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# BUSULFAN CONCENTRATED INJECTION 60 MG/10 ML

## SECTION 1 – PRODUCT AND COMPANY IDENTIFICATION

**Product Name:** Busulfan Accord Concentrated Injection

60 mg/10 mL

Sponsor	Manufacturer
Accord Healthcare Pty Ltd	Intas Pharmaceuticals Ltd.
Level 24, 570 Bourke Street,	Plot No. 457, 458
Melbourne, VIC, 3000,	Village-Matoda,
Australia	Bavla Road, Ta. Sanand,
	Dist. Ahmedabad-382 210,
Telephone: 1800 222 673	Gujarat, India
(hours 8:30am – 4:30pm)	

# **SECTION 2 – HAZARD(S) IDENTIFICATION**

## **Classification of the Substance or Mixture:**

# **GHS – Classification:**

Serious Eye Damage/Eye Irritation
Germ Cell Mutagenicity
Reproductive Toxicity
Carcinogenicity
Category 1B
Category 1B



## **Label Elements:**

Signal Word: Danger

#### **Hazard Statements:**

H319 - Causes serious eye irritationH340 - May cause genetic defects

H350 - May cause cancer

H360FD - May damage fertility. May damage the unborn child

# **Precautionary Statements:**

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P201 - Obtain special instructions before use

P202 - Do not handle until all safety precautions have been read and understood

P264 - Wash hands thoroughly after handling

P280 - Wear protective gloves/protective clothing/eye protection/face protection

P308 + P313 - IF exposed or concerned: Get medical attention/advice P337 + P313 - If eye irritation persists: Get medical advice/attention

P405 - Store locked up

**Other Hazards:** An Occupational Exposure Value has been established for one or more of the ingredients (see Section 8).

**Note:** This document has been prepared in accordance with standards for workplace safety, which requires the inclusion of all known hazards of the product or its ingredients regardless of the potential risk. The precautionary statements and warning included may not apply in all cases. Your needs may vary depending upon the potential for exposure in your workplace.

## SECTION 3 – COMPOSITION / INFORMATION ON INGREDIENTS

Active: Busulfan.

**Inactive:** Dimethylacetamide, Macrogol 400.

Ingredient	CAS Number	EU EINECS/ELINCS List	GHS Classification	%
			Repr. 1B (H360FD)	
Busulfan	55-98-1	200-250-2	Carc. 1B (H350)	< 1
			Muta. 1B (H340)	
			Repr. 1B (H360D)	
N.N. Dimethylesetemide	127-19-5	204-826-4	Acute Tox. 4 (H312)	30 - 35
N,N- Dimethylacetamide	127-19-3	204-820-4	Acute Tox. 4 (H332)	30 - 33
			Eye Irrit. 2A (H319)	
Polyethylene glycol	25322-68-3	Not Listed	Not Listed	*

#### Additional Information:

Ingredient(s) indicated as hazardous have been assessed under standards for workplace safety.

For the full text of the CLP/GHS abbreviations mentioned in this Section, see Section 16

# **SECTION 4 - FIRST AID MEASURES**

## **Description of Necessary First Aid Measures:**

Eye Contact: Flush with water while holding eyelids open for at least 15 minutes. Seek medical attention immediately.

**Skin Contact:** Remove contaminated clothing. Flush area with large amounts of water. Use soap. Seek medical attention.

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**Ingestion:** Never give anything by mouth to an unconscious person. Wash out mouth with water. Do not induce vomiting unless directed by medical personnel. Seek medical attention immediately.

**Inhalation:** Remove to fresh air and keep patient at rest. Seek medical attention immediately.

Symptoms and Effects of Exposure: No data available.

Medical Conditions Aggravated by Exposure: None known.

Medical Attention and Special Treatment: None.

#### **SECTION 5 - FIRE FIGHTING MEASURES**

Suitable Extinguishing Media: Extinguish fires with CO2, extinguishing powder, foam, or water.

Special Hazards Arising from the Substance or Mixture: Formation of toxic gases is possible during heating or fire.

Special Protective Equipment and Precautions for Fire-Fighters: During all firefighting activities, wear appropriate protective equipment, including self-contained breathing apparatus.

Fire / Explosion Hazards: Fine particles (such as mists) may fuel fires/explosions.

#### SECTION 6 - ACCIDENTAL RELEASE MEASURES

**Personal Precautions, Protective Equipment and Emergency Procedures:** Personnel involved in clean-up should wear appropriate personal protective equipment (see Section 8). Minimize exposure.

**Environmental Precautions:** Place waste in an appropriately labeled, sealed container for disposal. Care should be taken to avoid environmental release.

Methods and Material for Containment and Cleaning Up: Contain the source of spill if it is safe to do so. Collect spill with absorbent material. Clean spill area thoroughly.

Additional Consideration for Large Spills: Non-essential personnel should be evacuated from affected area. Report emergency situations immediately. Clean up operations should only be undertaken by trained personnel.

#### SECTION 7 - HANDLING AND STORAGE

**Precautions for Safe Handling:** Avoid breathing vapor or mist. Avoid contact with eyes, skin and clothing. When handling, use appropriate personal protective equipment (see Section 8). Wash hands

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and any exposed skin after removal of PPE. Releases to the environment should be avoided. Review and implement appropriate technical and procedural waste water and waste disposal measures to prevent occupational exposure or environmental releases. Potential points of process emissions of this material to the atmosphere should be controlled with dust collectors, HEPA filtration systems or other equivalent controls.

Conditions for Safe Storage, Including any Incompatibilities: Store as directed by product packaging.

**Specific end use(s):** Pharmaceutical product used as Antineoplastic.

#### SECTION 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

# **Control Parameters – Exposure Standards, Biological Monitoring:**

N,N- Dimethylacetamide:

ACGIH Threshold Limit Value (TWA) 10 ppm

**ACGIH - Biological Exposure Limit** 30 mg/g creatinine

**ACGIH - Skin Absorption Designation** Skin - potential significant contribution to

overall exposure by the cutaneous route

Australia TWA 10 ppm

 $36 \text{ mg/m}^3$ 

: 10 ppm Austria OEL - MAKs

 $36 \text{ mg/m}^3$ 

10 ppm **Belgium OEL - TWA** 

 $36 \text{ mg/m}^3$ 

: 10 ppm **Bulgaria OEL - TWA** 

 $36 \text{ mg/m}^3$ Cyprus OEL - TWA

: 10 ppm

 $36 \text{ mg/m}^3$ Czech Republic OEL - TWA :  $30 \text{ mg/m}^3$ 

**Denmark OEL - TWA** : 10 ppm

 $36 \text{ mg/m}^3$ 

Estonia OEL - TWA 10 ppm

 $36 \text{ mg/m}^3$ 

Finland OEL - TWA : 10 ppm

 $36 \text{ mg/m}^3$ 

France OEL - TWA 2 ppm

 $7.2 \text{ mg/m}^3$ 

**Germany - TRGS 900 - TWAs** : 10 ppm

 $36 \text{ mg/m}^3$ 

Germany (DFG) - MAK 10 ppm

 $36 \text{ mg/m}^3$ 

**Germany - Biological Exposure Limit:** 30 mg/g

**Greece OEL - TWA** 10 ppm

 $36 \text{ mg/m}^3$ 

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**Hungary OEL - TWA**  $36 \text{ mg/m}^3$ Ireland OEL - TWAs 10 ppm

 $36 \text{ mg/m}^3$ 

**Italy OEL - TWA** 10 ppm

 $36 \text{ mg/m}^3$ 

Latvia OEL - TWA 10 ppm

 $36 \text{ mg/m}^3$ 10 ppm

 $36 \text{ mg/m}^3$ 

Lithuania OEL - TWA

**Luxembourg OEL - TWA** 10 ppm

 $36 \text{ mg/m}^3$ 

Malta OEL - TWA : 10 ppm

 $36 \text{ mg/m}^3$ 

 $36 \text{ mg/m}^3$ **Netherlands OEL - TWA OSHA - Final PELS - TWAs:** 10 ppm

 $35 \text{ mg/m}^3$ 

**OSHA - Final PELs - Skin Notations:** prevent or reduce skin absorption

**Poland OEL - TWA**  $35 \text{ mg/m}^3$ Portugal OEL - TWA 10 ppm

 $36 \text{ mg/m}^3$ 

Romania OEL - TWA 10 ppm

 $36 \text{ mg/m}^3$ 

**Romania - Biological Exposure Limit:** 30 μg/g Creatinine

Russia OEL - TWA  $1 \text{ mg/m}^3$ Slovakia OEL - TWA 10 ppm

 $36 \text{ mg/m}^3$ 

Slovenia OEL - TWA 10 ppm

 $36 \text{ mg/m}^3$ 

Spain OEL - TWA 10 ppm

 $36 \text{ mg/m}^3$ 

30 mg/g Creatinine **Spain - Biological Exposure Limit:** 

Sweden OEL - TWAs 10 ppm  $35 \text{ mg/m}^3$ **Switzerland OEL -TWAs** 10 ppm

 $35 \text{ mg/m}^3$ 

100 mmol/mol creatinine **UK - Biological Exposure Limit:** 

Polyethylene glycol:

**Austria OEL - MAKs**  $1000 \text{ mg/m}^3$  $1000 \text{ mg/m}^3$ **Germany - TRGS 900 - TWAs** 

1000 mg/m<sup>3</sup> average molecular weight 200-600 Germany (DFG) - MAK

Slovakia OEL - TWA  $1000 \text{ mg/m}^3$  $1000 \text{ mg/m}^3$ Slovenia OEL - TWA  $1000 \text{ mg/m}^3$ **Switzerland OEL -TWAs** 

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**Appropriate Engineering Controls:** Engineering controls should be used as the primary means to control exposures. General room ventilation is adequate unless the process generates dust, mist or fumes. Keep airborne contamination levels below the exposure limits listed above in this section.

**Personal Protective Equipment:** Refer to applicable national standards and regulations in the selection and use of personal protective equipment (PPE). Contact your safety and health professional or safety equipment supplier for assistance in selecting the correct protective clothing/equipment based on an assessment of the workplace conditions, other chemicals used or present in the workplace and specific operational processes.

**Hands:** Impervious gloves (e.g. Nitrile, etc.) are recommended if skin contact with drug product is possible and for bulk processing operations. (Protective gloves must meet the standards in accordance with EN374, ASTM F1001 or international equivalent.)

**Eyes:** Wear safety glasses or goggles if eye contact is possible. (Eye protection must meet the standards in accordance with EN166, ANSI Z87.1 or international equivalent.)

**Skin:** Impervious protective clothing is recommended if skin contact with drug product is possible and for bulk processing operations. (Protective clothing must meet the standards in accordance with EN13982, ANSI 103 or international equivalent.)

**Respiratory protection:** Under normal conditions of use, if the applicable Occupational Exposure Limit (OEL) is exceeded, wear an appropriate respirator with a protection factor sufficient to control exposures to below the OEL (e.g. particulate respirator with a half mask, P3 filter). (Respirators must meet the standards in accordance with EN140, EN143, ASTM F2704-10 or international equivalent.)

#### **SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES**

**Appearance** : Solution

Colour Clear, colourless No data available Odour **Odour Threshold** No data available **Solvent Solubility** No data available Water Solubility No data available No data available рH **Melting/Freezing Point (°C)** No data available **Boiling Point and boiling range (°C)** No data available

Partition Coefficient (*n-octanol/water*)

N,N- Dimethylacetamide No data available Polyethylene glycol No data available Busulfan No data available **Decomposition Temperature (°C)** No data available **Evaporation Rate (Gram/s)** No data available Vapour Pressure (kPa) No data available Vapour Density (g/ml) No data available **Relative Density** No data available

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Viscosity
Auto-ignition Temperature (Solid) (°C)
: No data available
Flammability (Solids)
: No data available
Flash Point (Liquid) (°C)
: No data available
Upper Flammability or Explosive Limits
: No data available

(Liquid) (% by Vol.)

**Lower Flammability or Explosive Limits** 

(Liquid) (% by Vol.)

: No data available

#### **SECTION 10 - STABILITY AND REACTIVITY**

Reactivity: No data available.

Chemical Stability: Stable under normal conditions of use.

Conditions to Avoid: Fine particles (such as mists) may fuel fires/explosions.

**Incompatible Materials and Possible Hazardous Reactions:** As a precautionary measure, keep away from strong oxidizers.

Hazardous Decomposition Products: No data available.

#### SECTION 11 – TOXICOLOGICAL INFORMATION

The information included in this section describes the potential hazards of the active ingredient.

**Information on Toxicological Effects:** Common adverse effects include seizure myelosuppression, cardiac tamponade, pulmonary dysfunction, fever, headache, loss of strength/exhaustion (prostration), increased heart rate (tachycardia), increase in blood pressure (hypertension), nausea, inflammation of the mouth (stomatitis), vomiting, loss of appetite (anorexia), insomnia, diarrhea, and anxiety. May cause adverse effects on the developing fetus.

## **Acute Toxicity:**

# N,N- Dimethylacetamide:

1 1/3 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				
Species	Route	End Point	Dose	
Rabbit	Dermal	LD 50	2240 mg/kg	
Rat	Inhalation	LC50 1H	8.81 mg/L	

#### **Irritation / Sensitization:**

#### Polyethylene glycol:

Study Type	Species	Severity
Eye Irritation	Rabbit	Mild
Skin Irritation	Rabbit	Mild

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# **Reproduction & Development Toxicity:**

#### Busulfan:

Duration	Species	Route	Dose	End Point	Effect(s)
Embryo / Fetal	Rat	Oral	48 mg/kg/day	LOAEL	Teratogenic, Early
Development					embryonic development
Reproductive &	Rat	Oral	49 mg/kg/day	LOAEL	Fertility
Fertility					
Embryo / Fetal	Rabbit	Oral	32 mg/kg/day	LOAEL	Teratogenic, Fetotoxicity,
Development					Early embryonic
					development
Embryo / Fetal	Mouse	Oral	40 mg/kg/day	LOAEL	Teratogenic, Fetotoxicity,
Development					Early embryonic
					development

# **Genetic Toxicity:**

## Busulfan:

Study Type	Cell Type/Organism	Result
In Vivo Chromosome Aberration	Rat	Positive
Bacterial Mutagenicity (Ames)	Salmonella	Positive
In Vivo Direct DNA Damage	Rat Hepatocyte	Positive
Sister Chromatid Exchange	Human Lymphocytes	Positive
Unscheduled DNA Synthesis	Mouse	Positive

Carcinogen Status: See below.

Busulfan:

LARC: Group 1 (Carcinogenic to Humans)

NTP: Known Human Carcinogen

## **SECTION 12 – ECOLOGICAL INFORMATION**

**Environmental Overview:** The environmental characteristics of this material have not been fully evaluated. Releases to the environment should be avoided.

Ecotoxicity: No data available.

Persistence and Degradability: No data available.

Bio-accumulative Potential: No data available.

Mobility in Soil: No data available.

# **SECTION 13 - DISPOSAL CONSIDERATIONS**

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Waste Treatment Methods: Dispose of waste in accordance with all applicable laws and regulations. Member State specific and Community specific provisions must be considered. Considering the relevant known environmental and human health hazards of the material, review and implement appropriate technical and procedural waste water and waste disposal measures to prevent occupational exposure and environmental release. It is recommended that waste minimization be practiced. The best available technology should be utilized to prevent environmental releases. This may include destructive techniques for waste and wastewater.

#### SECTION 14 - TRANSPORTATION INFORMATION

The following refers to all modes of transportation unless specified below.

Not regulated for transport under USDOT, EUADR, IATA, or IMDG regulations.

## SECTION 15 - REGULATORY INFORMATION

Safety, Health and Environmental Regulations/Legislation Specific for the Substance or Mixture

Busulfan:

**CERCLA/SARA 313 Emission reporting** : Not Listed

California Proposition 65 : carcinogen 2/27/1987

developmental toxicity

1/1/1989 : Schedule 4

Standard for the Uniform Scheduling for Drugs and Poisons

**EU EINECS/ELINCS List** : 200-250-2

**Australia (AICS)** : Present

N,N- Dimethylacetamide:

**CERCLA/SARA 313 Emission reporting** : Not Listed

California Proposition 65 : Developmental toxicity

5/21/2010

male reproductive toxicity

5/21/10

: Schedule 5 Standard for the Uniform Scheduling for Drugs and Poisons

Schedule 6

**EU EINECS/ELINCS List** : 204-826-4 : Present

**Australia (AICS)** : Present **Inventory - United States TSCA - Sect. 8(b)** 

**REACH - Annex XVII - Restrictions on Certain Dangerous** : Use restricted.

**Substances** See item 30.

**REACH - Toxic to Reproduction Category 2** : Present

Polyethylene glycol:

**CERCLA/SARA 313 Emission reporting** : Not Listed California Proposition 65 : Not Listed

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**Standard for the Uniform Scheduling for Drugs and Poisons**: Schedule 2

Schedule 3

EU EINECS/ELINCS List
Australia (AICS)
: Not Listed
: Present

Inventory - United States TSCA - Sect. 8(b) : Present

## **SECTION 16 - OTHER INFORMATION**

# Full text of H phrases and GHS classifications:

ATO4 - Acute Toxicity (Oral) Category 4.
Carc1B - Carcinogenicity Category 1B.

STOT-R1 - Specific Target Organ Toxicity Following Repeat Exposure Category 1.

RT1B - Reproductive toxicity Category 1B.
 GCM2 - Germ Cell Mutagenicity Category 2.
 AA1 - Acute aquatic toxicity Category 1.
 CA1 - Chronic Aquatic Toxicity Category 1.

H302 - Harmful if swallowed.

H341 - Suspected of causing genetic defects.

H350 - May cause cancer.

H360FD - May damage fertility. May damage the unborn child.

H372 - Causes damage to hematological and gastrointestinal systems through prolonged

or repeated exposure.

H400 - Very toxic to aquatic life.

H410 - Very toxic to aquatic life with long lasting effects.

## **Abbreviations:**

ACGIH : American Conference of Governmental Industrial Hygienists

AICS : Australian Inventory of Chemical Substances
AIHA : American Industrial Hygiene Association
ANSI : American National Standards Institute

CAS : Number Chemical Abstract Service Registry Number

CERCLA : Comprehensive Environmental Response Compensation and Liability Act

CHAN : Chemical Hazard Alert Notice

CHEMTREC : Chemical Transportation Emergency Center

DOT : Department of Transportation
DSL : Domestic Substances List
ECHA : European Chemicals Agency

EINECS : European Inventory of Existing Commercial Chemical Substances

ELINCS : European List of Notified Chemical Substances

EPA : Environmental Protection Agency

GHS : Globally Harmonized System of Classification and Labelling of Chemicals

HEPA : High Efficiency Particulate Air (Filter)
HMIS : Hazardous Materials Identification System
IARC : International Agency for Research on Cancer

ICAO/IATA : International Civil Aviation Organization/International Air Transport

IMO : International Maritime Organization

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KOW : Octanol/Water Partition Coefficient

LEL : Lower Explosive Limit
MSDS : Material Safety Data Sheet

MSHA : Mine Safety and Health Administration

NA : Not Applicable, except in Section 14 where NA = North America

NE : Not Established

NADA : New Animal Drug Application NAIF : No Applicable Information Found

NCI : National Cancer Institute
NDSL : Non-Domestic Substances List
NFPA : National Fire Protection Association

NIOSH : National Institute for Occupational Safety and Health NPDES : National Pollutant Discharge Elimination System

NOS : Not Otherwise Specified NTP : National Toxicology Program

OSHA : Occupational Safety and Health Administration

OEL : Occupational Exposure Limit

PEL : Permissible Exposure Limit (OSHA)
RCRA : Resource Conservation and Recovery Act

RQ : Reportable Quantity

RTECS : Registry of Toxic Effects of Chemical Substances SARA : Superfund Amendments and Reauthorization Act

SDS : Safety Data Sheet

STEL : Short Term Exposure Limit
 TLV : Threshold Limit Value (ACGIH)
 TPQ : Threshold Planning Quantity
 TSCA : Toxic Substances Control Act

TWA : Time Weighted Average/8 Hours Unless Otherwise Noted

UEL : Upper Explosive Limit

UN : United Nations

USP : United States Pharmacopeia

WEEL : Workplace Environmental Exposure Level (AIHA)
WHMIS : Workplace Hazardous Materials Information System

**Data Sources:** Information from published literature.

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