MATERIAL SAFETY DATA SHEET

This product is classified as hazardous based on Directive 67/548/EEC (as amended) or Directive 1999/45/EC of the Commission of the European Communities

N-METHYLPYRROLIDONE

1. Identification of the substance/preparation and the company

1.1 Identification of the substance or preparation:

Synonyms: 1-methylpyrrolidinone, 1-methyl-2-pyrrolidinone, M-pyrol, 1-methylpyrrolidone, NMP, pyrol-M, N-methyl-2-pyrrolidone, N-pyrrollidinone

CAS no. : 000872-50-4
EC index no. : 606-021-00-7
EINECS no. : 212-828-1
RTECS no. : UY5790000
NFPA code : 2-1-0
Molecular weight : 99.13
Formula : C5H9NO

1.2 Company/undertaking identification:

Applied Biosystems Pty Ltd
52 Rocco Drive
Scoresby Vic
Australia 3179

Tel: 03 9730 8600 Fax: 03 9730 8798

1.3 Telephone number for emergency:

0011 1 703 527 3887
(Can be a Reverse Charge Call by Calling 12550 from Australia)
CHEMTREC (24 Hr Emergency Response Service Provider)
1300 Wilson Blvd.
Arlington, VA 22209
USA

2. Composition/information on ingredients

Hazardous ingredients	CAS no.	Conc. in %	Hazard class.	Risks (R-phrases)
N-methylpyrrolidone	872-50-4	100	Xi	36/38

3. Hazards identification

- Irritating to eyes and skin

4. First aid measures

4.1 Eye contact:
- Rinse immediately with plenty of water for 15 minutes
- Do not apply neutralizing agents
- Consult a doctor/medical service if irritation persists

4.2 Skin contact:
- Wash immediately with lots of water and soap for 15 minutes
- Remove clothing before washing
- Do not apply (chemical) neutralizing agents
- Consult a doctor/medical service if irritation persists

4.3 After inhalation:
- Remove the victim into fresh air
- Unconscious: maintain adequate airway and respiration
- Consult a doctor/medical service if breathing problems develop

4.4 After ingestion:
- Immediately give lots of water to drink
- Never give water to an unconscious person
- Consult a doctor/medical service if you feel unwell

5. Fire-fighting measures

5.1 Suitable extinguishing media:
- Water spray
- Alcohol foam
- BC powder
- Carbon dioxide

5.2 Unsuitable extinguishing media:
- Solid water jet ineffective as extinguishing medium

5.3 Special exposure hazards:
- Material presenting a fire hazard
- On heating/burning: release of toxic and corrosive gases/vapours (nitrous vapours, carbon monoxide, carbon dioxide)

5.4 Instructions:
- Cool tanks/drums with water spray/remove them into safety
- Dilute toxic gases with water spray

5.5 Special protective equipment for firefighters:
- Heat/fire exposure: compressed air/oxygen apparatus
- Heat/fire exposure: gas-tight suit

6. Accidental release measures

6.1 Personal protection: see 8.3

6.2 Environmental precautions:
- Contain leaking substance, pump over in suitable containers
- Plug the leak, cut off the supply

6.3 Clean-up:
- Take up liquid spill into inert absorbent material, e.g.: sand, earth, vermiculite
- Scoop absorbed substance into closing containers
- Clean contaminated surfaces with an excess of water
- Wash clothing and equipment after handling

7. Handling and storage

7.1 Handling:
- Observe normal hygiene standards
- Use earthed equipment
- Handle and open the container with care
- Remove contaminated clothing immediately
- Clean contaminated clothing

7.2 Storage:
- Keep container tightly closed
- Store in a cool area
- Store in a dry area
- Keep away from: heat sources, oxidizing agents, reducing agents, acids, bases

Storage temperature: 2/8 **°C**

7.3 Materials for packaging:
- suitable : steel, stainless steel, nickel, glass
- to avoid : aluminium, synthetic material

8. Exposure controls/Personal protection

8.1 Recommended engineering controls:
- Work under local exhaust/ventilation

Sampling methods:
1-Methyl-2-Pyrrolidinone OSHA CSI

8.2 Exposure limits:

TLV-TWA	:		**mg/m³**		**ppm**
TLV-STEL	:		**mg/m³**		**ppm**
OES-LTEL	:	103	**mg/m³**	25	**ppm**
OES-STEL	:	309	**mg/m³**	75	**ppm**
MAK	:	80 d	**mg/m³**	19 d	**ppm**
MAC-TGG 8h	:	80 d	**mg/m³**		
MAC-TGG 15 min.	:		**mg/m³**		
VME-8h	:		**mg/m³**		**ppm**
VLE-15 min.	:		**mg/m³**		**ppm**
GWBB-8h	:		**mg/m³**		**ppm**
GWK-15 min.	:		**mg/m³**		**ppm**

d = damp (vapor)

8.3 Personal protection:

eye protection:
- Safety glasses

hand protection:
- Gloves

skin protection:
- Protective clothing

materials for protective clothing:
- Butyl rubber
- Polyethylene

respiratory protection:
- High vapour concentration: gas mask with filter A

9. Physical and chemical properties

9.1 Appearance (at 20°C)	:	Liquid	
9.2 Odour	:	Amine	
9.3 Colour	:	Colourless to light-yellow	
9.4 pH value	:	8/10	
9.5 Boiling point/boiling range	:	202	**°C**
9.6 Melting point/melting range	:	-24	**°C**
9.7 Flashpoint	:	91	**°C**
9.8 Auto-ignition point	:	270	**°C**
9.9 Explosion limits	:	1.3/9.5	**vol% (°C)**
9.10 Vapour pressure (at 20°C)	:	0.4	**hPa**
9.11 Relative density (at 20°C)	:	1.0	
9.12 Water solubility	:	COMPLETELY	
9.13 Soluble in	:	Ethanol, ether, acetone, aromatic hydrocarbons, chloroform, ethylacetate	
9.14 Relative vapour density	:	3.4	
9.15 Saturation concentration	:	1.2	**g/m³**
9.16 Viscosity	:	0.0017	**Pa.s**

10. Stability and reactivity

10.1 Stability:
- Hygroscopic
- Unstable on exposure to light

10.2 Reactivity/Hazardous decomposition products:
- On heating/burning: release of toxic and corrosive gases/vapours nitrous vapours, carbon monoxide, carbon dioxide
- Reacts exothermically with (some) acids/bases
- Reacts violently with (strong) oxidizers: (increased) risk of fire/explosion
- Oxidizes slowly on exposure to air: peroxidation resulting in increased fire or explosion risk

10.3 Conditions/materials to avoid:
- Heat sources, oxidizing agents, reducing agents, acids, bases

11. Toxicological information

11.1 Acute toxicity:

LD50 oral rat	:	3914	**mg/kg**
LD50 dermal rat	:	7000	**mg/kg**
LD50 dermal rabbit	:	8000	**mg/kg**
LC50 inhalation rat	:	> 5.1	**mg/l/4 h**

11.2 Chronic toxicity:

EC carc. cat.	:	not listed
EC muta. cat.	:	not listed
EC repr. cat.	:	not listed
Carcinogenicity (TLV)	:	not listed
Carcinogenicity (MAC)	:	not listed
Carcinogenicity (VME)	:	not listed
Carcinogenicity (MEL)	:	not listed
Carcinogenicity (MAK)	:	not listed
Mutagenicity (MAK)	:	not listed
Teratogenicity (MAK)	:	C
IARC classification	:	not listed

Obligatory medical control (ARAB-RGPT Art. 124):
group: I number: 23.4

11.3 Routes of exposure: ingestion, inhalation, eyes and skin

11.4 Acute effects/symptoms:

AFTER INHALATION
- Dry/sore throat
- Coughing

AFTER INGESTION
- Practically toxic if swallowed
- Nausea
- Vomiting
- Irritation of the gastric/intestinal mucosa

AFTER SKIN CONTACT
- Substance is absorbed through the skin
- Non-toxic in contact with skin
- Tingling/irritation of the skin

AFTER EYE CONTACT
- Irritation of the eye tissue

11.5 Chronic effects:
- No teratogenic risk at exposure level lower than MAK value

ON CONTINUOUS/REPEATED EXPOSURE/CONTACT:
- Dry skin
- Swelling of the skin
- Tingling/irritation of the skin

12. Ecological information

12.1 Mobility:

- **Volatile organic compounds (VOC):** N.D.
- Slightly volatile
- Soluble in water

12.2 Biodegradation:

- soil:	**T ½**	: 2/15	**days**
	BOD_5	: 1.07	**g O_2/g substance**
	COD	: 1.56	**g O_2/g substance**

- water:
- Readily biodegradable in water
- test: >90% ,OECD 301E

12.3 Bioaccumulation:
- **log P_{ow}** : -0.7/-0.46
- **BCF** : N.D.

12.4 Aquatic toxicity:

- LC50 (96 h) : 3048 mg/l (SALMO GAIRDNERI)
- EC50 (48 h) : 4897 mg/l (DAPHNIA MAGNA)
- EC50 : >500 mg/l (SCENEDESMUS SUBSPICATUS)

12.5 Other information:

- **WGK:** 1 (002)
- **Effect on the ozone layer** : N.D.
- **Waste water purification** : Harmless to activated sludge at low concentration

13. Waste disposal considerations

13.1 Provisions relating to waste:
- Waste code (EC): N.D.
- Waste material code (Flanders): 015/034
- Waste code (Germany): 55370
- KCA (the Netherlands): category III
- BAGA (Netherlands): C.16
- Hazardous waste (91/689/EC)

13.2 Disposal methods:
- Recycle by distillation
- Remove to an authorized waste incinerator for solvents
- Obtain the consent of pollution control authorities before discharging to wastewater treatment plants
- Do not discharge into surface water

14. Transport information

14.1 Proper shipping name: N.A.

14.2 Transport by road/rail (ADR/RID): N.A.
Danger code: -
Danger labels on tanks : -
on packages : -

14.3 Substance identification number (UN number): N.A.
Packing: -

14.4 Maritime transport (IMDG code): N.A.
EMS : -
MFAG : -
Marine pollutant : -

14.5 Inland navigation (ADNR): N.A.

14.6 Air freight (ICAO) : N.A.
Instruction "passenger" : -
Instruction "cargo" : -

14.7 Other information: not restricted for any mode of international transport

15. Regulatory information

Labelling in accordance with EC directives 67/548/EEC and 1999/45/EEC

Irritant

R36/38 : Irritating to eyes and skin

S(02) : (Keep out of reach of children)
S41 : In case of fire and/or explosion do not breathe fumes
S64 : If swallowed, rinse mouth with water (only if the person is conscious)

16. Other information

The information provided on this MSDS is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

N.A. = NOT APPLICABLE
N.D. = NOT DETERMINED
***** = INTERNAL CLASSIFICATION

WGK:

001 : Internal classification
002 : Classification in compliance with Verwaltungsvorschrift wassergefährdender Stoffe (VwVwS) of 17 May 1999
003 : Classification based on R phrases in compliance with Verwaltungsvorschrift wassergefährdender Stoffe (VwVwS) of 17 May 1999
004 : Classification based on the components in compliance with Verwaltungsvorschrift wassergefährdender Stoffe (VwVwS) of 17 May 1999

Exposure limits:

TLV : Threshold Limit Value - ACGIH USA 1999
OES : Occupational Exposure Standards - United Kingdom 1999
MEL : Maximum Exposure Limits - United Kingdom 1999
MAK : Maximale Arbeitsplatzkonzentrationen - Germany 1999
TRK : Technische Richtkonzentrationen - Germany 1999
MAC : Maximale aanvaarde concentratie - The Netherlands 2000
VME : Valeurs limites de Moyenne d'Exposition - France 1999
VLE : Valeurs limites d'Exposition à court terme - France 1999
GWBB : Grenswaarde beroepsmatige blootstelling - Belgium 1998
GWK : Grenswaarde kortstondige blootstelling - Belgium 1998

MSDS established : 11-07-2000
Reference number : BIG\13543GB
P/N 400580

Document number : 4328493

Revision date : 01-08-2000
Revision number : A
Reason for revision : Document number