MATERIALS SAFETY DATA SHEET (MSDS) *Ethanol (C_2H_5OH)*		
	MSDS Number	NCP/P/1
	Version number	Version No: 8.0
	Date issued	8th April 2020
	Next Review date	April 2022
	Page No.	Page **1** of **11**

COMPANY DETAILS

Name :	NCP Alcohols	**Emergency telephone No.**:	+27 (31) 579 2004
Address :	121 Sea Cow lake Road, Durban, 4001, South Africa	**Telephone** :	+27 (31) 560 1111
		Fax :	+27 (31) 579 1541

1. Product and Company Identification

(Page 1 may be used as an emergency safety data sheet)

Trade name	: Ethanol (Industrial, Absolute or Anhydrous, Light Spirits, Extra Neutral Potable, Neutral Potable, Rectified Extra Neutral and High Purity Extra Neutral Potable Alcohol)	Chemical abstract No. Molecular Mass	: 64-17-5 : 46,08
Chemical family	: Aliphatic Alcohol	NIOSH No.	: KQ 6300000
Chemical name	: Ethanol	Hazchem code	: 2(S) E; 3(S) E
Synonyms	: Ethyl Alcohol, See Trade name	UN No.	: 1170

2. Composition:

Hazardous components	: Ethyl Alcohol (75.0 -99.9%$^{v}/_{v}$)
EEC classification	: 200 – 578 – 6 [30]
R Phrases	: R11 (Highly Flammable)

3. Hazards Identification:

3.1 Classification of the substance:

EU-GHS / CLP

Hazard Class and Category Code(s)	Flammable liquid Serious eye Irritation	Flam. Liq. 2 Eye Irrit. 2

EU-DSD / DPD

Indication(s) of danger and R phrase(s)	Highly flammable	R11

3.2 Label elements EU-GHS / CLP

Hazard pictogram(s)/*Symbols*

Signal word	Danger
Hazard statement(s)	
H225	Highly flammable liquid and vapour.
H319	Causes serious eye irritation.
Precautionary statements	
P210	Keep away from heat / sparks / open flames / hot surfaces – No smoking.
P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical / ventilating / lighting equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P280	Wear protective gloves / protective clothing /eye protection.
P264	Wash skin thoroughly after handling.
P303+ P361+P353	If on skin or hair remove/ take off immediately all contaminated clothing. Rinse skin with water.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337+P313	If eye irritation persists: Get medical advice/attention.
P370 + P378	In case of fire: Use powder, alcohol-resistant foam, lots of water, carbon dioxide for extinction.
P403 + P235	Store in a well-ventilated place. Keep cool.
P501	Disposal: Dispose of contents / container to a specialised waste disposal plant in accordance with local / regional regulations.

Main Hazard : Harmful if swallowed or inhaled. Possible aspiration hazard if swallowed (can enter lungs and cause damage). May be irritating to the skin, eyes and respiratory tract. Over exposure may cause CNS depression. Possible reproductive hazard.

Flammability : Flash Point 12°C. Extremely flammable liquid (R11). Ignition temperature 425°C.

Chemical Hazard : Ethanol is a flammable liquid whose vapours can form ignitable and explosive mixtures with air at normal room temperatures. Thus, an aqueous mixture containing 30% ethanol can produce a flammable mixture of vapour and air at 29°C, and even one containing only 5% alcohol can produce a flammable mixture at 62°C.[1] Ethanol reacts vigorously with a wide range of oxidizing materials and other chemicals[2] .e.g. Disulphuryl Difluoride, Silver Nitrate, Bromine Pentafluoride, Potassium Perchlorate, Nitrosyl Perchlorate, Chromyl Chloride, Chloryl Perchloride, Uranyl Perchlorite, Chromium Trioxide, Fluorine Nitrate, Dioxygen Difluoride, Uranium Hexafluoride, Iodine Heptafluoride, Tetra chlorosilane, Permanganic acid, Nitric acid [the nitric acid fizz reaction used formally for cleaning laboratory glassware should not be used[3,5]], Hydrogen Peroxide, Peroxodisulphuric acid, Potassium Dioxide, Sodium Peroxide, Potassium Permanganate, Ruthenium (VIII) Oxide, Platinum, Potassium[6], Potassium *tert* – Butoxide, Silver Oxide and Sodium[7].

Biological Hazard : Ethanol is rapidly oxidized in the body to acetaldehyde, then to acetate, and finally to carbon dioxide and water; un-oxidized alcohol is excreted in the urine and expired in the air. [8,9]

Reproductive hazard : Some evidence of foetotoxicity[26-28] and teratogenicity[29] has been observed in experimental animals treated with high doses of ethanol during gestation. Alcohol may induce spontaneous abortions, may impair fertility, may cause harm to the unborn child and may cause harm to breast fed babies. The reproductive hazards have been determined after repeated excessive consumption of ethanol; these effects are not likely to occur through exposure below the Occupational Exposure Limits in the working environment.

Health effects – eyes : Moderately irritating. Exposure to liquid, vapours, fumes or mist may cause irritation. Direct contact may cause irritation, redness, pain, corneal inflammation and possible corneal damage.

Health effects – skin : Repeated or prolonged contact may result in defatting, redness, pain, itching, inflammation, cracking and possible secondary infection. Repeated skin contact may result in allergic skin reaction in a very small proportion of individuals.

Health effects – ingestion : Large doses lead to alcohol poisoning while repeated ingestion can lead to alcoholism. Alcohol abuse and dependence can have a profound effect on work performance and tendency to accidents at work.[11-13] The presence of denaturants, e.g. Methanol, pyridines, and benzene in industrial alcohol greatly increase the toxicity on ingestion. Ethanol drinking is also suspected of increasing the toxic effect of other chemicals encountered in the laboratory and the workplace by inhibition of their metabolism or excretion[14]; e.g. 1, 1, 1–Trichloroethane[15], Xylene, Trichloroethylene and Dimethylformamide[16], Benzene[17] and Lead.[18, 19] May cause harmful central nervous system effects. Effects may include excitation, euphoria, headache, dizziness, drowsiness, blurred vision, fatigue, tremors, convulsions, loss of consciousness, coma, respiratory arrest and death. Severe acute intoxication may cause Hypoglycaemia, Hypothermia and extensor rigidity. Prolonged or frequent contact may result in liver injury.

Health effects – inhalation : Intoxicating if continuously inhaled for a long period of time. Occupational Exposure Limits (8-hour reference period) 1000ppm (1900mg/m^3).[30] May cause respiratory tract irritation.

Carcinogenicity : Long-term consumption of alcoholic beverages demonstrates an increase in the occurrence of breast cancer and colorectal cancer. Malignant tumours of the oral cavity, Pharynx, Larynx, Oesophagus and Liver is also causally related to the consumption of alcoholic beverages.[31] Some studies[20, 21] have shown an excess incidence of laryngeal cancer over the expected from exposure to synthetic alcohol, with Diethyl Sulphate probably being the causative agent.

Mutagenicity : Ethanol has been found to be non- mutagenic in the *Salmonella* microsome test, [22] but some transient mutagenic changes have been observed in male, but not female, mice treated with rather large doses.[23-25] Ethanol is mutagenic in man via its first metabolite, Acetaldehyde. Acetaldehyde induces chromosomal aberrations, sister-chromatid exchanges and cross-links between DNA strands.[32]

Neurotoxicity : Over exposure may cause Central Nervous System (CNS) depression.

4. First – aid Measures:

Product in eye : Flush immediately with water or neutral saline solution for at least 15 minutes. Seek medical attention.

Product on skin : Remove contaminated clothing and rinse contaminated area with soap and water. If skin irritation persists, seek medical attention.

Product ingested : If victim is conscious, give 1-3 glasses of water or milk to dilute stomach contents. If spontaneous vomiting occurs, or when vomiting is induced, monitor for breathing difficulty. Do not make an unconscious or semi – conscious person vomit. Keep affected person warm at rest. Get medical attention for substantial ingestions and/or gastrointestinal symptoms.

Product inhaled : Remove the victim to fresh air. If not breathing, ensure open airway and institute cardiopulmonary resuscitation (CPR). If breathing is weak, irregular or has stopped apply artificial respiration. Oxygen may be beneficial. Keep affected person warm and at rest. Get immediate medical attention.

5. Fire – fighting Measures:

Extinguishing media : Use dry chemical, alcohol foam or carbon dioxide to extinguish fire. Water may be ineffective but should be used to cool fire- exposed containers, structures and to protect personnel. If leak or spill has not ignited, ventilate area and use water spray to disperse gas or vapour and to protect personnel attempting to stop a leak. Use water to dilute spills and to flush them away from sources of ignition. Do not flush down public sewers or other drainage systems.

Special hazards : Flammable

Flash point : 12°C - *17°C*

Flammability/explosion limits : 3, 3 – *20%v/v*

Dangerous when exposed to heat or flame. Vapours form flammable or explosive mixtures with air at room temperature. Vapour or gas may spread to distant ignition sources and flash back. Run – off to sewer may cause fire or explosion hazard. Containers may explode in heat of fire. Vapours may concentrate in confined areas. Irritating or toxic substances may be emitted upon thermal decomposition. Hazardous composition products such as carbon oxides may form.

Protective clothing : Exposed fire fighters should wear approved self-contained breathing apparatus with full face mask and full protective equipment.

6. Accidental Release Measures:

Personal precautions : Protective clothing should be worn to prevent excessive skin contact.

Environmental precautions : Prevent liquid entering sewers. Do not allow to enter surface waters, storm drains, etc.

Small spills : Take immediate steps to stop and contain the spill. Caution should be excised regarding personnel safety and exposure to be spilled material. Eliminate all sources of ignition and wear protective clothing. Absorb small spills onto paper towels and evaporate in a safe place e.g. in a fume hood. Flush the contaminated area with plenty of water.

Large spills : Stop leak if you can do it without risk. Contact your local fire department. Eliminate all sources of ignition and static; restrict access to area until completion of clean-up procedure. Wear adequate protective equipment, use self-contained breathing apparatus in confined poorly ventilated areas. Large quantities should be absorbed on to sand, vermiculite or an equivalent absorbent material and removed to a safe area for disposal. Flush the contaminated area with plenty of water. Incineration is the recommended method of disposal.

7. Handling and Storage:

Suitable material : Ethanol is not corrosive to metals and may be stored in stainless steel, mild steel or aluminium containers. Ethanol may also be stored in HDPE containers.

Handling/ storage precautions : Ground lines and equipment used during transfer to reduce the possibility of static spark-initiated fire or explosion. Store in approved flammable liquid storage containers. Keep containers tightly closed as this material readily absorbs moisture. Store away from incompatible materials. Store in a cool, dry well- ventilated area away from sparks, flames and other sources of ignition. Eliminate all sources of static electricity. Use non –sparking electrical and ventilation systems. Storage criteria: Flammable Liquid store.

8. Exposure Control / Personal Protection:

Occupational exposure limits :

Country	8 Hour – TWA Hygiene Limit	STEL
US (OSHA)	1900 mg/m³ (1000ppm)	None
US (ACGIH)	1900 mg/m³ (1000ppm)	None
Germany (MAK)*	960 mg/m3 (500ppm)	Peak limit cat. II,1
UK (OES)	1920 mg/m³ (1000ppm)	None
Slovak Republic	960 mg/m3 (500ppm)	1920 mg/m3 (1000ppm) (30 min, 4x per shift)
Czech Republic	1000 mg/m³	3000 mg/m³

Engineering control measures : Engineering control methods to reduce hazardous exposures are preferred. General methods include mechanical ventilation (dilution and local exhaust), process or personnel enclosure, control of process conditions and process modification (e.g. substitution of a less hazardous material). Administrative controls and personal protective equipment may also be required. Use a non-sparking, grounded ventilation system separate from other exhaust ventilation systems. Exhaust directly to the outside. Supply sufficient replacement air to make up for air removed by exhaust system.

Personal protection – respiratory : If exposure limits are exceeded or if irritation is experienced, an approved respirator for organic vapours is generally acceptable. For high concentrations and for oxygen-deficient atmospheres, use approved air- supplied respirator. Full respiratory protection should be readily available in case of spillage.

Personal protection – hand : Rubber (Butyl) or neoprene gloves are recommended.

Personal protection – eye : Prevent eye contact with this material. Wear tight chemical safety goggles where eye exposure is reasonably probable. Provide an eyewash station immediately accessible to the work area. Contact lenses should not be worn when working with this chemical.

Personal protection – skin : Avoid skin contact. When working with this substance, wear appropriate chemical protective gloves. *Wear protective suit/ overalls*. Depending upon conditions of use, additional protection may be necessary such as face shield, apron, etc.

Other protection : Provide a safety shower immediately accessible to the work area.

9. Physical and Chemical Properties:

Appearance	: Colourless, volatile liquid
Odour	: Characteristic pleasant odour
pH	: Neutral
Boiling point	: 74°C - 80°C
Melting point	: - 130°C to - 112°C
Flash point	: 12°C - 17°C
Flammability	: 3, 3 – 19% v/v
Auto-flammability	: 363°C
Explosive properties	: Vapours can form explosive mixtures with air. All sources of ignition or static must be excluded.
Oxidizing properties	: None
Vapour pressure	: 59 mm Hg at 20°C
Density	: 785.3 kg/m^3 – 809 kg/m^3 at 25°C
Solubility – water	: Miscible with water in all proportions
Solubility – solvent	: Miscible with ether, methanol, chloroform and acetone
Solubility – coefficient	: 1100 @ 37°C[33]

10. Stability and Reactivity:

Condition to avoid : Overheating, flames, sources of ignition or static electricity. Oxidizing agents. Vapour/ air mixtures are explosive. Keep away from heat and sources of ignition.

Incompatible materials : See section 3 (chemical hazards).

Hazardous decomposition products : Incomplete combustion can generate carbon monoxide and carbon dioxide.

Reactivity : Stable at normal ambient temperature and pressure.

Chemical Stability : No decomposition if stored and applied as directed.

11. Toxicological Information:

Acute toxicity	:	<u>Short-term hazards</u> Acute oral toxicity Ethanol : LD_{50} rat: 7,060 mg/kg; literature value Acute inhalation toxicity Ethanol : LC_{50} rat: 66,000 mg/l; literature value; 4 h Acute dermal toxicity Ethanol : LD_{50} rabbit: 20,000 mg/kg; literature value NOAEL - 2400 mg/kg (2%) - for rats LOAEL – 3600 mg/kg (3%) - for rats
Skin and eye contact	:	Redness, pain (refer to Section 3 for further information)
Chronic toxicity	:	Refer to Section 3
Carcinogenicity	:	Refer to Section 3
Mutagenicity	:	Refer to Section 3
Neurotoxicity	:	Refer to Section 3
Reproductive hazards	:	Refer to Section 3

12. Ecological Information:

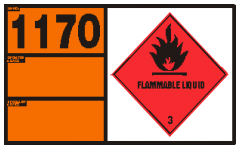
Aquatic toxicity – fish	:	In high concentration it harms fish and plankton; LC_{50} (fish, 96 hours) – 15.3 mg/L (Pimephales promelas)
Aquatic toxicity – daphnia	:	Threshold for deleterious effects in small crustaceans upwards of 7.800 mg/l; EC_{50} (Daphnia, 48 hours) – 5012 mg/L (Ceriodaphnia dubia)
Aquatic toxicity – algae	:	Toxic threshold concentration: *Pseudomonas putida* upwards of 6.500mg/l, *Scenedesmus quadricauda* upwards of 5.000mg/l, *Microsystis aeruginosa* upwards of 1.450ml/L IC_{50} (algae, 72 hours) – 275 mg/L
Biodegradability	:	This product is readily biodegradable. Ethanol is widely recognized as being readily biodegradable in the environment as it is both a metabolite of and nutrient for microbes.
Bio – accumulation	:	This product in not expected to bio accumulate through the food chains in the environment. The very low log KOW of –0.31 is indicative of a low bioaccumulation potential.
Mobility	:	This product is likely to volatize rapidly into the air because of its high vapour pressure. The product is poorly absorbed onto soils or sediments. Adsorption coefficient (K_{OC}) solid phase/liquid phase = 1 (highly mobile)
German wgk	:	1 (low hazard to water)

13. Disposal Considerations:

Disposal methods	: Only under conditions approved by local authorization. See also Section 6.
Disposal of packaging	: Empty containers may contain flammable and hazardous residues. Always obey hazard warnings.

14. Transport Information:

UN No	: 1170
Substance Identity No	: UN 1170
ADR/RID class	: 3
ADR/RID item No	: 3(b)
ADR/RID hazard identity No	: 3
IMDG – shipping name	: Ethanol
IMDG – class	: 3
IMDG – packaging group	: II
IMDG – marine pollutant	: Not a marine pollutant
IMDG – EMS No	: F-E, S-D
IMDG – MFAG table No	: 3074
IATA – shipping name	: Ethanol Solutions
IATA – class	: 3
IATA – subsidiary risk(s)	: Flammable liquid
ADNR – class	: UN –No.:1170; Class 3, Packaging Group II
UK – description	: Not available
UK- emergency action class	: Not available
UK – classification	: Not available
Tremcard No	: 1170



15. Regulatory Information:

EEC hazard classification	:	200 – 578 - 6
Risk phases	:	R11
Safety phases	:	S2, S7, S9, S16, S33
National legislation	:	Hazardous Substances Act 15 of 1973 and Regulations
		Occupational Health and Safety Act 85 of 1993 (Hazardous Chemical Substances Regulations)
International Legislation	:	IATA Dangerous Goods Regulation (DGR) 61st edition 2020
		IMDG Code, International Maritime Dangerous Goods Code, 2018 Edition (Amendment 39-18).

16. Sources of Information

1. Chemical Safety Data Sheets Volume 1 - Royal Society of Chemistry Information Services (Numbers in parenthesis refer to this article, see below).
2. Hazardous Chemicals Data Book, Environmental Health Review No. 4 Edited by G. Weiss.
3. Canadian Centre for Occupational Health and Safety. Record No. 516022

17. Other Information

1. *The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall NCP Alcohols be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if NCP Alcohols has been advised of the possibility of such damages.*

2. *This product may be denatured upon request with small quantities (≤ 5%$^{v}/_{v}$) of one or more of the following denaturants: Butanol (CAS No: 71-36-3); Denatonium Benzoate (Bitrix) (CAS No:3734-33-6); Di-ethyl Phthalate (DEP) (CAS No: 84-66-2); Ethyl Acetate (CAS 141-78-6); Hibitane (CAS No: 82432-16-4); Iso-amyl alcohol (123-51-3), Iso-propyl alcohol (CAS No:67-63-0); Menthol (CAS No: 2216-51-5); Methanol (CAS No: 67-56-1); Propylene Glycol (CAS No: 57-55-6); Tertiary-Butyl Alcohol (CAS No: 75-65-0); Wood Naphtha (CAS No: 67-56-1), or formulations as per the Specialised Denaturants list in the Industrial Solvents handbook.*

3. *This product may be blended upon request with flavourants (alcoholic or non-alcoholic), such as malt, Gin, Anethole, etc.*

18. Change Details

Revision: 2.0	- Changed MSDS Format - Updated contents to include current information available
Revision 3.0	- Included international reference to IATA Dangerous Goods Regulation (DGR) 55th Edition 2014 - Include CAS numbers for denaturants
Revision 4.0	- Updated IMDG class in accordance with IMDG Code, 2008 Edition. - Included reference to IMDG Code, 2008 Edition
Revision 5.0	- Included EU-GHS/CLP requirements under Hazard Identification
Revision 6.0	- Updated product and company identification. - Updated hazard identification section - Updated fire-fighting measures section. - Updated exposure control/personal protection section. - Updated physical properties section. - Updated stability and reactivity section. - Updated regulatory information to include current DGR reference. - Updated “Other information” - Updated references
Revision 7.0	- Updated section 17.2 to include Tertiary-butyl alcohol.
Revision 8.0	- Updated reference to international legislation to include current versions. - Corrected spelling error on page 6. - Updated section 17.

19. References

1. *Chem. Saf. Summ.* 1984, **55**(219), 62
2. Bretherick,L.*Handbook of Reactive Chemical Hazards (3rd edition)*
3. *Univ. Saf. Assocn. Saf. News* 1982, (16)
4. *Laboratory Hazards Bulletin* 1982, 584
5. *Laboratory Hazards Bulletin* 1983, 113
6. Pratt, E.F.; et al. *J. Am. Chem. Soc.* 1954, **75**, 54
7. Braendstrom, A. *Acta Chem. Scand.* 1951, **4,** 1608-1010
8. Wimer, W.W.; et al. *Alcohols Toxicology* (Noyes Data, 1983)
9. Henson, E.V. *JOM, J. Occup. Med.* 1960, **2,** 497
10. Lester, D.; Greenberg, L.A. *J. Stud. Alcohol.* 1951, **12,** 167
11. *Encyclopaedia of Occupational Health & Safety* ILO. Ethyl Alcohol and Alcoholism
12. Emery, M. *Occup. Saf. Health* 1979, **9**(9), 8-13
13. Madden, J.S. *J. Soc. Occup. Med.* 1976, **26**(2), 61-64
14. Christensen, J.M. *Acta, Pharmacol. Toxicol.* 1983, 53, Suppl. II
15. Woolverton, W.L.; Balster, R.L. *Toxicol. Appl. Pharmacol.* 1981, **59**(1), 1-7
16. Riihimaki, V.; et al. *Scand. J. Work, Environ. Health* 1982, **8**(1), 77-79
17. Baarson, K.A.; et al. *Toxicol. Appl. Pharmacol.* 1982, **64**(3), 393-404
18. Munoz, P.J.; et al. *Rev. Med.* 1984, **22**(2), 79-83
19. Ito, Y.; et al. *J. Sci. Labour* 1984, **60**(6), 255-267
20. Lynch, J.; et al. *JOM, J. Occup. Med.* 1979, **21**(5), 333-341
21. Tuyns, A.J.; at al. *Int. J. Cancer* 1979, **23**(4), 443-447
22. McCann, J.; et al. *Proc. Natl. Acad. Sci.* 1975, **72**(12), 5135
23. Badr, F.M.; *R.S. Nature* 1975, **253,** 134
24. Machemer, L.; *D. Mutat. Res.* 1975, **29,** 209
25. Chaubey, R.C.; et al. *Mutat. Res.* 1977, **43,** 441
26. Tze, W.J.; Lee, M. *Nature* 1975, **257,** 479
27. Skosyreva, A.M. *Akush. Ginekol.* 1973, **4,** 15
28. Schwetz, B.A.; et al. *Teratology* 1978, **18**(3), 385
29. Hemminki, K.; Viriei, P. *Teratog. Carcinog. Mutagen.* 1985, **5**(4), 251-318
30. www_static.shell.com/ethanol_CAS_64_1_5_gb_stl1:pdf
31. International Agency for Research on Cancer, World Health Organization. (1988). *Alcohol drinking*. Lyon: World Health Organization, International Agency for Research on Cancer. ISBN 92-832-1244-4. http://monographs.iarc.fr/ENG/Monographs/vol44/volume44.pdf. p8
32. www.inchem.org/documents/sids/sids/64175.pdf
33. Toxicity and risks induced by Occupational Exposure to chemical compounds Pg.259.
34. Material Safety Data Sheet, Ethanol SDA35A 200 Proof, SASOL, Version 1.1
35. Material Safety Data Sheet, Ethanol SDA3C 190 Proof, SASOL, Version 1.02

Compiled By: D.D. Liebenberg	**Reviewed and updated by**: L. Mudaly (SHEQ Manager)	**Approved By**: G. Bregovits