Standard Range of Smoke Generating Systems

Health and Safety Data

Reviewed September 2017

Introduction

Concept have been designing and manufacturing Industrial and Military smoke generators since 1964, and are the only such specialist to have held NATO's AQAP 1 and ISO 9OO1 Quality Assurance Certification.

The cosmetic smoke produced by all reputable manufacturers has been subjected to extensive independent tests to ensure that it is non toxic (and, in Concept's case, non flammable), and extracts from these reports are enclosed for your reference. Full copies of these reports (English only) are available on request

However, as cosmetic smoke behaves in a similar way to the toxic smoke produced by a fire, many people coming across cosmetic smoke for the first time are understandably cautious about the material and its safety aspects. The information contained herein should re-assure all concerned with the use of Concept's cosmetic smoke as to the material's safety, and Concept's ongoing commitment to the quality of our product.

Types of Concept Smoke

Smoke Chemicals (simulants)	Used on
(i) Propylene Glycol/Purified Water	Comet 3, Colt 3, Spirit B, Spirit 900 B AirTrace
(ii) Glycerine BP/Purified Water	Comet 4, Colt 4, Spirit A, Spirit 900 A, E&E+Series, Sentinel 100/150, AirTrace
(iii)) Intrinsically Biodegradeable Food quality white oil	R7, Aviator MKV /X , ViCount, Artem, Aerotech, Vulcan
(Iv) Triethylene Glycol / Purified Water	B1
(v) Dipropylene Glycol/Purified Water	Euro C, Spirit 900C, 'M' series

Occupational Exposure Limits

The Occupational Exposure Standards (OES) for our simulants are listed below. These standards relate to an 8 hour daily exposure to the chemicals, and whilst dense smoke concentrations exceed these limits, you will see from the various enclosed reports that these limits are of restricted value in assessing the 'toxicity' of the smoke.

Some 'Glycol' based chemicals used for smoke production are not allocated OES. This, however, does not mean that these chemicals are any safer than Glycols that are allocated an OES. The UK's Health and Safety Executive recommend that, should a chemical not be allocated a exposure limit in its own right, the exposure limit for a similar chemical type should be adopted.

Long term exposure limit – OES

Propylene Glycol	10mg/m^3	Glycerine BP/USP grade	10mg/m^3
Dipropylene Glycol	Not allocated	White Oil	5 mg/m^3
Triethylene Glycol	Not allocated		

A cursory comparison of the above limits implies that the water based Glycol and Glycerine smokes are twice as safe as the White Oil smokes that we produce.

However, a comparison of the concentration of water based smokes versus oil based smokes reveals that much less oil is required to achieve comparative smoke densities. Comparing the best (i.e. the most persistent) of the water based smokes, Glycerine, with Concept's 'Smoke Oil' reveals that **only 25-39%** of the amount of oil is required to achieve the same visibility through the smoke (See Appendix C).

If the same comparison is made with the faster dispersing Glycol smokes, then only 10-15% of the amount of oil is required to achieve the same visibility. So, to achieve similar smoke densities, and taking the OES's as a basis for comparison, smoke oil can be demonstrated to be even safer as a simulant than conventional Glycols.

Particle Size - why is this so critical?

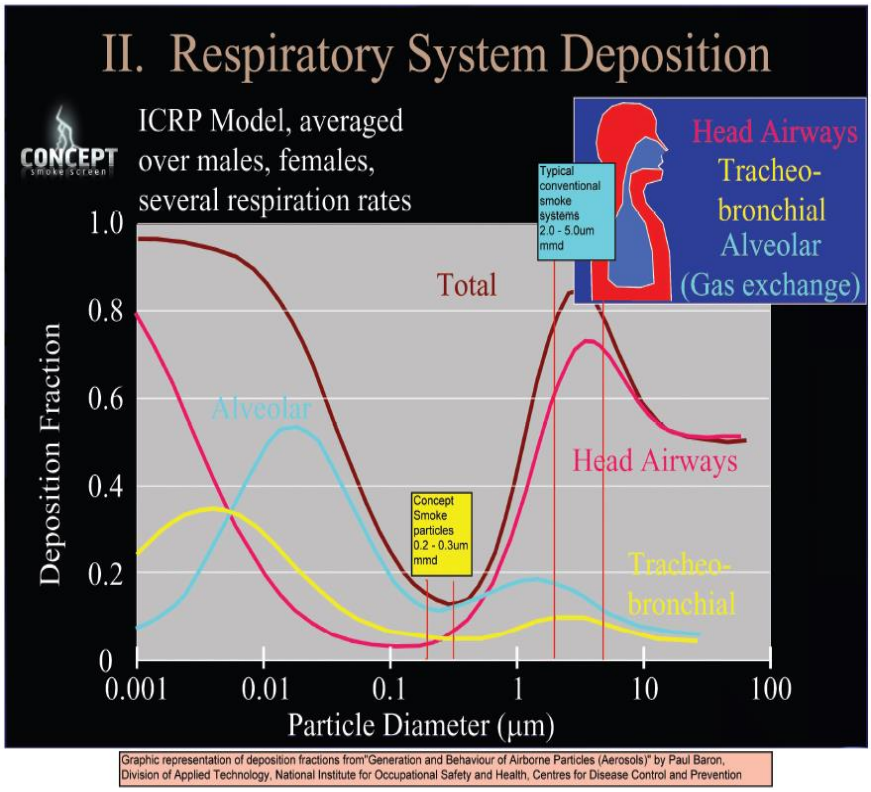
All artificial smoke systems actually produce a fog or liquid particle, and the establishing the size of that particle is critical in making comparisons in the relative safety of smokes produced by differing systems.

Representative samples of Concept generators are tested by the Atomic Energy Authority (AEA). Using this test data we are able to establish that the 'smoke' particles produced by our mains powered systems (i.e. Colt, ViCount and Spirit and Smoke Screen models and derivatives) are truly in a class of their own, with a typical particle size of 0.2 - 0.3 micron, and a typical gsd (Geometric Standard Deviation) of 1.35 -1.45.

This compares to typical particle sizes of conventional 'smoke systems' of 2.0 – 5.0 microns.

Producing a smaller particle not only means that dense smoke concentrations can be achieved using much less chemical, (a benefit in health and safety terms, % LEL (flammability) and running costs) but also impacts on the respiratory system to the minimum possible degree. This is well illustrated on the accompanying graph from the US National Institute for Occupational Safety and Health where the appropriate bands relating to Concept and more conventional artificial smokes have been appended.

Note: Deposition Fraction is defined as the amount of material deposited in the tissue divided by the amount of material inhaled.



Graphic representation of deposition fractions from"Generation and Behaviour of Airborne Particles (Aerosols)" by Paul Baron, Division of Applied Technology, National Institute for Occupational Safety and Health, Centres for Disease Control and Prevention

Health & Safety – precautions and recommendations

The smoke produced by Concepts smoke generators has been rigorously tested to ensure that, if used in accordance with the instructions and in normal conditions it is non toxic. Independent health and safety reports indicate that dense smoke concentrations can be entered without any serious health risk for short periods of time.

We do nevertheless recommend the following;

- always seek advise from Concept as to the most appropriate system for your application
- persons who are asthmatic or suffer from a respiratory complaint are not subjected to dense smoke concentrations
- the use of suitable PPE in the event of extended exposure or repeated exposure to such environments (Concept recommend the 3m 6000 facemask with 2 x 2135 p3 particulate filters, or similar)
- if used in conjunction with live fires, where, by definition there is the potential for products of combustion to be formed, along with other hazards (unburnt propane etc), self contained breathing apparatus (SCBA) should always be worn.

Copies of independent reports on the safety aspects of Concept smoke are available on request.

Inert Propellant – ViCount / Vulcan Range

At full output, the ViCount Vulcan range of oil based smoke systems use approximately 1.2m³ of propellant gas per hour of operation. Any inert gas can be used as the propellant (N_2, CO_2, Helium, Argon etc)

Independent testing

Concepts systems have undergone tesing by numerous independent bodies to ensure the safety (both in toxicological and flammability terms) of the smoke. Copies of these full reports (in English) available on request

The Health and Safety Laboratory (part of the UK's Health and Safety Executive)

The UK Governments's Health and Safety Executive --were asked to assess the safety of our Fluid A / Fluid B and Oil based smoke, in terms of both toxicity and flammability, in extremely dense smoke concentrations (visibility through the smoke typically 500-600mm) suitable for fire training.

HSE's conclusion

"low visibility can be achieved without the risk of forming a flammable atmosphere" and that "these atmospheres can be entered without any serious health risk" for brief exposures

National Occupational Hygiene Service

The NOHS (National Occupational Hygiene Service) – tested our Fluid A and Oil based smoke in dense concentrations. Dr King, a founding member of the World Health Organisation committee on exposure levels concluded

NOHS conclusion - Fluid A

"Taking a thick fog level of 520mg/m³ , one would need some two hours exposure to take in the two grammes of glycerol that has been suggested as being safe (as regards excretion) in the course of an eight hour day."

"I cannot therefore visualise any problem as regards risk to health or even momentary discomfort with the reasonable use of this generator."

NOHS conclusion - Smoke Oil

"On the basis of short term (up to one hour) exposures to even 'high' (up to the levels used in this work) concentrations of this oil mist, I cannot conceive any problem as regards risk to health. As with the glycerol, the only applicable TLV is that of a nuisance material, and this cannot be taken seriously in circumstances where the material is not present as a 'nuisance', but as an integral part of the job."

The United States Navy

The US Navy tested and assessed the systems for Justification document for the the Colt 4 and Spirit 900 A series

USN concluded the products produce

"a non-toxic, non-flammable, non-corrosive, water based dense smoke". "The Colt 4 and Spirit smoke generators provided by the supplier listed in section 2 above are devices that meet the Navy's qualification requirements and are certified and approved for immediate use by all commands having available discretionary funds"

Atomic Weapons Establishment (AWE)

Collecting the resulting smoke particles for analysis from our water based and oil based smoke systems concluded "I can confirm that using gas chromatography / mass spectrometry techniques we found no evidence of decomposition having occurred"

Quartec Occupational Hygiene Limited

A CHAS accredited laboratory looking specifically at the potential production of aldehydes in dense concentrations of Smoke Fluid A smoke (visibility through the smoke <1m).

It concluded (Colt 4) that it would take the following exposure times, at the concentrations tested, to exceed the EH40 Workplace Exposure Limit (WEL) (mg/m³) 8 hour TWA

Acetaldehye	1482 hours
Formaldehyde	345 hours
Propionaldehyde	2259 hours

"Concentrations of all measured aldehydes are very low. Personal exposure levels are unlikely to become significant even under prolonged exposure situations.
Test with the Colt 4 indicates that the concentration of acrolein in the environment was below 0.01mg/m3 which is the detection limit of the analytical laboratory method used"

Appendices

'A'	ISO 9001 Quality Assurance & Scope	
'B'	Extract on the toxicology aspects of Glycols (ICI) – text	
'C'	Comparison of oil mist and Glycerol (Glycerine) mist concentrations to achieve similar smoke densities.	
'D'	Product Safety Data sheet -	Spirit B
'D1'	Product Safety Data sheet-	Colt 3
'D2'	Product Safety Data sheet-	AirTrace
'D3'	Product Safety Data shhet-	B1/CB1
'E'	Product Safety Data sheet -	Smoke Fluid A (Spirit 900A, E, E+,Sentinel 100/150)
'E1'	Product Safety Data sheet-	Colt 4 Smoke (Colt 4, Comet 4, E, E+)
'F'	Product Safety Data sheet -	Smoke Oil 135 /180 (ViCount/Vulcan/ MKV/X)
'F1'	Product Safety Data sheet-	Artem Smoke Oil cans
'G'	Product Safety Data sheet -	Euro C/Spirit C/M series

Appendix A – Quality Assurance

Concept have held Quality Assurance certification since 1990 (AQAP 1)

The scope of our current certification is as follows:

"design, manufacture and supply of non toxic smoke generating equipment and aerosol generating equipment for scientific, military, security and industrial use"

Appendix B – Toxicology

The ethylene and propylene glycols described in this publication are of a low order of toxicity. Having low volatilities they present little hazard from inhalation. They are not absorbed from the skin in harmful quantities, nor are they skin irritants. Glycol splashes entering the eye may cause transient irritation.

Whereas propylene glycol may be regarded as practically non-toxic, the oral ingestion of only a few fluid ounces of ethylene glycol can cause serious damage and may prove fatal. The toxic properties of diethylene, triethylene and dipropylene glycol lie somewhere between those of ethylene glycol and propylene glycol.

Ethylene Glycol

Ethylene glycol is slowly oxidised in the body to oxalic acid, and in this way the drinking of antifreeze solutions has been known to have fatal results. The lethal dose for an adult is approximately 100g and ingestion of amounts in excess of this have mostly been due to use of temporary containers previously used for beverages. Suitable warning labels are considered essential on retail packages.

Diethylene Glycol

Like ethylene glycol, diethylene glycol is toxic when taken internally, and deaths have been known to result from accidental drinking of the material.

Triethylene Glycol

This glycol is reported to have a lower order of oral toxicity than diethylene glycol. From published results of studies with animals, in addition to trials of air disinfection involving the exposure of large numbers of humans, it has been concluded that indefinitely long exposure to air substantially saturated with triethylene glycol vapour at room temperature is harmless.

Propylene Glycol

Propylene glycol is the least toxic of the ICI glycols, being toxicologically similar to glycerol and substantially less toxic than ethylene glycol. It has no action on the skin.

Dipropylene Glycol

The toxicity of dipropylene glycol is reported to be twice that of propylene glycol, although it is less harmful than ethylene glycol.

Appendix C – Light Absorption

% Light Absorption	Glycerol Mist mg/m3	Concept Smoke Oil Mist Mg/m3
10	190	49
20	370	138
30	520	204
40	800	276
50	1300	385

It can be seen that, in order to achieve the same level of light absorption, the concentration of oil mist required is only 25% - 30% of that required for Glycerol mist.

Source: National Occuaptional Hygiene Service

Appendix D – Safety Data Sheet

Smoke Simulant Fluid – Concept Smoke Fluid B

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

Name:	Smoke Fluid B
Synonyms:	A mixture of Propylene glycol * propane – 1,2-diol and deionised water
Supplier:	Concept Engineering Limited,7 Woodlands Business Park, Woodlands Park Avenue, Maidenhead, Berks SL6 3UA, UK
Emergency Telephone:	+44 (0)1628 825555
Facsimile:	+44 (0)1628 826261
E Mail:	support@conceptsmoke.com

2. Hazards Identification

Not a hazardous substance or mixture according to Regulation (EC) No 1272/2008
This substance is not classified as dangerous according to Directive 67/548/EEC
Low toxicity under normal conditions of handling and use

Label Elements: This product does not need to be labelled in accordance with EC Directives or respective national laws

3. Composition/information on ingredients

Chemical	Mono Propylene Glycol $\geq$ 50% / Deionised water $\leq$ 50%
CAS	57-55-6 / 7732-18-15

4. First Aid measures

Exposure Route	Symptom	Treatment
Inhalation	Irritation of Breathing Passages	Remove from exposure, rest and keep warm. In severe cases, or if recovery is not rapid or complete, seek medical attention.
Skin Contact	Mild irritation	Drench the skin with plenty of water. Remove contaminated clothing and wash before re-use. If a large area of the skin is damaged or if irritation persists, seek medical attention.
Eye Contact	Mild irritation	Irrigate thoroughly with water for at least 10 minutes. Obtain medical attention.
Ingestion	Mild irritation of gastrointestinal tract.	Wash out mouth with water. Do not induce vomiting. Give water to drink. If patient feels unwell, seek medical attention.

Immediate treatment/Antidote: Symptomatic treatment.

5. Fire Fighting Measures

Suitable Extinguishers – water spray, alcohol resistant foam, dry chemical, CO_2

Hazardous Combustion Products – Oxides of carbon

Special Equipment for Fire Fighting – Self contained breathing apparatus

6. Accidental Release Measures

Safety Precautions – Wear appropriate PPE – see section 7

Environmental Precautions – Prevent entry into drains and water courses.

Clean up Procedure – Bind or absorb material with sand, earth or other suitable absorbent material. If possible, transfer to a salvage tank, otherwise absorb residues and place in suitable labelled containers and hold for waste disposal.

7. Handling & Storage

Handling	
Ventilation:	General Ventilation
Recommended procedures & equipment:	Avoid prolonged skin contact. Avoid contact with eyes. Avoid inhalation of high concentrations of mists.
Storage	
Temperature Range:	Ambient
Humidity range:	Dry.
Keep away from:	See section 10
Suitable storage media:	Mild steel, aluminium, stainless steel

8. Exposure Controls/Personal Protection

Exposure Limits:	10 mg.m³, particulates; 150ppm (470mg/m³), Total, ShTWA Type:OES
Monitoring Method:	As propane-1,2-diolProtective Measures
Respiratory:	Type approved RPE for organic vapours and mists if reqd.
Hand:	Gloves
Eye:	Goggles
Skin:	Impervious Overalls and boots

Hygiene Measures: Always wash thoroughly after handling chemicals.

The smoke produced by Concepts smoke generators has been rigorously tested to ensure that in normal conditions it is non toxic. Independent health and safety reports indicate that dense smoke concentrations can be entered without any serious health risk for short periods of time. Copies available on request. We do nevertheless recommend the following;

- persons who are asthmatic or suffer from a respiratory complaint are not subjected to dense smoke concentrations
- the use of suitable PPE in the event of extended exposure or repeated exposure to such environments (Concept recommend the 3m 6000 facemask with 2 x 2135 p3 particulate filters, or similar)
- if used in conjunction with live fires, where, by definition there is the potential for products of combustion to be formed, along with other hazards (unburnt propane etc), self contained breathing apparatus (SCBA) should always be worn.

9. Physical & Chemical Properties

Appearance	Colourless liquid
Boiling Point/range	188°C
Melting Point/range	< - 57°C, tends to supercool.
Flash Point	103ºC (closed cup)
Explosive Limits	2.6 – 12.5 %v/v
Autoignition temperature	371ºC
Vapour Pressure	30Pa @ 25ºC
Relative density	1.04 @ 20/20°C
Solubility in water	Miscible
Solubility in solvent	Miscible with chloroform and acetone
Partition coefficient	-2.6

10. Stability & Reactivity

Stability: Stable in normal conditions, material is hygroscopic.

Material to avoid: Strong oxidisers

Hazardous decomposition products: Oxides of carbon, including propionaldehyde.

11. Toxicological Information

Effects: Extremely low oral toxicity, large doses may produce effects on liver, kidneys and central nervous system. Unlikely to be hazardous by inhalation because of the low vapour pressure, however large concentration of mist may irritate the respiratory tract. Prolonged or repeated skin contact may cause irritation. Causes slight eye irritation but permanent damage is unlikely.

LD_{50} Oral – rat 20,000 mg/kg

LD_{50} Dermal – rabbit 20,800 mg/kg

12. Ecological Information

Environmental Effects

Mobility: Liquid with low volatility, soluble in water. Predicted to have high mobility in soil.

Toxicity to fish: Mortality NOEC Pimephales promelas 52390mg/l – 96h

Toxicity to daphnia / aquatic invertebrates: Mortality NOED Daphnia 13.020mg/l – 48h

EC50 Daphnia magna >10000mg/l -48h

Degradability: BOD_5 = 1.08 gO_2/g; ThOD = 1.68 gO_2/g; COD = 1.63 gO_2/g; BOD_{20}/ThOD = 86% The substance is substantially biodegradable.

Bioaccumulative potential: Low

13. Disposal Considerations

Substance: Via an authorised waste disposal contractor to an approved waste disposal site, observing all local and national regulations.

Container: As substance. Used containers must not be cut up or punctured until completely purged of product residues.

14. Transport Information

This product is not regulated as hazardous in bulk form.

When packaged in aerosol format the goods are classified as hazardous because of the nature of the pressurised container. The propellant within the canister is inert nitrogen

15. Regulatory Information

Supply label details:

Label name:	Smoke Fluid B / Mono Propylene Glycol
Symbol:	No risk or safety phrases stipulated
Risk phrases	No risk or safety phrases stipulated
Safety phrases	No risk or safety phrases stipulated

Users are advised to consult these regulations for further information. The information contained in this data sheet does not constitute an assessment of workplace risks

16. Other Information

Further details may be available upon request from Concept Engineering.

Appendix D1 – Safety Data Sheet

Smoke Simulant Fluid – Concept Colt 3

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

Chemical Name:	Smoke Fluid B
Synonyms:	Propylene glycol * propane – 1,2-diol
Supplier:	Concept Engineering Limited,7 Woodlands Business Park, Woodlands Park Avenue, Maidenhead, Berks SL6 3UA, UK
Emergency Telephone:	+44 (0)1628 825555
Facsimile:	+44 (0)1628 826261
E Mail	support@conceptsmoke.com

2. Hazards Identification

Not a hazardous substance or mixture according to Regulation (EC) No 1272/2008
This substance is not classified as dangerous according to Directive 67/548/EEC
Low toxicity under normal conditions of handling and use

Label Elements:
For shipping within the US the following GHS04 (Compressed Gas) pictogram applies

3. Composition/information on ingredients

Chemical	Mono Propylene Glycol
CAS	57-55-6

4. First Aid measures

Exposure Route	Symptom	Treatment
Inhalation	Irritation of Breathing Passages	Remove from exposure, rest and keep warm. In severe cases, or if recovery is not rapid or complete, seek medical attention.
Skin Contact	Mild irritation	Drench the skin with plenty of water. Remove contaminated clothing and wash before re-use. If a large area of the skin is damaged or if irritation persists, seek medical attention.
Eye Contact	Mild irritation	Irrigate thoroughly with water for at least 10 minutes. Obtain medical attention.
Ingestion	Mild irritation of gastrointestinal tract.	Wash out mouth with water. Do not induce vomiting. Give water to drink. If patient feels unwell, seek medical attention.

Immediate treatment/Antidote: Symptomatic treatment

5. Fire Fighting Measures

Suitable Extinguishers – water spray, alcohol resistant foam, dry chemical, CO_2

Hazardous Combustion Products – Oxides of carbon

Special Equipment for Fire Fighting – Self contained breathing apparatus.

6. Accidental Release Measures

Safety Precautions – Wear appropriate PPE – see section 7

Environmental Precautions – Prevent entry into drains and water courses.

Clean up Procedure – Bind or absorb material with sand, earth or other suitable absorbent material. If possible, transfer to a salvage tank, otherwise absorb residues and place in suitable labelled containers and hold for waste disposal.

7. Handling & Storage

Handling	
Ventilation:	General Ventilation
Recommended procedures & equipment:	Avoid prolonged skin contact. Avoid contact with eyes. Avoid inhalation of high concentrations of mists.
Storage	
Temperature Range:	Ambient
Humidity range:	Dry.
Keep away from:	See section 10
Suitable storage media:	Mild steel, aluminium, stainless steel

8. Exposure Controls/Personal Protection

Exposure Limits:	10 mg.m^3, particulates; 150ppm (470mg/m^3), Total, ShTWA Type:OES
Monitoring Method:	As propane-1,2-diolProtective Measures
Respiratory:	Type approved RPE for organic vapours and mists if reqd.
Hand:	Gloves
Eye:	Goggles
Skin:	Impervious Overalls and boots

Hygiene Measures: Always wash thoroughly after handling chemicals.

The smoke produced by Concepts smoke generators has been rigorously tested to ensure that in normal conditions it is non toxic. Independent health and safety reports indicate that dense smoke concentrations can be entered without any serious health risk for short periods of time. Copies available on request. We do nevertheless recommend the following;

- persons who are asthmatic or suffer from a respiratory complaint are not subjected to dense smoke concentrations
- the use of suitable PPE in the event of extended exposure or repeated exposure to such environments (Concept recommend the 3m 6000 facemask with 2 x 2135 p3 particulate filters, or similar)
- if used in conjunction with live fires, where, by definition there is the potential for products of combustion to be formed, along with other hazards (unburnt propane etc), self contained breathing apparatus (SCBA) should always be worn.

9. Physical & Chemical Properties

Appearance	Colourless liquid
Boiling Point/range	188°C
Melting Point/range	< - 57°C, tends to supercool.
Flash Point	103ºC (closed cup)
Explosive Limits	2.6 – 12.5 %v/v
Autoignition temperature	371ºC
Vapour Pressure	30Pa @ 25ºC
Relative density	1.04 @ 20/20°C
Solubility in water	Miscible
Solubility in solvent	Miscible with chloroform and acetone
Partition coefficient	-2.6

10. Stability & Reactivity

Stability: Stable in normal conditions, material is hygroscopic.

Material to avoid: Strong oxidisers

Hazardous decomposition products: Oxides of carbon, including propionaldehyde.

11. Toxicological Information

Effects: Extremely low oral toxicity, large doses may produce effects on liver, kidneys and central nervous system. Unlikely to be hazardous by inhalation because of the low vapour pressure, however large concentration of mist may irritate the respiratory tract. Prolonged or repeated skin contact may cause irritation. Causes slight eye irritation but permanent damage is unlikely.

LD_{50} Oral – rat 20,000 mg/kg

LD_{50} Dermal – rabbit 20,800 mg/kg

12. Ecological Information

Environmental Effects

Mobility: Liquid with low volatility, soluble in water. Predicted to have high mobility in soil.

Toxicity to fish: Mortality NOEC Pimephales promelas 52390mg/l – 96h

Toxicity to daphnia / aquatic invertebrates: Mortality NOED Daphnia 13.020mg/l – 48h

EC50 Daphnia magna >10000mg/l -48h

Degradability: BOD_5 = 1.08 gO_2/g; ThOD = 1.68 gO_2/g; COD = 1.63 gO_2/g; BOD_{20}/ThOD = 86% The substance is substantially biodegradable.

Bioaccumulative potential: Low

13. Disposal Considerations

Substance: Via an authorised waste disposal contractor to an approved waste disposal site, observing all local and national regulations.

Container: As substance. Used containers must not be cut up or punctured until completely purged of product residues.

14. Transport Information

The goods are classified as Aerosols and are therefore considered hazardous because of the nature of the pressurised canister. The propellant within the canister is inert nitrogen. Aerosols are classified as UN1950, Hazard Class 2.2. Normally shipped as “limited quantities”

The chemical contents are not classified by IMDG as a marine pollutant.

By Air: UN1950, Aerosols, Non Flammable,2.2

By Sea /Road (Multimodal) UN1950, Aerosols, 2.2, “Ltd Qty”, (ADR5A). All inners less than 1 litre capacity

For further information or guidance please contact Concept (techsupport@conceptsmoke.com)

15. Regulatory Information

Supply label details:	CLP
Label name:	Colt / Comet 3 / Mono Propylene Glycol
Symbol:	No risk or safety phrases stipulated
Risk phrases	No risk or safety phrases stipulated
Safety phrases	No risk or safety phrases stipulated

Users are advised to consult these regulations for further information. The information contained in this data sheet does not constitute an assessment of workplace risks

16. Other Information

Further details may be available upon request from Concept Engineering.

Appendix D2 – Health and Safety Data

Smoke Simulant Fluid – Air Trace Smoke Fluid

1. Identification of the substance/mixture and of the company/undertaking

Product identifier

Trade Name:	Air Trace Smoke Fluid
Article Number:	Not Available
Application of substance / preparation:	Airflow tracing
Details of supplier of safety data sheet:	
	Concept Engineering Ltd, 7 Woodlands Business Park, Maidenhead, Berkshire, SL6 3UA, UK
Tel:	01628 825 555
Email:	info@conceptsmoke.com

2. Hazards Identification

Not a hazardous substance according to Regulation (EC) no 1272/2008
This substance is not classified as dangerous according to Directive67/548/EEC
Not generally regarded as hazardous in normal conditions of handling and use.
This product does not need to be labelled in accordance with EC directives or respective national laws

3. Composition/information on ingredients

CAS	Description	%
57-55-6	USP propane glycol-1,2-diol	≤50.0%
56-81-5	USP glycerol	<10.0%
7732-18-5	Water, distilled, conductivity or of similar purity	≥40.0%

4. First aid measures

- **After inhalation:** Supply fresh air; consult doctor in case of complaints*(Refer to section 8 – In concentrations associated with visualisation, for durations <10min, no respiratory / eye protection required).
- **After skin contact:**
  Immediately wash with water and soap and rinse thoroughly. If skin irritation continues, consult a doctor.
- **After skin contact:** Rinse opened eyed for several minutes under running water
- **After swallowing:** If symptoms persist consult doctor

5. Firefighting measures

- **Suitable extinguishing agents:** Use firefighting measures that suit the environment.
- **Special hazards arising from the substance or mixture:** No further relevant information available.
- **Protective equipment:** Mouth respiratory protective device.

6. Accidental release measures

- **Personal precautions, protective equipment & emergency procedures:** Mount respiratory protective device.
- **Environmental precautions:**
  Dilute with plenty of water.
  Do not allow to enter sewers/surface or ground water
- **Methods and material for containment and cleaning up:**
  Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).

7. Handling and storage

- **Handling:**
- **Precautions for safe handling** keep receptacles tightly sealed.
- **Information about protection against explosions and fires: Keep ignition sources away – Do not smoke**

- **Storage:**
- **Requirements to be met by storerooms and receptacles:** Store in a cool location.
- **Information about storage in one common storage facility:**
  Store away for foodstuffs
  Store away from flammable substances
- **Further information about storage conditions:** Keep receptacle tightly sealed

8. Exposure controls/personal protection

Exposure Limits: CAS 57-55-6 / 56-81-5	10 mg.m³, 8h TWA Type:OES
Monitoring Method:	As mist
Protective Measures	
Respiratory protection:	Unlikely to be required in normal use – see below
Hand:	Gloves
Eye:	Goggles
Skin:	Overalls and boots
Hygiene Measures -	Always wash thoroughly after handling chemical

The smoke produced by Concepts smoke generators has been rigorously tested to ensure that in normal conditions it is non toxic. Independent health and safety reports (available on request) indicate that dense smoke concentrations can be entered without any serious health risk for short periods of time.

In the concentrations typically required for Air Trace applications, no respiratory protection would be required, although we do recommend in general terms that those suffering from asthma or with a severe respiratory condition should not be subjected to artificial smoke / fog from any device

9. Physical and chemical properties

• **General Information**	
• **Appearance:**	
Form:	Liquid
Color:	Transparent
Odour:	Odourless
Odour threshold:	Not available
• **pH-value:**	Not available
• **Change in condition**	
Melting point/Melting range:	Not available
Freezing point:	Not available
Boiling point/Boiling range:	Not available
• **Flash point:**	Not available
• **Flammability (solid, gaseous):**	Not available

• **Auto-Ignition temperature:**	Not available
• **Decomposition temperature:**	Not available
• **Explosion limits:**	
Lower:	Not available
Upper:	Not available

• **Vapour pressure:**	Not available
• **Density:**	Not available
Relative density	Not available
Vapour density	Not available
Evaporation rate	Not available
• **Solubility in / miscibility with water:**	Not available
• **Partition coefficient (n-octanol/water)**	Not available
	Not available
• **Viscosity:**	
Dynamic:	Not available
Kinematic:	Not available

10. Stability and reactivity

- **Reactivity:** No decomposition if used according to specification.
- **Chemical stability:** Stable under recommended storage conditions.
- **Possibility of hazardous reactions:** No dangerous reactions known.
- **Conditions to avoid:** No further relevant information available.
- **Hazardous decomposition products:** No dangerous decomposition products known.

11. Toxicological information

- **Acute toxicity:**

LD/LC50 values that are relevant for classification:

57-55-6 USP propane glycol-1,2-diol		
Oral	LD50	20000 mg/kg (rat)
Dermal	LD50	20800 mg/kg (rabbit)
56-81-5 USP glycerol		
Oral	LD50	4090 mg/kg (mouse)
		12600 mg/kg (rat)
Dermal	LD50	>10000 mg/kg (rabbit)

- **Primary irritant effect:**
- **On the skin:** Irritating effect possible
- **One the eye:** Irritating effect possible
- **Sensitization:** Sensitization possible through skin contact
- **Additional toxicological information:**

The product is not subject to classification according to internally approved calculation methods for preparations:
When used and handled according to specification, the product does not have any harmful effects according to our experience and the information provided to us.

- **Carcinogenic categories**
  - **IARC (International Agency for Research on Cancer**
    None of the ingredients is listed
  - **NTP (National Toxicology Program)**
    None of the ingredients is listed

12. Ecological information

- **Toxicity**
- **Aquatic toxicity:** No further relevant information available
- **Persistence and degradability:** No further relevant information available

- **Bio-accumulative potential:** No further relevant information available
- **Mobility in soil:** No further relevant information available

Additional ecological information:

- **General notes:** Water hazard class 1 (self-assessment): slightly hazardous for water

Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.

13. Disposal considerations

Waste treatment methods

- **Recommendation:** Smaller quantities can be disposed of with household waste.

Uncleaned packages:

- **Recommendation:** Disposal must be made according to official regulations.
- **Recommend cleansing agent:** Water, if necessary with cleansing agents.

14. Transportation information

Non hazardous for shipping / transportation

- **UN-Number**
- **DOT, IMDG, IATA** Not applicable
- **UN proper shipping name**
- **DOT, IMDG, IATA** Not applicable
- **Transport hazard class(es)**
- **DOT, IMDG, IATA**
- **Class** Not applicable
- **Packing Group**
- **DOT, IMDG, IATA** Not applicable
- **Environmental hazards:**
- **Marine pollutant:** No
- **Special precautions for user** Not applicable
- **EMS Number:** Not applicable **Trade name: Concept Air Trace (fog machine for flow visualisation)**
- **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code** Not applicable

15. Regulatory information

Supply label details:	CLP
Label name:	Air Trace Smoke Fluid
Symbol	No risk or safety phrases stipulated
Risk phrases	No risk or safety phrases stipulated
Safety phrases	No risk or safety phrases stipulated

Users are advised to consult these regulations for further information. The information contained in this data sheet does not constitute an assessment of workplace risks

16. Other Information

Further details may be available upon request from Concept Engineering Ltd

Appendix D3 – Health and Safety Data SDS

Smoke Simulant Fluid – Concept Smoke Fluid B1 / CB1

SECTION 1 – IDENTIFICATION

Product Name: B1 / CB1 Smoke Fluid
Product Label: B1 / CB1 Smoke Fluid
Manufacturer: Concept Smoke Systems / Concept Engineering Ltd
7 Woodlands Business Park, Woodlands Park Avenue, Maidenhead, Berks, SL6 3UA
T +44 (0) 1628 825555 E: technicalsupport@conceptsmoke.com
REACH No : A registration number is not available for this substance as the substance or its uses are exempted from registration or the annual tonnage does not require a registration

SECTION 2 – HAZARD IDENTIFICATION

Not a hazardous substance according to Regulation (EC) no 1272/2008
This substance is not classified as dangerous according to Directive67/548/EEC
Not generally regarded as hazardous in normal conditions of handling and use.
This product does not need to be labelled in accordance with EC directives or respective national laws CLP /GHS

SECTION 3 – COMPOSITION / INGREDIENTS

B1/ CB1 smoke fluid contains 1 or more of products 1/2/3 plus product 4

1. Glycerol CAS 56-81-5
2. Monopropylene Glycol CAS 57-55-6 (>50%)
3. Triethylene Glycol CAS 112-27-6
4. Demineralized Water CAS 7732-18-5 (<50%)

SECTION 4 – FIRST AID MEASURES

General: No Special Procedure
Eye: Flush With Water. Obtain Medical Attention in Case of Irritation.
Skin: Wash Off With Water.
Ingestion: Do Not Induce Vomiting. Rinse Mouth with Water, Then Drink Water. Obtain Medical Attention in Case of Irritation.

SECTION 5 – FIRE-FIGHTING MEASURES

Flammability: Not Flammable
Means of Extinction: N/A. Water Spray, Foam, CO2, or Dry Powder can be used on Surrounding Fire _ Special Fire Hazards: None

SECTION 6 – ACCIDENTAL RELEASE MEASURES

Leak and Spill Procedure: Spilled Fluid or Splashed Fluid Droplets Can Cause Slip Hazard,
Mop up the Fluid and Dispose of it
Environmental Protection: No Federal Requirements, Check State and Local Government Requirements

SECTION 7 – HANDLING AND STORAGE

Handling: No Special Procedure
Storage: Keep Out of Reach of Children, Keep Container Tightly Closed Until Use
Storage Temperature: <60°C

SECTION 8 – EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits:	10 mg.m³, 8h TWA Type:OES
Monitoring Method:	As mist
Protective Measures	
Respiratory protection:	Unlikely to be required in normal use – see below
Hand:	Gloves
Eye:	Goggles
Skin:	Overalls and boots
Hygiene Measures -	Always wash thoroughly after handling chemicals.

The smoke produced by Concepts smoke generators has been rigorously tested to ensure that in normal conditions it is non-toxic. Independent health and safety reports (available on request) indicate that dense smoke concentrations can be entered without any serious health risk for short periods of time. We do nevertheless recommend the following;

- persons who are asthmatic or suffer from a respiratory complaint are not subjected to dense smoke concentrations
- the use of suitable PPE in the event of extended exposure or repeated exposure to such environments (fire trainers for example) Concept recommend the 3m 6000 facemask with 2 x 2135 p3 particulate filters, or similar
- if used in conjunction with live fires, where, by definition there is the potential for products of combustion to be formed, along with other hazards (unburnt propane etc), self-contained breathing apparatus (SCBA) should always be worn.

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Liquid
Color: Colorless
Odor: Neutral
Freezing Point: <0°C
Boiling Point: >100°C
Density: >1.0 g/cm3
Solubility in Water: Arbitrary
pH: 6-8 at 20°C
Hazardous Categorization: None

SECTION 10 – STABILITY AND REACTIVITY

Stability: Stable

Incompatibility: Reacts with Strong Oxidants
Thermal Decomposition: No Known Dangerous Products
Hazardous Reaction: None Listed

SECTION 11 – TOXICOLOGICAL INFORMATION

Effects: Low oral toxicity. Slightly irritating to rabbit skin and eyes; unlikely to cause irritation in humans.

SECTION 12 – ECOLOGICAL INFORMATION

Environmental Effects
CAS 56-81-5

Mobility:	Soluble in Water
Degradability:	Biodegradable. BOD5 / COD : 0.87 / 1.16 g02/g
Aquatic Toxicity:	LC50, fish > 5000 mg/1; IC50, algae > 2900 mg/1; EC50, bacteria > *10000mg/1 CAS 57-55-6*
Mobility:	Liquid with low volatility, soluble in water. Predicted to have high mobility in soil.
Toxicity to fish:	Mortality NOEC Pimephales promelas 52390mg/l – 96h
Toxicity to daphnia / aquatic invertebrates:	Mortality NOED Daphnia 13.020mg/l – 48h EC50 Daphnia magna >10000mg/l -48h
Degradability:	BOD_5 = 1.08 gO_2/g; ThOD = 1.68 gO_2/g; COD = 1.63 gO_2/g; BOD_{20}/ThOD = 86% The substance is substantially biodegradable.
Bioaccumulative potential:	Low

CAS 112-27-6
Toxicity
Toxicity to fish LC50 - Leuciscus idus (Golden orfe) - > 100 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates EC50 - Daphnia magna (Water flea) - 46,500 mg/l - 48 h
Toxicity to algae Remarks: no data available
Persistence and degradability Biodegradability Result: > 70 % - Readily biodegradable.
Bioaccumulative potential: No bioaccumulation is to be expected (log Pow <= 4).
Mobility in soil : no data available
Results of PBT and vPvB assessment: Not available

This product is not harmful to the environment.
Ready Biodegradable according to EC / OECD

SECTION 13 – DISPOSAL CONSIDERATIONS

Substance: Via an authorised waste disposal contractor to an approved waste disposal site, observing all local and national regulations.
Container: As substance

SECTION 14 – TRANSPORT INFORMATION

The goods are not classified as hazardous / dangerous under ADR/RID, IMDG, or IATA
The chemical contents are not classified by IMDG as a marine pollutant.
For further information or guidance please contact Concept (techsupport@conceptsmoke.com)

SECTION 15 – REGULATORY INFORMATION

Supply label details:	CLP
Label name:	B1/ CB1 Smoke Fluid
Symbol	No risk or safety phrases stipulated
Risk phrases	No risk or safety phrases stipulated
Safety phrases	No risk or safety phrases stipulated

Users are advised to consult these regulations for further information. The information contained in this data sheet does not constitute an assessment of workplace risk

SECTION 16 – OTHER INFORMATION

Legal Disclaimer The above information is based on the present state of our knowledge of the product at the time of publication. It is given in good faith, no warranty is implied with respect to this information

Appendix E – Health and Safety Data
Smoke Simulant Fluid – Concept Smoke Fluid A – NSN 1365 99 733 9217

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

Name: Concept Smoke Fluid A

Supplied by: Concept Engineering Limited
7 Woodlands Business Park
Woodlands Park Avenue
Maidenhead, Berkshire SL6 3UA
Telephone: +44 (0)1628 825555 Facsimile: +44 (0) 1628 826261
E Mail: support@conceptsmoke.com

2. Hazards Identification

Not a hazardous substance according to Regulation (EC) no 1272/2008
This substance is not classified as dangerous according to Directive67/548/EEC
Not generally regarded as hazardous in normal conditions of handling and use.
This product does not need to be labelled in accordance with EC directives or respective national laws

3. Composition/information on ingredients

Chemical - Glycerine ($\geq$ 50%) / De Ionised water ($\leq$ 50%)
Exposure - 10 mg/m³
CAS - 56-81-5 /7732-18-5
EINECS - 200-289-5
REACH- Exempted

4. First Aid measures

Exposure Route	Symptom	Treatment
Inhalation	Irritation of Breathing Passages	Remove from Exposure, rest and keep warm. In severe cases, or if recovery is not rapid or complete, seek medical attention.
Skin Contact	Mild irritation	Drench the skin with plenty of water. Remove contaminated clothing and wash before re-use. If a large area of the skin is damaged or if irritation persists, seek medical attention.
Eye Contact	Mild irritation	Irrigate thoroughly with water for at least 10 minutes. Obtain medical attention.
Ingestion	Mild irritation	if swallowed wash out mouth with water. Do not induce vomiting. Give water to drink. If patient feels unwell, seek medical attention. Immediate treatment/Antidote: Symptomatic treatment.

5. Fire Fighting Measures

Suitable Extinguishers – Water mist, alcohol resistant foam, dry powder, CO2.
Hazardous Combustion Products – Oxides of carbon
Special Equipment for Fire Fighting – Self contained breathing apparatus.

6. Accidental Release Measures

Safety Precautions –	Wear appropriate PPE – see section 8
Environmental Precautions –	Prevent entry of large spillages into drains and water courses.
Clean up Procedure –	Bind or absorb material with sand, earth or other suitable absorbent material. If possible, transfer to a salvage tank, otherwise absorb residues and place in suitable labelled containers and hold for waste disposal. Wash spill site with plenty of water after material has been taken up.

7. Handling & Storage

Handling Ventilation:	General Ventilation
Storage Temperature Range:	Ambient
Humidity range:	Dry.
Keep away from:	See section 10
Suitable storage media:	Store in original containers

8. Exposure Controls/Personal Protection

Exposure Limits:	10 mg.m³, 8h TWA Type:OES
Monitoring Method:	As mist
Protective Measures	
Respiratory protection:	Unlikely to be required in normal use – see below
Hand:	Gloves
Eye:	Goggles
Skin:	Overalls and boots
Hygiene Measures -	Always wash thoroughly after handling chemicals.

The smoke produced by Concepts smoke generators has been rigorously tested to ensure that in normal conditions it is non toxic. Independent health and safety reports indicate that dense smoke concentrations can be entered without any serious health risk for short periods of time. We do nevertheless recommend the following;

- persons who are asthmatic or suffer from a respiratory complaint are not subjected to dense smoke concentrations
- the use of suitable PPE in the event of extended exposure or repeated exposure to such environments (fire trainers for example) Concept recommend the 3m 6000 facemask with 2 x 2135 p3 particulate filters, or similar
- if used in conjunction with live fires, where, by definition there is the potential for products of combustion to be formed, along with other hazards (unburnt propane etc), self contained breathing apparatus (SCBA) should always be worn.

9. Physical & Chemical Properties

Appearance	Colourless liquid
PH	Neutral
Boiling Point/range	Ca. 290ºC
Melting Point/range	Ca. 18ºC, solidifies at a much lower temperature.
Flash Point	177ºC
Autoignition temperature	400ºC
Vapour Pressure	<0.01 mbar @ 20ºC; <1 mbar @ 100ºC
Relative density	1262 Kg/m³ @ 20°C
Solubility in water	Miscible
Solubility in solvent	Miscible with ethanol, slightly soluble in acetone, insoluble in ether and in chloroform.
Partition coefficient	-2.6
Viscosity	Ca. 1300 mPa.s @ 20°C

10. Stability & Reactivity

Stability:	**Stable in normal** conditions
Known Hazardous reactions:	Violent or explosive reactions with some oxidising agents
Conditions to avoid:	Moisture, extremes of temperature
Materials to avoid:	Strong oxidising agents
Hazardous decomposition products:	Thermal decomposition may release acrolein.

11. Toxicological Information

Effects: Low oral toxicity. Slightly irritating to rabbit skin and eyes; unlikely to cause irritation in humans.

12. Ecological Information

Environmental Effects

Mobility:	Soluble in Water
Degradability:	Biodegradable. BOD5 / COD : 0.87 / 1.16 g02/g
Aquatic Toxicity:	LC50, fish > 5000 mg/1; IC50, algae > 2900 mg/1; EC50, bacteria > 10000mg/1

13. Disposal Considerations

Substance: Via an authorised waste disposal contractor to an approved waste disposal site, observing all local and national regulations.
Container: As substance

14. Transport Information

The goods are not classified as hazardous.
The chemical contents are not classified by IMDG as a marine pollutant.
For further information or guidance please contact Concept (techsupport@conceptsmoke.com)

15. Regulatory Information

Supply label details:	CLP
Label name:	Glycerine / Smoke Fluid A
Symbol	No risk or safety phrases stipulated
Risk phrases	No risk or safety phrases stipulated
Safety phrases	No risk or safety phrases stipulated

Users are advised to consult these regulations for further information. The information contained in this data sheet does not constitute an assessment of workplace risks

16. Other Information

Further details may be available upon request from Concept Engineering.

Appendix E1 – Health and Safety Data
Smoke Simulant Fluid – Colt 4 Smoke Canister – NSN 1365 99 804 1753

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

Name: Colt 4 / Comet 4 aerosol - liquid contents Smoke Fluid A

Supplied by: Concept Engineering Limited
7 Woodlands Business Park
Woodlands Park Avenue
Maidenhead, Berkshire SL6 3UA
Emergency Telephone: +44 (0)1628 825555 Facsimile: +44 (0)1628 826261 E:support@conceptsmoke.com

2. Hazards Identification

The liquid contents are not considerede a hazardous substance according to Regulation (EC) no 1272/2008
The liquid contents are not classified as dangerous according to Directive67/548/EEC
The liquid contents are not generally regarded as hazardous in normal conditions of handling and use.

As a pressurised aerosol, no hazard pictogram is required for shipment with the EC

Label Elements:
For shipping within the US the following GHS04 (Compressed Gas) pictogram applies

3. Composition/information on ingredients

Chemical - A mixture of pharmaceutical grade Glycerine (>50%) and Deionised Water (<50%)
Exposure - 10 mg/m³
CAS - 56-81-5 /7732-18-5
REACH- Exempted

4. First Aid measures

Exposure Route	Symptom	Treatment
Inhalation	Irritation of Breathing Passages	Remove from Exposure, rest and keep warm. In severe cases, or if recovery is not rapid or complete, seek medical attention.
Skin Contact	Mild irritation	Drench the skin with plenty of water. Remove contaminated clothing and wash before re-use. If a large area of the skin is damaged or if irritation persists, seek medical attention.
Eye Contact	Mild irritation	Irrigate thoroughly with water for at least 10 minutes. Obtain medical attention.
Ingestion	Mild irritation if swallowed	Wash out mouth with water. in large quantities. Do not induce vomiting. Give water to drink. If patient feels unwell, seek medical attention.
Immediate treatment/Antidote:		Symptomatic treatment.

5. Fire Fighting Measures

Suitable Extinguishers –	Water mist, alcohol resistant foam, dry powder, CO2.
Hazardous Combustion Products –	Oxides of carbon
Special Equipment for Fire Fighting –	Self contained breathing apparatus.

6. Accidental Release Measures

Safety Precautions –	Wear appropriate PPE – see section 8
Environmental Precautions –	Prevent entry of large spillages into drains and water courses.
Clean up Procedure –	Bind or absorb material with sand, earth or other suitable absorbent material. If possible, transfer to a salvage tank, otherwise absorb residues and place in suitable labelled containers and hold for waste disposal. Wash spill site with plenty of water after material has been taken up.

7. Handling & Storage

Handling Ventilation:	General Ventilation
Storage Temperature Range:	Ambient
Humidity range:	Dry.
Keep away from:	See section 10
Suitable storage media:	Store in original containers

8. Exposure Controls/Personal Protection

Exposure Limits:	10 mg.m³, 8h TWA Type:OES
Monitoring Method:	As mist
Protective Measures	
Respiratory protection:	Unlikely to be required in normal use. For heavy / repeated users see note below
Hand:	Gloves
Eye:	Goggles
Skin:	Overalls and boots
Hygiene Measures -	Always wash thoroughly after handling chemicals.

The smoke produced by Concepts smoke generators has been rigorously tested to ensure that in normal conditions it is non toxic. Independent health and safety reports (available on request) indicate that dense smoke concentrations can be entered without any serious health risk for short periods of time. We do nevertheless recommend the following;

- persons who are asthmatic or suffer from a respiratory complaint are not subjected to dense smoke concentrations
- the use of suitable PPE in the event of extended exposure or repeated exposure to such environments (fire trainers for example) Concept recommend the 3m 6000 facemask with 2 x 2135 p3 particulate filters, or similar
- if used in conjunction with live fires, where, by definition there is the potential for products of combustion to be formed, along with other hazards (unburnt propane etc), self contained breathing apparatus (SCBA) should always be worn.

9. Physical & Chemical Properties

Appearance	Colourless liquid
PH	Neutral
Boiling Point/range	Ca. 290ºC
Melting Point/range	Ca. 18ºC, solidifies at a much lower temperature.
Flash Point	177ºC
Autoignition temperature	400ºC
Vapour Pressure	<0.01 mbar @ 20ºC; <1 mbar @ 100ºC
Relative density	1262 Kg/m³ @ 20°C
Solubility in water	Miscible
Solubility in solvent	Miscible with ethanol, slightly soluble in acetone, insoluble in ether and in chloroform.
Partition coefficient	-2.6
Viscosity	Ca. 1300 mPa.s @ 20°C

10. Stability & Reactivity

Stability:	Stable in normal conditions
Known Hazardous reactions:	Violent or explosive reactions with some oxidising agents
Conditions to avoid:	Moisture, extremes of temperature
Materials to avoid:	Strong oxidising agents
Hazardous decomposition products:	Thermal decomposition may release acrolein.

11. Toxicological Information

Effects: Low oral toxicity. Slightly irritating to rabbit skin and eyes; unlikely to cause irritation in humans.

12. Ecological Information

Environmental Effects

Mobility:	Soluble in Water
Degradability:	Biodegradable. BOD5 / COD : 0.87 / 1.16 g02/g
Aquatic Toxicity:	LC50, fish > 5000 mg/1; IC50, algae > 2900 mg/1; EC50, bacteria > 10000mg/1

13. Disposal Considerations

Substance: Via an authorised waste disposal contractor to an approved waste disposal site, observing all local and national regulations.
Container: As substance

14. Transport Information

The goods are classified as Aerosols and are therefore considered hazardous because of the nature of the pressurised canister. The propellant within the canister is inert nitrogen.

Aerosols are classified as UN1950, Hazard Class 2.2. Normally shipped as “limited quantities”

The chemical contents are not classified by IMDG as a marine pollutant.

By Air:	UN1950, Aerosols, Non Flammable,2.2
By Sea /Road (Multimodal)	UN1950, Aerosols, 2.2, “Ltd Qty”, (ADR5A). All inners less than 1 litre capacity

For further information or guidance please contact Concept (techsupport@conceptsmoke.com)

15. Regulatory Information

Supply label details:	CLP
Label name:	Glycerine / Colt 4 / Smoke Fluid A
Symbol	No risk or safety phrases stipulated
Risk phrases	No risk or safety phrases stipulated
Safety phrases	No risk or safety phrases stipulated

For US only: Compressed gas warning Pictogram – warning - contains gas under pressure – may explode if heated

Users are advised to consult these regulations for further information. The information contained in this data sheet does not constitute an assessment of workplace risks

16. Other Information

Further details may be available upon request from Concept Engineering.

Appendix G – Health and Safety Data SDS

Smoke Simulant Fluid – Concept Smoke C

Section 1: Product Identification

1.1 Product identifiers

Product name : A mixture of Dipropylene glycol and DeIonized Water
Product Number : D215554
Brand : Concept
REACH No. : A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No. : 25265-71-8

1.2 Relevant identified uses of the substance or mixture and uses advised against Identified uses :

Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company :
Concept Engineering Ltd
7 Woodlands Busienss Park, Maidenhead
Berks, SL6 3UA – UK
T +44 (0)1628 825555
F +44 (0)1628 826261
E support@conceptsmoke.com

1.4 Emergency telephone number
Emergency Phone # : +44 (0)1628 825555

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture
Not a hazardous substance or mixture according to Regulation (EC) No. 1272/2008.
Not a hazardous substance or mixture according to EC-directives 67/548/EEC or 1999/45/EC.
2.2 Label elements
The product does not need to be labelled in accordance with EC directives or respective national laws.
2.3 Other hazards - none

SECTION 3: Composition/information on ingredients

3.1 Substances
DiPropylene Glycol CAS 25265-7178 > 50%
DiWater CAS 7732-18-5 <50%
No components need to be disclosed according to the applicable regulations.

SECTION 4: First aid measures

4.1 Description of first aid measures
If inhaled- If breathed in, move person into fresh air. If not breathing, give artificial respiration.
In case of skin contact - Wash off with soap and plenty of water.
In case of eye contact- Flush eyes with water as a precaution.
If swallowed- Never give anything by mouth to an unconscious person. Rinse mouth with water.
4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11
4.3 Indication of any immediate medical attention and special treatment needed -no data available

SECTION 5: Firefighting measures

5.1 Extinguishing media- Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.
5.2 Special hazards arising from the substance or mixture - Carbon oxides
5.3 Advice for firefighters- Wear self contained breathing apparatus for fire fighting if necessary.
5.4 Further information- no data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Avoid breathing vapours, mist or gas.
For personal protection see section 8.
6.2 Environmental precautions
Do not let product enter drains.
6.3 Methods and materials for containment and cleaning up
Keep in suitable, closed containers for disposal.
6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
For precautions see section 2.2.
7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.
Hygroscopic. Store under inert gas.
7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters
Components with workplace control parameters
Contains no substances with occupational exposure limit values.
8.2 Exposure controls
Appropriate engineering controls
General industrial hygiene practice.
Personal protective equipment
Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).
Skin protection

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.
Body Protection
impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.
Respiratory protection
Respiratory protection not required. For nuisance exposures use type OV/AG (US) or type ABEK (EU EN 14387) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).
Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties
a) Appearance Form: viscous Colour: colourless
b) Odour odourless
c) Odour Threshold no data available
d) pH no data available
e) Melting point/freezing point
Melting point/range: < -20 °C at 101.3 hPa
f) Initial boiling point and boiling range 227 °C at 0.98 hPa
g) Flash point 130 °C - closed cup
h) Evaporation rate no data available
i) Flammability (solid, gas) no data available
j) Upper/lowerflammability or explosive limits no data available
k) Vapour pressure 0.0 hPa at 25 °C
l) Vapour density 5.37
m) Relative density 1.023 g/mL at 25 °C
n) Water solubility soluble
o) Partition coefficient: noctanol/water log Pow: -0.46 at 21.7 °C
p) Auto-ignition temperature 332 °C at 98.96 - 100.18 hPa
q) Decomposition temperature no data available
r) Viscosity no data available
s) Explosive properties no data available
t) Oxidizing properties no data available

9.2 Other safety information
Surface tension 71.4 mN/m at 1.01 at 22 °C
Relative vapour density 5.37

SECTION 10: Stability and reactivity

10.1 Reactivity- no data available
10.2 Chemical stability -Stable under recommended storage conditions.
10.3 Possibility of hazardous reactions -no data available
10.4 Conditions to avoid -no data available
10.5 Incompatible materials- Strong oxidizing agents
10.6 Hazardous decomposition products - Other decomposition products - no data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects
Acute toxicity CAS 25265-7178
LD50 Oral - rat - male and female - > 5,000 mg/kg
LC50 Inhalation - rat - male and female - 4 h - > 2.34 mg/l
LD50 Dermal - rabbit - > 5,010 mg/kg
Skin corrosion/irritation
Skin - rabbit
Result: No skin irritation
Serious eye damage/eye irritation
Eyes - rabbit
Result: No eye irritation
Respiratory or skin sensitisation
Buehler Test - guinea pig
Did not cause sensitisation on laboratory animals.
Germ cell mutagenicity in vitro assay lymphocyte
Result: negative
Mutagenicity (micronucleus test)
rat - male
Carcinogenicity
IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
Reproductive toxicity
Reproductive toxicity - rat - Oral
Maternal Effects: Other effects. no data available
Specific target organ toxicity - single exposure no data available
Specific target organ toxicity - repeated exposure no data available
Aspiration hazard no data available
Additional Information
Repeated dose toxicity - rat - male - Oral - No observed adverse effect level - 470 mg/kg
Repeated dose toxicity - rat - female - Oral - No observed adverse effect level - 530 mg/kg
RTECS: UB8765000
prolonged or repeated exposure can cause:, Central nervous system depression, Nausea, Headache,vomiting

SECTION 12: Ecological information

12.1 Toxicity
Toxicity to fish LC50 - Carassius auratus (goldfish) - > 5,000 mg/l - 24 h
Toxicity to daphnia and other aquatic invertebrates
static test EC50 - Daphnia magna (Water flea) - > 100 mg/l - 48 h
(OECD Test Guideline 202)
Toxicity to algae EC50 - Desmodesmus subspicatus (green algae) - > 100 mg/l - 72 h
(OECD Test Guideline 201)
12.2 Persistence and degradability
Biodegradability aerobic - Exposure time 28 d
Result: 84.4 % - Readily biodegradable.
(OECD Test Guideline 301F)
12.3 Bioaccumulative potential
Bioaccumulation Cyprinus carpio (Carp) - 3 mg/l
Bioconcentration factor (BCF): 0.3 - 4.6
(OECD Test Guideline 305C)
12.4 Mobility in soil- no data available
12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted
12.6 Other adverse effects - no data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods
Product
Offer surplus and non-recyclable solutions to a licensed disposal company.
Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number
ADR/RID: - IMDG: - IATA: -
14.2 UN proper shipping name
ADR/RID: Not dangerous goods
IMDG: Not dangerous goods
IATA: Not dangerous goods
14.3 Transport hazard class(es)
ADR/RID: - IMDG: - IATA: -
14.4 Packaging group
ADR/RID: - IMDG: - IATA: -
14.5 Environmental hazards
ADR/RID: no IMDG Marine pollutant: no IATA: no
14.6 Special precautions for user - no data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.
15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
no data available
15.2 Chemical Safety Assessment
For this product a chemical safety assessment was not carried out

SECTION 16 – OTHER INFORMATION

Legal Disclaimer The above information is based on the present state of our knowledge of the product at the time of publication. It is given in good faith, no warranty is implied with respect to this information

Appendix G (a) – Health and Safety Data SDS

Smoke Simulant Fluid – Concept Smoke C –in aerosol canister

Section 1: Product Identification

1.1 Product identifiers

Product name : A mixture of Dipropylene glycol and DeIonized Water in an aerosol, pressurised by inert N2
Product Number : D215554
Brand : Concept
REACH No. : A registration number is not available for this substance as the substance
or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No. : 25265-71-8

1.2 Relevant identified uses of the substance or mixture and uses advised against Identified uses :

Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company :
Concept Engineering Ltd
7 Woodlands Business Park, Maidenhead
Berks, SL6 3UA – UK
T +44 (0)1628 825555
F +44 (0)1628 826261
E support@conceptsmoke.com

1.4 Emergency telephone number
Emergency Phone # : +44 (0)1628 825555

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture
Not a hazardous substance or mixture according to Regulation (EC) No. 1272/2008.
Not a hazardous substance or mixture according to EC-directives 67/548/EEC or 1999/45/EC.

2.2 Label elements
CLP /GHS applies :

As a pressurised aerosol, no hazard pictogram is required for shipment with the EC

For shipping within the US the following GHS04 (Compressed Gas) pictogram applies

SECTION 3: Composition/information on ingredients

3.1 Substances
DiPropylene Glycol CAS 25265-7178 > 50%
DiWater CAS 7732-18-5 <50%
No components need to be disclosed according to the applicable regulations.

SECTION 4: First aid measures

4.1 Description of first aid measures
If inhaled- If breathed in, move person into fresh air. If not breathing, give artificial respiration.
In case of skin contact - Wash off with soap and plenty of water.
In case of eye contact- Flush eyes with water as a precaution.
If swallowed- Never give anything by mouth to an unconscious person. Rinse mouth with water.
4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11
4.3 Indication of any immediate medical attention and special treatment needed -no data available

SECTION 5: Firefighting measures

5.1 Extinguishing media- Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.
5.2 Special hazards arising from the substance or mixture - Carbon oxides
5.3 Advice for firefighters- Wear self-contained breathing apparatus for firefighting if necessary.
5.4 Further information- no data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Avoid breathing vapours, mist or gas.
For personal protection see section 8.
6.2 Environmental precautions
Do not let product enter drains.
6.3 Methods and materials for containment and cleaning up
Keep in suitable, closed containers for disposal.
6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
For precautions see section 2.2.
Protect from sunlight and do not expose to temperature >50C. Do not pierce or burn, even after use. Do not spray onto a naked flame or any incandescent material.
7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.
Hygroscopic.
7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters
Components with workplace control parameters
Contains no substances with occupational exposure limit values.
8.2 Exposure controls
Appropriate engineering controls
General industrial hygiene practice.
Personal protective equipment
Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).
Skin protection
The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of

contaminated gloves after use in accordance with applicable laws and good laboratory practices.
Wash and dry hands.
Body Protection
impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.
Respiratory protection
Respiratory protection not required. For nuisance exposures use type OV/AG (US) or type ABEK (EU EN 14387) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).
Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties
a) Appearance Form: viscous Colour: colourless
b) Odour odourless
c) Odour Threshold no data available
d) pH no data available
e) Melting point/freezing point
Melting point/range: < -20 °C at 101.3 hPa
f) Initial boiling point and boiling range 227 °C at 0.98 hPa
g) Flash point 130 °C - closed cup
h) Evaporation rate no data available
i) Flammability (solid, gas) no data available
j) Upper/lower flammability or explosive limits no data available
k) Vapour pressure 0.0 hPa at 25 °C
l) Vapour density 5.37
m) Relative density 1.023 g/mL at 25 °C
n) Water solubility soluble
o) Partition coefficient: noctanol/water log Pow: -0.46 at 21.7 °C
p) Auto-ignition temperature 332 °C at 98.96 - 100.18 hPa
q) Decomposition temperature no data available
r) Viscosity no data available
s) Explosive properties no data available
t) Oxidizing properties no data available

9.2 Other safety information
Surface tension 71.4 mN/m at 1.01 at 22 °C
Relative vapour density 5.37

SECTION 10: Stability and reactivity

10.1 Reactivity- no data available
10.2 Chemical stability -Stable under recommended storage conditions.
10.3 Possibility of hazardous reactions -no data available
10.4 Conditions to avoid -no data available
10.5 Incompatible materials- Strong oxidizing agents
10.6 Hazardous decomposition products - Other decomposition products - no data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects
Acute toxicity CAS 25265-7178
LD50 Oral - rat - male and female - > 5,000 mg/kg
LC50 Inhalation - rat - male and female - 4 h - > 2.34 mg/l
LD50 Dermal - rabbit - > 5,010 mg/kg
Skin corrosion/irritation
Skin - rabbit
Result: No skin irritation

Serious eye damage/eye irritation
Eyes - rabbit
Result: No eye irritation
Respiratory or skin sensitisation
Buehler Test - guinea pig
Did not cause sensitisation on laboratory animals.
Germ cell mutagenicity in vitro assay lymphocyte
Result: negative
Mutagenicity (micronucleus test)
rat - male
Carcinogenicity
IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
Reproductive toxicity
Reproductive toxicity - rat - Oral
Maternal Effects: Other effects. no data available
Specific target organ toxicity - single exposure no data available
Specific target organ toxicity - repeated exposure no data available
Aspiration hazard no data available
Additional Information
Repeated dose toxicity - rat - male - Oral - No observed adverse effect level - 470 mg/kg
Repeated dose toxicity - rat - female - Oral - No observed adverse effect level - 530 mg/kg
RTECS: UB8765000
prolonged or repeated exposure can cause:, Central nervous system depression, Nausea, Headache,vomiting

SECTION 12: Ecological information

12.1 Toxicity
Toxicity to fish LC50 - Carassius auratus (goldfish) - > 5,000 mg/l - 24 h
Toxicity to daphnia and other aquatic invertebrates
static test EC50 - Daphnia magna (Water flea) - > 100 mg/l - 48 h
(OECD Test Guideline 202)
Toxicity to algae EC50 - Desmodesmus subspicatus (green algae) - > 100 mg/l - 72 h
(OECD Test Guideline 201)
12.2 Persistence and degradability
Biodegradability aerobic - Exposure time 28 d
Result: 84.4 % - Readily biodegradable.
(OECD Test Guideline 301F)
12.3 Bioaccumulative potential
Bioaccumulation Cyprinus carpio (Carp) - 3 mg/l
Bioconcentration factor (BCF): 0.3 - 4.6
(OECD Test Guideline 305C)
12.4 Mobility in soil- no data available
12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted
12.6 Other adverse effects - no data available

SECTION 13: Disposal considerations

Substance: Via an authorised waste disposal contractor to an approved waste disposal site, observing all local and national regulations.

Container: As substance

SECTION 14: Transport information

The goods are classified as Aerosols and are therefore considered hazardous because of the nature of the pressurised canister. The propellant within the canister is inert nitrogen.

Aerosols are classified as UN1950, Hazard Class 2.2. Normally shipped as "limited quantities"

The chemical contents are not classified by IMDG as a marine pollutant.

By Air:	UN1950, Aerosols, Non Flammable, 2.2
By Sea /Road (Multimodal)	UN1950, Aerosols, 2.2, "Ltd Qty", (ADR5A). All inners less than 1 litre capacity

For further information or guidance please contact Concept (techsupport@conceptsmoke.com)

SECTION 15: Regulatory information

Supply label details:	CLP
Label name:	Cubic supply own labelling
Symbol	No risk or safety phrases stipulated
Risk phrases	No risk or safety phrases stipulated
Safety phrases	No risk or safety phrases stipulated

For US only: Compressed gas warning Pictogram – warning - contains gas under pressure – may explode if heated

Users are advised to consult these regulations for further information. The information contained in this data sheet does not constitute an assessment of workplace risks

SECTION 16 – OTHER INFORMATION

Date: July 2015

Legal Disclaimer The above information is based on the present state of our knowledge of the product at the time of publication. It is given in good faith, no warranty is implied with respect to this information

Appendix F SDS Concept Smoke Oil 135 / 180

(relates to product supplied from 1st June 2016)

1. Identification of the Substance/Preparation and the Company/Undertaking

Product identifier:	Concept Smoke Oil 135 / 180
Product name:	Concept Smoke Oil 135 / 180
REACH registered name:	White Mineral Oil – Pharmaceutical Grade
REACH registered No:	01-211948707078-27
CAS Number:	8042-47-5
Chemical Synonyms:	Liquid Paraffin, meeting the requirements of European Pharmacopoeia and FDA 178.3620(a) and 172.878

Details of the supplier of the safety data sheet:
Concept Smoke Systems Ltd
7 Woodlands Business Park
Woodlands Park Avenue
Maidenhead
Berks, UK, SL6 3UA

Emergency telephone number:	+44 (0)1628 825555
Email:	technicalsupport@conceptsmoke.com

2 Hazards Identification

2.1 Classification of the Substance or Mixture: CLP Regulation 1272/2008/EC
Does not contain any components which are hazardous according to DSD [67/548/EC] or CLP Regulation 1272/2008/EC. For further information refer to Section 11 – Toxicological Information

2.2 Label Elements:
Does not require a hazard warning label in accordance with DSD [67/548/EC] or CLP Regulation 1272/2008/EC

2.3 Other Hazards:
PBT: This product is not identified as a PBT / vPvB substance

Hot liquid may cause thermal burns.

3 Composition

3.1 Substances: Not Applicable
3.2 Mixtures: White, pharmaceutical grade mineral oil

CAS-No:	Substance Name	% Range	EC Number	REACH Reg No
8042-47-5	White Mineral Oil (petroleum)	100	232-455-8	01-211948707078-27

There are no additional ingredients present which, within current knowledge of the supplier, are classified and contribute to the classification of the substance and hence require reporting in this section in accordance with Regulation (EC) No. 1272/2008.

4 First aid measures

4.1 Description of First Aid Measures

General Information: Remove contaminated / saturated clothing immediately. In case of accident or illness seek medical advice immediately.

Inhalation: Remove the affected person to fresh air, keep warm and rest. If recovery is not rapid, obtain medical attention

Skin Contact: Wash the affected parts of the body with soap and water. No emergency measures are necessary but if adverse skin effects follow, refer for medical attention.

Eye Contact: Flush eyes immediately with fresh water for at least 5 minutes while holding the eyelids open. No emergency measures are necessary but if adverse eye effects follow, refer for medical attention.

Ingestion: Do not induce vomiting. No emergency measures are needed but if adverse health effects follow or large amounts are swallowed, refer for medical attention.

Self-Protection of First Aider: First aider, pay attention to self-protection.

4.2 Most important symptoms and effects, both acute and delayed

Inhalation:	Over-heated oil can produce fumes which may be irritant when breathed in.
Skin Contact:	May cause slight irritation to skin.
Ingestion:	No known significant effects or critical hazards
Eye Contact:	May cause slight irritation to eyes

4.3 Indication of any immediate medical attention and special treatment needed

In contact with or splashed by hot liquid:

Skin Contact	Cool the skin immediately with cool water. Treat burns according to their severity. Obtain medical attention. Never try to remove the material with solvents.
Contact with eyes	Cool the area immediately with cold water. Seek advice of an ophthalmologist.
Specific Treatment:	First Aider, decontamination, treatment of symptoms.
Notes to doctor:	Treat symptomatically.

5 Firefighting measures

5.1 Extinguishing media: Foam, dry chemical, carbon dioxide, water mist.

5.2 Special hazards arising from the substance or mixture: Slight flammability hazard when exposed to heat or flame. During a fire, toxic gases (carbon monoxide, nitrous gases) may be generated by thermal decomposition or combustion.

5.3 Advice for firefighters: Only suitably trained personnel should attempt to tackle fires. Do not stay in the danger zone without respiratory protective equipment and protective clothing.

6 Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures: Surfaces may become slippery after spillage.

6.2 Environmental precautions: Water may be used to flush spills away from sources of ignition. Do not allow the product to enter public drainage system or open water courses.

6.3 Methods and material for containment and cleaning up: Use Sand or active clay to absorb spilled substance and remove to containers for disposal

6.4 Reference to other Sections: See sections 8 and 13

7 Handling and storage

7.1 Precautions for safe handling: Avoid skin contact. Do not wear contaminated clothing. Avoid contact with the eyes – wear chemical protective goggles when handling the product. Protective clothing such as impervious gloves should be worn if skin contact is anticipated. Protective clothing should be regularly inspected and maintained, discard oil saturated leather articles. The use of barrier and after work creams may be beneficial. Wash hands after working with the material.

7.2 Conditions for safe storage, including any incompatibilities: Keep containers tightly closed. Avoid heat and sources of ignition. Store in original containers or in other mild steel or high density polyethylene containers which are closable and clearly labelled. Clean up any spilled material immediately

8 Exposure Controls/Personal Protection

8.1 Control Parameters:	Oil mist < 5mg/m^3. Exposure should be kept as low as reasonably possible by good ventilation and safe working practices.
DNEL / PNEC Values: -	No Data Available
8.2 Exposure Controls:	
Appropriate engineering measures:	Facilities storing/utilising this material should be equipped with an eyewash facility.
Respiratory protection:	Type approved RPE for organic vapours and mists if required
Eye protection:	Wear appropriate eye goggles.
Skin protection:	No special precautions are needed beyond clean working conditions and safe handling practices. Change heavily contaminated clothing.
Hand protection:	Use impervious gloves [conforming to EN374] PVC is suitable for casual contact. If direct contact for more than 2 hours then Neoprene or nitrile gloves recommended.

8.3 Environmental Exposure Controls: See sections 6, 7, 12 and 13

The resultant artificial smoke produced by appropriate Concept smoke generators has been rigorously tested to ensure that in normal conditions it is non-toxic. Independent health and safety reports (available on request) indicate that dense artificial smoke concentrations (visibility through the smoke 0.5 – 1m) can be entered without any serious health risk for short periods of time. Copies available on request. We do nevertheless recommend the following;

- persons who are asthmatic or suffer from a respiratory complaint are not subjected to dense smoke concentrations
- the use of suitable PPE in the event of extended exposure or repeated exposure to such environments (Concept recommend the 3m 6000 facemask with 2 x 2135 p3 particulate filters, or similar)
- if used in conjunction with live fires, where, by definition there is the potential for products of combustion to be formed, along with other hazards (unburnt propane etc.), self-contained breathing apparatus (SCBA) should always be worn.

9 Physical and Chemical Properties

9.1 Information on basic chemical and physical properties:

Appearance:	Colourless Liquid (at elevated temperature)
Odour:	Odourless
Odour threshold:	Not determined
pH:	Neutral
Melting point/ Congealing point:	Not Applicable
Boiling point/ range:	310 - 550°C
Flash Point:	> 160°C, (ASTM D92, COC)
Evaporation Rate:	<0.1 (n-Bu Acetate= 1)
Flammability (solid, gas):	May be combustible at high temperature
Explosion Limits:	Not determined
Vapour pressure:	<0.1 mmHg at 20^0C
Vapour density:	>1 at 101.3kPa (air= 1)
Relative density (at 15°C):	0.83 – 0.86 kg/l
Solubility in water:	Insoluble
Solubility in other solvents:	Petroleum Ether, Ethyl Acetate
Partition coefficient n-octanol/water:	Not Determined
Auto-ignition temperature:	>160°C.
Decomposition temperature:	Not determined
Viscosity (Kinematic, at 40°C):	21~32 cSt
Explosive properties:	Not determined
Oxidizing properties:	Not determined

9.2 Other Information: None

10 Stability and Reactivity

10.1 Reactivity: This product is not reactive under normal storage and handling conditions (see section 7).
10.2 Chemical stability: Under normal storage and handling conditions, this product is stable. May react with strong oxidising agents, especially at high temperatures.
10.3 Possibility of hazardous reactions: No specific hazardous reactions are expected to occur.
10.4 Conditions to avoid: Extremes of temperature (preferably, store between 5 & 39 °C).
10.5 Incompatible materials: May react with strong oxidants (e.g. chlorates, peroxides).
10.6 Hazardous decomposition products: Thermal decomposition or incomplete combustion may produce carbon monoxide, nitrous gases and irritating fumes.

11 Toxicological Information

11.1 Information on toxicological effects – White Mineral Oil

Acute Toxicity

Acute Toxicity (oral)	LD50>5000mg/kg
Acute Toxicity (dermal)	LD50>2000mg/kg
Acute Toxicity (inhalation)	LC50 >5200mg/m^3/4hr
Skin Corrosive / Irritation:	Not Irritant
Serious Eye Damage Irritation:	Repeated or prolonged contact spray, mist or vapours may cause eye irritation but no permanent damage.
Respiratory Sensitisation:	This material has a low vapour pressure and does not cause an irritation to the breathing passages. Aspiration of spray, mist or vapour may cause chemical pneumonitis.
Skin Sensitisation:	Non-sensitising
Repeated Dose Toxicity:	Prolonged contact to skin or eyes can cause irritation and possible dermatitis.
Mutagenicity:	Negative to Modified Ames test
Carcinogenicity:	Does not contain any IARC Group 1, 2(a) or 2(b) Listed Chemicals. Polycyclic Aromatic Hydrocarbons by IP346 <1.0%.
Reproductive Toxicity:	Not determined

12 Ecological Information

12.1 Toxicity: White Mineral Oil

Environmental Fate – this material, because of its density, will float on water. Since it consists of relatively low molecular weight paraffinic substances, small spillages into water will be dispersed by evaporation and biodegradation.

Aquatic toxicity (fish):	LC50 >400,000ppm in 96h – Rainbow Trout (0% mortality)
Aquatic toxicity (algae):	not established.
Aquatic toxicity (invertebrate):	LC50 > 500,000ppm in 96h – Mysidopsis bahia.
Mobility:	This material will float on water. For other Physio-chemical properties see section 9.
Biodegradation:	Inherently Biodegradable (OECD 301B 50% in 28 days)
Bioaccumulation potential:	Bioaccumulation is unlikely due to the very low water solubility of this product. Bioavailability to aquatic organisms is minimal.
Other Ecological information:	Although not toxic to vertebrates and invertebrates, spilled material may affect organisms (especially small invertebrates) by physical smothering leading to or by deoxygenation of the water below the oil film.
Results of PBT/vPvB assessment:	This substance does not fulfil the criteria for being classed as a PBT or vPvB substance.

13 Disposal Considerations

13.1 Waste treatment methods: Transport to authorised waste location, or incinerate under controlled conditions (EU Directives 2000/76/EC and 1999/31EC apply). European Waste Catalogue No. 050199/130899.

14 Transport Information

14.1 UN number:	Not Classified.
14.2 UN Proper shipping name:	Not Classified
14.3 Transport Hazard Class(es):	Not Classified
14.4 Packing Group:	Not Classified
14.5 Environmental Hazards:	None
14.6 Special Precautions for user:	None
14.7 Transport in bulk according To Annex II of MARPOL73/78 and the IBC code:	Not Classified

15 Regulatory Information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture:

EU Regulations	Directive 67/548/EC Regulation [EC] 1272/2008 Regulation [EC] 1907/2006

15.2 Chemical Safety Assessment: The supplier has not performed a chemical safety assessment of this substance.

16 Other Information

Indication of changes:

The above information is applicable to the following grades supplied from 1st June 2016. Always refer to operating instructions before use
Smoke Oil 135
Smoke Oil 180
The above products are not classified as VOC's

Abbreviations & Acronyms

PNEC	**Predicted No Effect Level**
DNEL	**Derived No Effect Level**
LD50	**Median Lethal Dose**
LC50	**Median Lethal Concentration**
CAS No	**Chemical Abstract Services number**
CLP	**Classification Labelling and Packaging Regulation**
ES	**Exposure Scenario**
EC	**European Commission**
EC No	**European Chemical Number – EINECS - ELINCS**
ECHA	**European Chemical Agency**
EINECS	**European Inventory of Existing Commercial Chemical Substances**
ELINCS	**European List of Notified Chemical Substances.**

Legal Disclaimer The above information is based on the present state of our knowledge of the product at the time of publication. It is given in good faith, no warranty is implied with respect to the quality or the specification of the product. The user must satisfy themselves that the product is entirely suitable for their purpose.

Appendix F1 SDS Concept Artem Smoke Cans

(relates to product supplied from 1st June 2015)

1. Identification of the Substance/Preparation and the Company/Undertaking

Product identifier:	Concept Artem Smoke cans
Product name:	Concept Artem Smoke Cans
REACH registered name:	White Mineral Oil – Pharmaceutical Grade
REACH registered No:	01-211948707078-27
CAS Number:	8042-47-5
Chemical Synonyms:	Liquid Paraffin, meeting the requirements of European Pharmacopoeia and FDA 178.3620(a) and 172.878

Details of the supplier of the safety data sheet:
Concept Smoke Systems Ltd
7 Woodlands Business Park
Woodlands Park Avenue
Maidenhead
Berks, UK, SL6 3UA

Emergency telephone number:	+44 (0)1628 825555
Email:	technicalsupport@conceptsmoke.com

2 Hazards Identification

2.1 Classification of the Substance or Mixture: CLP Regulation 1272/2008/EC
Does not contain any components which are hazardous according to DSD [67/548/EC] or CLP Regulation 1272/2008/EC. For further information refer to Section 11 – Toxicological Information

2.2 Label Elements:
The smoke chemical does not require a hazard warning label in accordance with DSD [67/548/EC] or CLP Regulation 1272/2008/EC.

Because of the packaging in an aerosol format the following applies:
For US only: Compressed gas warning Pictogram

2.3 Other Hazards:
PBT: This product is not identified as a PBT / vPvB substance

Hot liquid may cause thermal burns.

3 Composition

3.1 Substances: Not Applicable
3.2 Mixtures: White, pharmaceutical grade mineral oil

CAS-No:	Substance Name	% Range	EC Number	REACH Reg No
8042-47-5	White Mineral Oil (petroleum)	100	232-455-8	01-211948707078-27

There are no additional ingredients present which, within current knowledge of the supplier, are classified and contribute to the classification of the substance and hence require reporting in this section in accordance with Regulation (EC) No. 1272/2008.

4 First aid measures

4.1 Description of First Aid Measures

General Information: Remove contaminated / saturated clothing immediately. In case of accident or illness seek medical advice immediately.

Inhalation: Remove the affected person to fresh air, keep warm and rest. If recovery is not rapid, obtain medical attention

Skin Contact: Wash the affected parts of the body with soap and water. No emergency measures are necessary but if adverse skin effects follow, refer for medical attention.

Eye Contact: Flush eyes immediately with fresh water for at least 5 minutes while holding the eyelids open. No emergency measures are necessary but if adverse eye effects follow, refer for medical attention.

Ingestion: Do not induce vomiting. No emergency measures are needed but if adverse health effects follow or large amounts are swallowed, refer for medical attention.

Self-Protection of First Aider: First aider, pay attention to self-protection.

4.2 Most important symptoms and effects, both acute and delayed

Inhalation:	Over-heated oil can produce fumes which may be irritant when breathed in.
Skin Contact:	May cause slight irritation to skin.
Ingestion:	No known significant effects or critical hazards
Eye Contact:	May cause slight irritation to eyes

4.3 Indication of any immediate medical attention and special treatment needed

In contact with or splashed by hot liquid:

Skin Contact	Cool the skin immediately with cool water. Treat burns according to their severity. Obtain medical attention. Never try to remove the material with solvents.
Contact with eyes	Cool the area immediately with cold water. Seek advice of an ophthalmologist.
Specific Treatment:	First Aider, decontamination, treatment of symptoms.
Notes to doctor:	Treat symptomatically.

5 Firefighting measures

5.1 Extinguishing media: Foam, dry chemical, carbon dioxide, water mist.

5.2 Special hazards arising from the substance or mixture: Slight flammability hazard when exposed to heat or flame. During a fire, toxic gases (carbon monoxide, nitrous gases) may be generated by thermal decomposition or combustion.

5.3 Advice for firefighters: Only suitably trained personnel should attempt to tackle fires. Do not stay in the danger zone without respiratory protective equipment and protective clothing.

6 Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures: Surfaces may become slippery after spillage.

6.2 Environmental precautions: Water may be used to flush spills away from sources of ignition. Do not allow the product to enter public drainage system or open water courses.

6.3 Methods and material for containment and cleaning up: Use Sand or active clay to absorb spilled substance and remove to containers for disposal

6.4 Reference to other Sections: See sections 8 and 13

7 Handling and storage

7.1 Handling: Avoid contact with the eyes—wear chemical protective goggles when handling the product. Protective clothing such as impervious gloves should be worn if skin contact is anticipated. Protective clothing should be regularly inspected and maintained. The use of Barrier and after work creams may be beneficial.

7.2 Storage: Keep containers lightly closed in cool, dry conditions. Avoid heat and sources of Ignition. Store in original containers or in other mild steel or high density polyethylene Containers which are closable and clearly labelled. Clean up any spilled material immediately. Take all necessary precautions against accidental spillage into soil or water courses

8 Exposure Controls/Personal Protection

8.1 Control Parameters: Oil mist < 5mg/m^3. Exposure should be kept as low as reasonably possible by good ventilation and safe working practices.

DNEL / PNEC Values: - No Data Available

8.2 Exposure Controls:

Appropriate engineering measures: Facilities storing/utilising this material should be equipped with an eyewash facility.

Respiratory protection: Type approved RPE for organic vapours and mists if required

Eye protection: Wear appropriate eye goggles.

Skin protection: No special precautions are needed beyond clean working conditions and safe handling practices. Change heavily contaminated clothing.

Hand protection: Use impervious gloves [conforming to EN374] PVC is suitable for casual contact. If direct contact for more than 2 hours then Neoprene or nitrile gloves recommended.

8.3 Environmental Exposure Controls: See sections 6, 7, 12 and 13

<u>Artem smoke is designed for outdoor use only. It is not intended or recommended for indoor use or on confined / restricted areas</u>

- persons who are asthmatic or suffer from a respiratory complaint are not subjected to dense smoke concentrations
- If exposure to dense concentrations of smoke is likely then consider the use of suitable PPE (for example the 3m 6000 facemask with 2 x 2135 p3 particulate filters, or similar)

9 Physical and Chemical Properties

9.1 Information on basic chemical and physical properties:

Appearance:	Colourless Liquid (at elevated temperature)
Odour:	Odourless
Odour threshold:	Not determined
pH:	Neutral
Melting point/ Congealing point:	Not Applicable
Boiling point/ range:	310 - 550°C
Flash Point:	> 160°C, (ASTM D92, COC)
Evaporation Rate:	<0.1 (n-Bu Acetate= 1)
Flammability (solid, gas):	May be combustible at high temperature
Explosion Limits:	Not determined
Vapour pressure:	<0.1 mmHg at 20^0C
Vapour density:	>1 at 101.3kPa (air= 1)
Relative density (at 15°C):	0.83 – 0.86 kg/l
Solubility in water:	Insoluble
Solubility in other solvents:	Petroleum Ether, Ethyl Acetate
Partition coefficient n-octanol/water:	Not Determined
Auto-ignition temperature:	>160°C.
Decomposition temperature:	Not determined
Viscosity (Kinematic, at 40°C):	21~32 cSt
Explosive properties:	Not determined
Oxidizing properties:	Not determined
Aerosol propellant:	Inert Nitrogen

9.2 Other Information: None

10 Stability and Reactivity

10.1 Reactivity: This product is not reactive under normal storage and handling conditions (see section 7).
10.2 Chemical stability: Under normal storage and handling conditions, this product is stable. May react with strong oxidising agents, especially at high temperatures.
10.3 Possibility of hazardous reactions: No specific hazardous reactions are expected to occur.
10.4 Conditions to avoid: Extremes of temperature (preferably, store between 5 & 39 °C).
10.5 Incompatible materials: May react with strong oxidants (e.g. chlorates, peroxides).
10.6 Hazardous decomposition products: Thermal decomposition or incomplete combustion may produce carbon monoxide, nitrous gases and irritating fumes.

11 Toxicological Information

11.1 Information on toxicological effects – White Mineral Oil

Acute Toxicity

Acute Toxicity (oral)	LD50>5000mg/kg
Acute Toxicity (dermal)	LD50>2000mg/kg
Acute Toxicity (inhalation)	LC50 >5200mg/m^3/4hr
Skin Corrosive / Irritation:	Not Irritant
Serious Eye Damage Irritation:	Repeated or prolonged contact spray, mist or vapours may cause eye irritation but no permanent damage.
Respiratory Sensitisation:	This material has a low vapour pressure and does not cause an irritation to the breathing passages. Aspiration of spray, mist or vapour may cause chemical pneumonitis.
Skin Sensitisation:	Non-sensitising
Repeated Dose Toxicity:	Prolonged contact to skin or eyes can cause irritation and possible dermatitis.
Mutagenicity:	Negative to Modified Ames test
Carcinogenicity:	Does not contain any IARC Group 1, 2(a) or 2(b) Listed Chemicals. Polycyclic Aromatic Hydrocarbons by IP346 <1.0%.
Reproductive Toxicity:	Not determined

12 Ecological Information

12.1 Toxicity: White Mineral Oil

Environmental Fate – this material, because of its density, will float on water. Since it consists of relatively low molecular weight paraffinic substances, small spillages into water will be dispersed by evaporation and biodegradation.

Aquatic toxicity (fish):	LC50 >400,000ppm in 96h – Rainbow Trout (0% mortality)
Aquatic toxicity (algae):	not established.
Aquatic toxicity (invertebrate):	LC50 > 500,000ppm in 96h – Mysidopsis bahia.
Mobility:	This material will float on water. For other Physio-chemical properties see section 9.
Biodegradation:	Inherently Biodegradable (OECD 301B 50% in 28 days)
Bioaccumulation potential:	Bioaccumulation is unlikely due to the very low water solubility of this product. Bioavailability to aquatic organisms is minimal.
Other Ecological information:	Although not toxic to vertebrates and invertebrates, spilled material may affect organisms (especially small invertebrates) by physical smothering leading to or by deoxygenation of the water below the oil film.
Results of PBT/vPvB assessment:	This substance does not fulfil the criteria for being classed as a PBT or vPvB substance.

13 Disposal Considerations

13.1 Waste treatment methods: Transport to authorised waste location, or incinerate under controlled conditions (EU Directives 2000/76/EC and 1999/31EC apply). European Waste Catalogue No. 050199/130899.

14 Transport Information

Due to the packaging of the product in aerosol form, the Artem Smoke Canister is considered as hazardous because of the nature of the pressurised container.

The Smoke Chemical itself is not classified as hazardous by UN, RID/ADR,IMO,IATA/ICAO, not classified to Annex 1 of Marpol 73/78.

Packaged in aerosol format the classifications are as follows:

14.1 UN number:	UN1950
14.2 UN Proper shipping name:	Aerosols, non flammable
14.3 Transport Hazard Class(es):	By Air: UN1950, Aerosols, Non Flammable, 2.2 By Sea: UN1950, Aerosols, 2.2, "Ltd Qty", (ADR5A). All inners less than 1L capacity
14.4 Packing Group:	Y203 (air), Overpack for sea

15 Regulatory Information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture:

EU Regulations	Directive 67/548/EC Regulation [EC] 1272/2008 Regulation [EC] 1907/2006

15.2 Chemical Safety Assessment: The supplier has not performed a chemical safety assessment of this substance.

16 Other Information

Indication of changes: All sections revised according to Regulation [EC] No 1272/2008 [CLP] in preparation for the 1 June 2015 deadline.

The above information is applicable to the following grades supplied from 1st June 2015. Always refer to operating instructions before use
Artem Smoke Canisters

The above product is not classified as VOC's

Abbreviations & Acronyms

PNEC	**Predicted No Effect Level**
DNEL	**Derived No Effect Level**
LD50	**Median Lethal Dose**
LC50	**Median Lethal Concentration**
CAS No	**Chemical Abstract Services number**
CLP	**Classification Labelling and Packaging Regulation**
ES	**Exposure Scenario**
EC	**European Commission**
EC No	**European Chemical Number – EINECS - ELINCS**
ECHA	**European Chemical Agency**
EINECS	**European Inventory of Existing Commercial Chemical Substances**
ELINCS	**European List of Notified Chemical Substances.**

Legal Disclaimer The above information is based on the present state of our knowledge of the product at the time of publication. It is given in good faith, no warranty is implied with respect to the quality or the specification of the product. The user must satisfy themselves that the product is entirely suitable for their purpose.