

# ACRYLONITRILE

## BASELINE HEALTH MONITORING BEFORE STARTING WORK IN AN ACRYLONITRILE PROCESS

1. **Collection of demographic data**
2. **Work history**
3. **Medical history**
4. **Physical examination**

A physical examination will be conducted with emphasis on the central nervous system (CNS), respiratory system and skin, only if work and medical history indicates this is necessary, for example the presence of symptoms.

## DURING EXPOSURE TO AN ACRYLONITRILE PROCESS

5. **Medical examination**

Where workers are excessively exposed to acrylonitrile, for example following spills or loss of containment, are suspected of being excessively exposed to acrylonitrile, or have concerns about acrylonitrile exposure, for example where relevant symptoms are identified, the person conducting a business or undertaking should arrange an appointment with the registered medical practitioner.

## AT TERMINATION OF WORK IN AN ACRYLONITRILE PROCESS

6. **Final medical examination**

A final medical examination will be conducted, with emphasis on CNS, respiratory system and skin.

## SUPPLEMENTARY INFORMATION ON ACRYLONITRILE

7. **Work activities that may represent a high risk exposure**

The major uses of acrylonitrile are in the manufacture of polymers, resins, plastics and nitrile rubbers.

Examples of work activities involving acrylonitrile which require special attention when assessing exposure include acrylic fibre production—especially in procedures where solvent is removed from newly-formed fibres.

Special attention should also be given to acute exposures that may occur in the above process.

## 8. Non-work sources

There are a number of potential sources of non-work-related exposure to acrylonitrile. These include:

- previously used as a fumigant
- acrylonitrile can be found in car exhaust
- present in cigarette smoke
- food may contain acrylonitrile as a result of migration from food containers.

Consumer exposure to acrylonitrile from skin contact with acrylic fibres and from ingestion of foods contaminated with residual acrylonitrile in packaging materials is estimated at a maximum of 2.2 and 33 ng/kg/day respectively [1].

## 9. Route of entry into the body

The primary route of acrylonitrile entry into the body is through inhalation, with an average respiratory retention of 52 per cent. Acrylonitrile can also be absorbed percutaneously in quantities sufficient to cause health effects.

## 10. Target organ/effect

**Central nervous system** – headache, dizziness, general weakness.

**Liver** – hepatocellular damage.

**Skin** – irritation, burns, blisters, sensitisation.

**Respiratory tract** – irritation.

**Eyes** – irritation.

**Carcinogen** – GHS Carcinogenicity Category 1B (May cause cancer), multiple sites.

## 11. Acute effects

Acute overexposure can cause rapid onset of eye, nose, throat and airway irritation, headache, sneezing, nausea and vomiting. Weakness and light-headedness may also occur.

Acrylonitrile is a cellular asphyxiant with actions similar to cyanide, causing symptoms like profound weakness, headache, nausea, shortness of breath, dizziness, collapse, convulsions, asphyxia and death.

Prolonged skin contact with the liquid may result in absorption with systemic effects and the formation of large blisters after a latent period of several hours.

## 12. Chronic effects

Repeated spills on exposed skin may result in dermatitis or can act as a skin sensitiser. Chronic inhalation may cause headache, insomnia, irritability, nose bleeds, respiratory difficulties and abnormal liver function.

## 13. Carcinogenicity

Acrylonitrile has been shown to cause cancer in laboratory animals. Some studies of workers potentially exposed to acrylonitrile have demonstrated an increased incidence of cancer of the lung, gastrointestinal tract and prostate.

#### 14. Carcinogen classification<sup>1</sup>

Acrylonitrile is classified according to the GHS as Carcinogenicity Category 1B (May cause cancer).

#### REFERENCED DOCUMENTS

1. National Industrial Chemicals Notification and Assessment Scheme, *Acrylonitrile, Priority Existing Chemical Assessment Report No. 10*, Feb 2000.

#### FURTHER READING

Agency for Toxic Substances and Disease Registry, *Medical Management Guidelines for Acrylonitrile*. <http://www.atsdr.cdc.gov/MMG/MMG.asp?id=443&tid=78>

Australian Chemical Industry Council, *Code of Practice on the Safe Handling of Acrylonitrile*, Australian Chemical Industry Council, Melbourne, 1992.

International Agency for Research on Cancer, *IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, Volume 71: Re-evaluation of Some Organic Chemicals, Hydrazine and Hydrogen Peroxide*, International Agency for Research on Cancer, Lyon, 1999.

International Programme on Chemical Safety, *Environmental Health Criteria 28: Acrylonitrile*, International Programme on Chemical Safety, World Health Organization, Geneva, 1983.

Lauwerys RR, Hoet P, *Industrial Chemical Exposure Guidelines for Biological Monitoring*, 3<sup>rd</sup> Ed, Lewis Publishers, Boca Raton, 2001.

National Toxicology Program, *Acrylonitrile*, in 12th Report on Carcinogens, United States Department of Health and Human Services, Public Health Service, 2011.

World Health Organisation/International Program on Chemical Safety, *Concise International Chemical Assessment Document 39: Acrylonitrile*, WHO, Geneva, 2002.

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- 1 This classification information is provided on an advisory basis and is taken from the European Union's Annex VI to Regulation (EC) No 1272/2008, updated by the 1st Adaption to Technical Progress to the Regulation. Other hazard classes and categories may apply - see <http://esis.jrc.ec.europa.eu/index.php?PGM=cla>. These classifications are legally binding within the European Union.

## HEALTH MONITORING REPORT ACRYLONITRILE

This health monitoring report is a **confidential** health record and must not be disclosed to another person except in accordance with the Work Health and Safety Regulations or with the consent of the worker.

There are two sections. Complete both sections and all questions if applicable.

**Section 1** is to be forwarded to the PCBU who has engaged your services.

**Section 2** may contain confidential information which may not be relevant to the health monitoring program being carried out. This section should be retained by the medical practitioner. Information which is required to be given to the PCBU should be summarised in part 7 of section 1.

<b>SECTION 1 - THIS SECTION TO BE RETURNED TO THE PCBU</b>			
<b>1. PERSON CONDUCTING A BUSINESS OR UNDERTAKING</b>			
Company / Organisation name:			
Site address:			
Suburb:			Postcode:
Site Tel:	Site Fax:	Contact Name:	
<b>2. OTHER BUSINESSES OR UNDERTAKINGS ENGAGING THE WORKER</b>			
Company / Organisation name:			
Site address:			
Suburb:			Postcode:
Site Tel:	Site Fax:	Contact Name:	
<b>3. WORKER</b> <span style="float: right;">(✓) all relevant boxes</span>			
Surname:		Given names:	
Date of birth: DD/MM/YYYY		Sex: <input type="checkbox"/> Male <input type="checkbox"/> Female	
Address:			
Suburb:			Postcode:
Current Job:		Tel(H):	Mob:
Date started employment : DD/MM/YYYY			
<b>4. EMPLOYMENT IN ACRYLONITRILE RISK WORK</b> <span style="float: right;">(✓) all relevant boxes</span>			
1. <input type="checkbox"/> New to acrylonitrile work			
2. <input type="checkbox"/> New worker but not new to acrylonitrile work			
3. <input type="checkbox"/> Current worker continuing in acrylonitrile work			
4. Worked with acrylonitrile since DD/MM/YYYY			
5. Satisfactory personal hygiene (for example nail biting, frequency of hand washing)		<input type="checkbox"/> Yes	<input type="checkbox"/> No
6. Risk assessment completed		<input type="checkbox"/> Yes	<input type="checkbox"/> No

## HEALTH MONITORING REPORT ACRYLONITRILE

<b>5. WORK ENVIRONMENT ASSESSMENT</b>		(✓) all relevant boxes
Date of assessment: DD/MM/YYYY		
<b>Acrylonitrile Industry</b>		
<input type="checkbox"/> Production <input type="checkbox"/> Automotive <input type="checkbox"/> Other (specify):	<b>Controls:</b> Wear gloves <span style="margin-left: 100px;"><input type="checkbox"/> Yes</span> <span style="margin-left: 100px;"><input type="checkbox"/> No</span> Respirator use <span style="margin-left: 100px;"><input type="checkbox"/> Yes</span> <span style="margin-left: 100px;"><input type="checkbox"/> No</span> Local exhaust ventilation <span style="margin-left: 100px;"><input type="checkbox"/> Yes</span> <span style="margin-left: 100px;"><input type="checkbox"/> No</span> Overalls / work clothing <span style="margin-left: 100px;"><input type="checkbox"/> Yes</span> <span style="margin-left: 100px;"><input type="checkbox"/> No</span> Laundering by employer <span style="margin-left: 100px;"><input type="checkbox"/> Yes</span> <span style="margin-left: 100px;"><input type="checkbox"/> No</span> Wash basins & showers (with hot & cold water) <span style="margin-left: 100px;"><input type="checkbox"/> Yes</span> <span style="margin-left: 100px;"><input type="checkbox"/> No</span> Smoking or eating in workshop <span style="margin-left: 100px;"><input type="checkbox"/> Yes</span> <span style="margin-left: 100px;"><input type="checkbox"/> No</span>	
	<b>Personal hygiene:</b> Clean Shaven <span style="margin-left: 100px;"><input type="checkbox"/> Yes</span> <span style="margin-left: 100px;"><input type="checkbox"/> No</span> Shower & change into clean clothes at end of shift <span style="margin-left: 100px;"><input type="checkbox"/> Yes</span> <span style="margin-left: 100px;"><input type="checkbox"/> No</span>	
<b>6. BIOLOGICAL MONITORING RESULTS</b> Include at least the previous two test results (if available)		
Date	Tests performed	Recommended Action and/or Comment
1. DD/MM/YYYY		
2. DD/MM/YYYY		
3. DD/MM/YYYY		
4. DD/MM YYYY		
5. DD/MM/YYYY		
6. DD/MM/YYYY		
7. DD/MM YYYY		
8. DD/MM/YYYY		

## HEALTH MONITORING REPORT ACRYLONITRILE

<b>7. RECOMMENDATIONS</b> (by Medical Practitioner)      (✓) all relevant boxes		
1. <input type="checkbox"/>	Suitable for work with acrylonitrile	
2. <input type="checkbox"/>	Counselling required	
3. <input type="checkbox"/>	Review workplace controls	
4. <input type="checkbox"/>	Repeat health assessment in      month(s)/      week(s)	
5. <input type="checkbox"/>	Removal from work with acrylonitrile      On DD/MM/YYYY	
6. <input type="checkbox"/>	Medical examination by Medical Practitioner      On DD/MM/YYYY	
7. <input type="checkbox"/>	Fit to resume work      From DD/MM/YYYY	
8. <input type="checkbox"/>	Referred to Medical Specialist (respiratory/dermatology/other): On DD/MM/YYYY	
Specialist's name:		
<b>Additional comments or recommendations arising from health monitoring:</b>		
<b>Medical Practitioner</b> (responsible for supervising health monitoring)		
Name:	Signature	Date: DD/MM/YYYY
Tel:	Fax:	Registration Number:
Medical Practice:		
Address:		
Suburb:	Postcode:	

## HEALTH MONITORING REPORT ACRYLONITRILE

SECTION 2 - THIS SECTION TO BE RETAINED BY THE MEDICAL PRACTITIONER			
1. PERSON CONDUCTING A BUSINESS OR UNDERTAKING			
Company / Organisation name:			
Site address:			
Suburb:			Postcode:
Site Tel:	Site Fax:	Contact Name:	
2. OTHER BUSINESSES OR UNDERTAKINGS ENGAGING THE WORKER			
Company / Organisation name:			
Site address:			
Suburb:			Postcode:
Site Tel:	Site Fax:	Contact Name:	
3. WORKER <span style="float: right;">(✓) all relevant boxes</span>			
Surname:		Given names:	
Date of birth: DD/MM/YYYY	Sex:	<input type="checkbox"/> Male	<input type="checkbox"/> Female
		<input type="checkbox"/> Pregnant/Breast Feeding?	
Address:			
Suburb:			Postcode:
Current Job:	Tel(H):	Mob:	
Date started employment : DD/MM/YYYY			
4. GENERAL HEALTH ASSESSMENT (if applicable)			
Symptoms of:	Comments	Further testing?	
Skin disorders		<input type="checkbox"/> Yes	<input type="checkbox"/> No
Headaches, dizziness		<input type="checkbox"/> Yes	<input type="checkbox"/> No
Respiratory disorders		<input type="checkbox"/> Yes	<input type="checkbox"/> No
Irritation of eyes, nose or throat		<input type="checkbox"/> Yes	<input type="checkbox"/> No
CNS		<input type="checkbox"/> Yes	<input type="checkbox"/> No
Others:		<input type="checkbox"/> Yes	<input type="checkbox"/> No

**HEALTH MONITORING REPORT ACRYLONITRILE**

Height _____cm Weight _____kg Bp ____/____ mmHg		<input type="checkbox"/> Yes <input type="checkbox"/> No
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**5. OTHER MEDICAL HISTORY, FAMILY MEDICAL HISTORY, CURRENT MEDICATION, COMMENTS, TESTS OR RECOMMENDATIONS** (use separate sheet if necessary)

**Medical Practitioner** (responsible for supervising health monitoring)

Name:		Signature		Date: DD/MM/YYYY
Tel:	Fax:	Registration Number:		
Medical Practice:				
Address:				
Suburb:			Postcode:	