

# 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,N-DIMETHYLFORMAMIDE

### 1. Identification of the substance/preparation and the company

#### 1.1 Identification of the substance or preparation:

**Synonyms:** dimethylformamide, N,N-dimethylmethanamide, formyldimethylamine, DMF(amide), DMFA, DMF, peptide synthesis reagent #10

**CAS no.** : 000068-12-2  
**EC index no.** : 616-001-00-X **NFPA code** : 1-2-0  
**EINECS no.** : 200-679-5 **Molecular weight** : 73.09  
**RTECS no.** : LQ2100000 **Formula** : C3H7NO

#### 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,N-Dimethylformamide	68-12-2	100	T	61-20/21-36

### 3. Hazards identification

- May cause harm to the unborn child
- Also harmful by inhalation and in contact with skin
- Irritating to eyes

### 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
- 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
- Do not allow vomiting
- Consult a doctor/medical service if you feel unwell

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### 5. Fire-fighting measures

#### 5.1 Suitable extinguishing media:

- Water spray
- Alcohol foam
- Polyvalent foam
- BC powder
- Carbon dioxide

#### 5.2 Unsuitable extinguishing media:

- Halons
- Solid water jet ineffective as extinguishing medium

#### 5.3 Special exposure hazards:

- Material presenting a fire hazard
- On heating: release of highly flammable gases/vapours dimethylamine
- On heating/burning: release of toxic and corrosive gases/vapours nitrous vapours, carbon monoxide -

#### 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:

- Prevent soil and water pollution
- Substance must not be discharged into the sewer
- Contain leaking substance, pump over in suitable containers
- Plug the leak, cut off the supply
- Dam up the liquid spill

#### 6.3 Clean-up:

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

### 7. Handling and storage

#### 7.1 Handling:

- Reduce/avoid exposure and/or contact
- Use earthed equipment
- Do not discharge the waste into the drain
- Avoid contact of substance with water
- Remove contaminated clothing immediately

#### 7.2 Storage:

- Keep container tightly closed
- Store in a dry area
- Ventilation at floor level
- Keep away from: heat sources, oxidizing agents, acids, halogens

Storage temperature: 20 °C

#### 7.3 Materials for packaging:

- suitable : steel, aluminium, glass
- to avoid : synthetic material, iron, copper, tin

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### 8. Exposure controls/Personal protection

#### 8.1 Recommended engineering controls:

- Measure the concentration in the air regularly
- Work under local exhaust/ventilation

#### Sampling methods:

N,N-Dimethylformamide (DMF) OSHA 66  
N,N-Dimethylformamide (DMF) NIOSH 2004

#### 8.2 Exposure limits:

TLV-TWA	:		mg/m <sup>3</sup>	10	ppm
TLV-STEL	:		mg/m <sup>3</sup>	-	ppm
OES-LTEL	:	30	mg/m <sup>3</sup>	10	ppm
OES-STEL	:	61	mg/m <sup>3</sup>	20	ppm
MAK	:	30	mg/m <sup>3</sup>	10	ppm
TRK	:		mg/m <sup>3</sup>		ppm
MAC-TGG 8h	:	15	mg/m <sup>3</sup>		
MAC-TGG 15 min.	:		mg/m <sup>3</sup>		
VME-8h	:	30	mg/m <sup>3</sup>	10	ppm
VLE-15 min.	:	-	mg/m <sup>3</sup>	-	ppm
GWBB-8h	:	30	mg/m <sup>3</sup>	10	ppm
GWK-15 min.	:	-	mg/m <sup>3</sup>	-	ppm

#### 8.3 Personal protection:

##### eye protection:

- Safety glasses

##### hand protection:

- Gloves

##### skin protection:

- Protective clothing

##### materials for protective clothing:

- Butyl rubber
- Tetrafluoroethylene

##### 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	:	Unpleasant	
9.3 Colour	:	Colourless to light-yellow	
9.4 pH value	:	7/8	
9.5 Boiling point/boiling range	:	153	°C
9.6 Melting point/melting range	:	-61	°C
9.7 Flashpoint	:	58	°C
9.8 Auto-ignition point	:	440	°C
9.9 Explosion limits	:	2.2/16	vol% (°C)
9.10 Vapour pressure (at 20°C)	:	3.8	hPa
9.11 Relative density (at 20°C)	:	0.95	
9.12 Water solubility	:	COMPLETELY	g/100 ml
9.13 Soluble in	:	Ethanol, ether, acetone, aromatic hydrocarbons, chloroform	
9.14 Relative vapour density	:	2.5	
9.15 Saturation concentration	:	12	g/m <sup>3</sup>
9.16 Viscosity	:	0.0008	Pa.s

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### 10. Stability and reactivity

#### 10.1 Stability:

- Hygroscopic
- Unstable on exposure to moisture

#### 10.2 Reactivity/Hazardous decomposition products:

- Decomposes slowly on exposure to water (moisture): release of highly flammable gases/vapours (dimethylamine) and release of corrosive products (formic acid)
- On heating: release of highly flammable gases/vapours (dimethylamine)
- On heating/burning: release of toxic and corrosive gases/vapours (nitrous vapours, carbon monoxide, carbon dioxide)
- Violent to explosive reaction with many compounds e.g.: with (strong) oxidizers and with (some) halogens

#### 10.3 Conditions/materials to avoid:

- Heat sources, oxidizing agents, acids, halogens

### 11. Toxicological information

#### 11.1 Acute toxicity:

LD50 oral rat	: 2800	mg/kg
LD50 dermal rat	: N.D.	mg/kg
LD50 dermal rabbit	: N.D.	mg/kg
LC50 inhalation rat	: > 5.9	mg/l/4 h

#### 11.2 Chronic toxicity:

EC carc. cat.	: not listed
EC muta. cat.	: not listed
EC repr. cat.	: 2

Carcinogenicity (TLV)	: A4
Carcinogenicity (MAC)	: not listed
Carcinogenicity (VME)	: not listed
Carcinogenicity (MEL)	: not listed

Carcinogenicity (MAK)	: not listed
Mutagenicity (MAK)	: not listed
Teratogenicity (MAK)	: B

IARC classification : 2B

Obligatory medical control (ARAB-RGPT Art. 124):  
group: I number: 22.2

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

#### 11.4 Acute effects/symptoms:

##### AFTER INHALATION:

- Harmful by inhalation

##### EXPOSURE TO HIGH CONCENTRATIONS:

- Coughing
- Nausea
- Vomiting
- Abdominal pain
- Dizziness
- Excited/restless
- High arterial pressure
- Feeling of weakness
- Enlargement/affection of the liver
- Alcohol intolerance

##### AFTER SWALLOWING:

- Practically non-toxic if swallowed

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### AFTER SKIN CONTACT:

- Substance is absorbed through the skin
- Harmful in contact with skin
- Slightly irritant to skin
- Red skin
- Dry skin
- Symptoms similar to those listed under inhalation

### AFTER EYE CONTACT:

- Irritation of the eye tissue
- Conjunctivitis
- Inflammation/damage of the eye tissue

### 11.5 Chronic effects:

- No certainty about human carcinogenic properties
- Probably hazardous to the foetus

### ON CONTINUOUS/REPEATED EXPOSURE/CONTACT:

- Tingling/irritation of the skin
- Skin rash/inflammation
- Headache
- Gastrointestinal complaints
- Loss of appetite
- Risk of testicular tumors
- Possible premature birth
- Cardiac and blood circulation effects
- Promotes the clotting of blood

## 12. Ecological information

### 12.1 Mobility:

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

### 12.2 Biodegradation:

- soil:	T ½	: N.D.	days
	BOD <sub>5</sub>	: 0.9	g O <sub>2</sub> /g substance
	COD	: 0.3645	g O <sub>2</sub> /g substance

- water: - Readily biodegradable in water
- test: 100%, 21 days, OECD 301E

- 12.3 Bioaccumulation: - log P<sub>ow</sub> : -1.01/-0.13  
- BCF : 1.2 (ORYZIAS LATIPES)

### 12.4 Aquatic toxicity:

- LC50 (96 h) : 9800 mg/l (SALMO GAIRDNERI/ONCORHYNCHUS MYKISS)
- EC50 (48 h) : 4500 mg/l (DAPHNIA MAGNA)
- EC50 (96 h) : >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

## 13. Waste disposal considerations

### 13.1 Provisions relating to waste:

- EWC code (91/689/EC): 07 01 04
- Waste material code (Flanders): 001 015 034
- Waste code (Germany): 55311
- 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
- Do not discharge into surface water

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## N,N-DIMETHYLFORMAMIDE

### 14. Transport information

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- 14.1 Proper shipping name: UN 2265, N,N-dimethylformamide
- 14.2 Transport by road/rail (ADR/RID): class 3, 31c)  
Danger code: 30  
Danger labels on tanks : 3  
on packages : 3
- 14.3 Substance identification number (UN number): 2265  
Packing: III
- 14.4 Maritime transport (IMDG code): class 3.3 p. 3335  
EMS : 3-06  
MFAG : 321  
Marine pollutant : -
- 14.5 Inland navigation (ADNR): class 3, 31c)
- 14.6 Air freight (ICAO) : class 3  
Instruction "passenger" : 309/Y309  
Instruction "cargo" : 310
- 14.7 Other information: -

### 15. Regulatory information

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



Toxic

- R61 : May cause harm to the unborn child  
R20/21 : Also harmful by inhalation and in contact with skin  
R36 : Irritating to eyes
- S53 : Avoid exposure - obtain special instructions before use  
S45 : In case of accident or if you feel unwell, seek medical advice (show the label where possible)

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### 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

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