carbon monoxide, nitrogen oxides, smoke, part oxidised hydrocarbon fragments including formaldehyde
Fire Fighting Precautions foam, dry chemical, water fog or spray; fire fighters must wear SCBA
Static Charge Accumulation cannot accumulate a static charge on agitation or pumping

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6. ACCIDENTAL RELEASE MEASURES

Leak Precaution dyke to control spillage and prevent environmental contamination
 Handling Spill ventilate contaminated area; recover free liquid with suitable pumps; absorb residue on an inert sorbent, sweep, shovel & store in closed containers for recycling or disposal

7. HANDLING & STORAGE

Store in a cool, dry environment, away from heat and oxidising agents. Always ensure that containers, whether empty or full, or part full, are tightly sealed unless in use.

Avoid generating or breathing product mist. If product mist forms in use, install adequate exhaust ventilation to clear workplace air.

Never cut, drill, weld or grind on or near this container. Avoid prolonged contact with skin and wash work clothes frequently. An eye bath and safety shower must be available near the workplace.

8. EXPOSURE CONTROL & PERSONAL PROTECTION

Ontario TWAEV	not listed
ACGIH TLV	not listed – recommended (WEEL) 10mg/m ³
OSHA PEL	not listed – recommended (WEEL) 10mg/m ³
Ventilation	no special ventilation required
Hands	butyl or “Viton” gloves recommended – <i>other types may also protect; consult supplier to confirm suitability</i>
Eyes	safety glasses with side shields – <i>always protect the eyes</i>
Clothing	no special protective clothing required

9. PHYSICAL PROPERTIES

Odour & Appearance	viscous, clear, colourless, nearly odourless liquid
Odour Threshold	not known
Vapour Pressure	below 0.01mmHg / 0.0013kPa (20°C / 68°F)
Evaporation Rate (<i>Butyl Acetate = 1</i>)	not known – not volatile
Vapour Density (air = 1)	~14
Boiling Range	over 200°C / 392°F – <i>decomposes without boiling</i>
Melting Point	-28°C / -18°F
Specific Gravity	1.027 (20/20°C)
Water Solubility	<0.5%
Also soluble in	chlorinated solvents, polar solvents
Viscosity	238centipoise (25°C / 77°F)
pH	7
Molecular Weight	~400grams per mole (average)

10. REACTIVITY

Dangerously Reactive With	strong oxidising agents; at elevated temperature, strong alkalies
Also Reactive With	strong acids & substances reacting with hydroxyl ions
Stability	stable; will not polymerize
Decomposes in Presence of	heat; slow decomposition above 50°C; rapid decomposition at 300°C
Decomposition Products	none apart from Hazardous Combustion Products
Sensitive to Mechanical Impact	no

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11. TOXICITY**Effects, Acute Exposure**

Skin Contact	brief contact – little to no effect; irritation may occur following prolonged or repeated contact
Skin Absorption	slight; no toxic effects likely by this route
Eye Contact	slightly irritating if washed within 2-5 minutes; chemical burns on prolonged (24hr) contact; <i>not relevant to industrial exposure</i>
Inhalation	mist may irritate with chest pain and discomfort – viscous liquid, misting unlikely
Ingestion	may cause abdominal discomfort, nausea, diarrhoea – <i>not a route of industrial exposure</i>

Effects, Chronic Exposure

General	prolonged exposure 24hr+ may cause dermatitis & chemical burns to skin & eyes*; <i>burns heal within a week; prolonged feeding of NP-9 (1000mg/kg/day) caused enlarged livers & lower body weight in rats; no adverse systemic effects reported following industrial exposure</i>
Sensitising	not a sensitiser in animals – <i>sensitization to nonylphenol ethoxylates is extremely rare</i>
Carcinogen/Tumorigen	not considered a tumorigen or a carcinogen in humans or animals
Reproductive Effect	no known effect in humans; fetotoxic in rodents only at doses causing maternal symptoms
Mutagen	no known effect on humans or animals
Synergistic With	not known
LD ₅₀ (oral)	960-3980mg/kg (rat)
LD ₅₀ (skin)	2000-2990mg/kg (rabbit)
LC ₅₀ (inhalation)	1150mg/m ³ (rat)

* USA EPA document, April 2001:

http://iaspub.epa.gov/opthpv/Public_Search.PublicEndPointReport?robust_summary_id=25021946&WhichButton=PrintTab&ep_name=Skin+Irritation&selchemid=

12. ECOLOGICAL INFORMATION

Bioaccumulation	not a bioaccumulator, but biodegradation products (<i>nonylphenol with one, two, or no ethylene oxide</i>) bioaccumulate & mimic hormones, causing sexual dysfunction in shore birds, amphibians & fish <u>at very low doses</u>
Biodegradation	degrades readily but slowly in unacclimated waters, rapidly in acclimated waters, in the presence of oxygen; ½-life between 3-69days depending on temperature, chain length, & other conditions; <i>biodegradation tends to be incomplete, leaving nonylphenol, mono- and di-ethoxylates which have biological activity (The structural formula of branched nonylphenol (unethoxylated) bears a striking resemblance to 17β-oestradiol³ –a potent oestrogen.) (see NOTE below)</i>
Abiotic Degradation	not known – <i>aromatic ring should be susceptible to photolysis</i>
Mobility in soil, water	somewhat water soluble; mobile in soil and water
Ecotoxicity	<i>data below for nonylphenol ethoxylates with various degrees of ethoxylation</i>
LC ₅₀ (Fish, 96hr)	3.8-7.7mg/l (Pimephales promelas), 16.4mg/litre (Poecilia reticulata – 48hr)
LC ₅₀ (Crustacea, 48hr)	9.3-21.4mg/l (Daphnia magna), 20.9mg/litre (Gammarus pulex)
EC ₅₀ (Algae)	17mg/litre (Scenedesmus quadricauda), 15mg/litre (Lemna minor)
EC ₅₀ (Bacteria)	>1000mg/litre (various bacteria)

ENVIRONMENTAL NOTE:

Several studies show that nonylphenol ethoxylates biodegrade completely^{1,2} (to CO₂), others believe this is not possible; that a residue always remains³. Given the very large amounts used, this small residue (estimated as 0.4% of the initial nonylphenol ethoxylate) may be enough (as hormone mimics) to cause the reproductive disruption which has been observed in some fish & shore birds. European authorities virtually banned the use of nonylphenol ethoxylates since January 2005⁴.

(1) European Industry Comment: <http://www.cepad.eu/pospap/np-biodeg-final-12-99-a.pdf>

(2) Scholarly article: <http://pubs.acs.org/doi/abs/10.1021/es000127o>

(3) Master's Thesis University of Lund: http://www.sysav.se/upload/ovrigt/Biodegradation_of_nonylphenol_ethoxylates.pdf
See Page 8 for a comparison between the structural formulae of nonylphenol & 17β-oestradiol.

(4) European Commission Regulation (July 2008): <http://edexim.jrc.ec.europa.eu/searchChemical.php?einecs=500-024-6>

On May 9, 2012, the USA EPA, through its "Design for the Environment" programme began to urge industry to replace nonylphenol ethoxylates with "safer alternatives". The Canadian government may well announce a similar programme.
<http://www.epa.gov/oppt/existingchemicals/pubs/actionplans/np-npe.html>

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13. DISPOSAL

Waste Disposal **do not flush to sewer**, recycle if possible, may be incinerated in approved facility, after mixing with a suitable flammable waste

Containers **Drums** should be reused. Recondition and pressure test by a licensed reconditioner prior to re-use.
Pails must be vented and thoroughly dried prior to crushing and recycling.
IBCs (intermediate bulk containers): polyethylene bottle must be pressure tested & recertified at 30 months. Replace at 60 months (5yrs). Steel containers must be inspected, pressure tested & recertified every 5 years.
Never cut, drill, weld or grind on or near this container, even if empty

14. TRANSPORT CLASSIFICATION

Canada TDG	PIN	UN – not regulated for transport
AND	Shipping Name	not regulated for transport
U.S.A. 49 CFR	Class & Packing Group	not regulated for transport
Marine Pollutant		not a marine pollutant
ERAP Required		NO

EMERGENCY INFORMATION

Canada	Call CANUTEC (collect)	(613) 996-6666
U.S.A.	Call CHEMTREC	(800) 424-9300

15. REGULATIONS

Canada DSL	on inventory	
U.S.A. TSCA	on inventory	
Europe EINECS	on inventory –	<i>use of nonylphenol ethoxylates in Europe is severely restricted see NOTE in Part 12, above</i>

TSCA Requirements: Section 8(a) of TSCA requires manufacturers of this chemical substance to report preliminary assessment information concerned with production, exposure, and use to EPA as cited in the preamble in 51 FR 41329.

16. OTHER INFORMATION

Prepared for Megaloid Laboratories by Peter Bursztyn, (705) 734-1577
 Data from RTECS, HSDB (Haz. Substance Data Base), Cheminfo (CCOHS), IUCLID Datasheets (ESIS – European Chem. Substance Info. System), & others.
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