SAFETY DATA SHEET

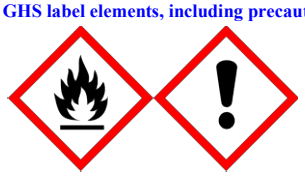
HEATSAVR

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

Product name	:	**HEATSAVR** **(HS140, HS480, HS560, HS700)**	**Supplier**	:	Flexible Solutions International 6001 - 54th Ave. Taber, AB T1G 1X4 Canada
Chemical product name	:	ISOPROPANOL			
Synonyms	:	ISOPROPYL ALCOHOL; PROPAN-2-OL; 2-PROPANOL; DIMETYL CARBINOL; IPA;			
EMERGENCY ONLY TELEPHONE NUMBER	:	Canutec (613) 996-6666	**Telephone No.**	:	(403) 223 - 2995
			Fax No.	:	(403) 223 - 2905
Formula	:	CH3CHOHCH3, CH3CH2OH	**Molecular Mass**	:	N/A

2. Hazards Identification

GHS label elements, including precautionary statement:



Signal Word: Danger

Physical/Chemical Hazard:

H225 Highly flammable liquid and vapour.
H315 + H320 Causes skin and eye irritation.
H335 + H336 May cause respiratory irritation. May cause drowsiness or dizziness.
P501 Dispose of contents and container to an approved waste disposal plant.
P240 Ground/bond container and receiving equipment.
P337 + P313 If eye irritation persists: Get medical attention.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention.
P303 + P361 + P353 IF ON SKIN: Remove immediately all contaminated clothing. Rinse skin with water.
P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P210 Keep away from heat, sparks, open flames, and hot surfaces. No smoking.
P233 Keep container tightly closed.
P403 + P235 Store in well-ventilated place. Keep cool.
P241 Use explosion-proof electrical, ventilation and lighting equipment.
P242 Use only non-sparking tools.
P264 Wash hands thoroughly after handling.
P280 Wear protective gloves and eye and face protection.

Potential Health Effects:

Organ	Description
Eyes	Can cause eye irritation. Common symptoms include stinging, tearing, and redness.
Ingestion	May cause dizziness, faintness, drowsiness, decreased awareness and responsiveness, euphoria, abdominal discomfort, nausea, vomiting, staggering gait, lack of coordination and coma.
Inhalation	High vapour concentrations may cause a burning sensation in the throat and nose, stinging and watering in the eyes. At concentrations which cause irritation, dizziness, faintness, drowsiness, nausea and vomiting may occur.

Skin	Mild irritant. Repeated or prolonged exposure may lead to dermatitis, erythema and scaling.
Chronic	Effects of Repeated Overexposure: Long term repeated oral exposure to ethanol may result in the development of progressive liver injury with fibrosis. Other Health Hazards: Repeated ingestion of ethanol by pregnant mothers has been shown to adversely affect the development of the fetal central nervous system and progression of fetal alcohol syndrome. Medical Conditions Aggravated by Overexposure: Repeated exposure to ethanol may aggravate previous liver condition. Skin contact may aggravate dermatitis.

3. Composition/Information on Ingredients

Chemical name: Heatsavr (Isopropanol)
Common name/Synonym: ISOPROPYL ALCOHOL; PROPAN-2-OL; 2-PROPANOL; DIMETYL CARBINOL; IPA

Chemical name*	CAS No.	%	EC Number	Symbol	R-Phrases
1) Isopropanol 2) Organic Surfactant	67-63-0	90.0 N/A	200-661-7	F, Xi	R11, R36, R37, R67

*** Occupational Exposure Limit(s), if available, are listed in Section 8**

Composition CONTAINS ISOPROPANOL
CAS No. 67-63-0
EINECS Number 200-661-7

4. First-Aid Measures

INGESTION	• Do NOT induce vomiting. Never give anything by mouth to an unconscious or convulsing person. Seek immediate medical attention. If vomiting occurs spontaneously, keep head below hips to prevent aspiration of liquid into the lungs.
SKIN	• In case of contact, immediately flush skin with plenty of water for at least 15 minutes. Get medical attention. Remove contaminated clothing and launder before reuse.
INHALATION	• Remove person to fresh air. If not breathing, give artificial respiration. If breathing is difficult, get immediate medical attention.
EYES	• In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.
NOTES FOR PHYSICIAN	• Treatment based on sound judgment of physician and individual reactions of patient. Because rapid absorption may occur through lungs if aspirated and cause systemic effects, the decision of whether to induce vomiting or not should be made by a physician. If lavage is performed, suggest endotracheal and/or esophageal control. Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach.Hemodialysis may be of benefit if substantial amounts have been ingested and the patient is showing signs of intoxication. Consider hemodialysis for patients with persistent hypotension or coma unresponsive to standard therapy (isopropanol levels >400 - 500 mg/dl). (Goldfrank 1998, King et al, 1970).

5. Fire-Fighting Measures

EXTINGUISHING MEDIA	• Water fog or fine spray, carbon dioxide, dry chemical, foam. Alcohol resistant foams (ATC type) are preferred if available. General purpose synthetic foams (including AFFF) or protein foams may function, but much less effectively. Do not use direct water stream, which will spread fire.
UNUSUAL FIRE AND EXPOSURE HAZARDS	• Isolate and restrict area access. Stop leak only if safe to do so. Move containers from fire area if you can do it without risk. Fight fire from a safe distance and from a protected location. Keep out of low areas where gases (fumes) can accumulate. Use water spray to cool fire-exposed containers and structures. Use water spray to disperse vapors; re-ignition is possible. NEVER use a water jet directly on the fire because it may spread the fire to a larger area. Use caution and test if material is burning before entering area. Material burns with invisible flame. Container may rupture from gas generation in a fire situation. When product is stored in closed containers, a flammable atmosphere can develop. Flammable mixtures of this product are readily ignited even by static discharge. Use proper bonding and grounding during product transfer. Vapors are heavier than air and may accumulate in low areas. Vapors may travel along the ground to be

	ignited at distant locations. Flammable mixtures may exist within the vapor space of containers at room temperature. Flammable concentrations of vapor can accumulate at temperatures above flash point. • Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. Consult local authorities.
PROCEDURE FOR CLEAN UP	• Contain spill by diking. Collect in suitable and properly labeled containers. Apply vapor suppression foams until spill can be cleaned up. Take precautionary measures against static discharge. Ensure electrical continuity by bonding and grounding (earthing) all equipment. Monitor area with combustible gas indicator. Pump with explosion-proof equipment. If available, use foam to smother or suppress vapors. Small spills: soak up with absorbent material and scoop into containers. Large spills : prevent contamination of waterways. Dike and pump into suitable containers. Clean up residual with absorbent material, place in appropriate container and flush with water.

6. Accidental Release Measures

PERSONAL AND ENVIRONMENTAL PRECAITIONARY MEASURES	• Isolate area. Keep unnecessary and unprotected personnel from entering the area. Keep personnel out of low areas. Keep upwind of spill. Ventilate area of leak or spill. No smoking in area. Eliminate all sources of ignition in vicinity of spill or released vapor to avoid fire or explosion. Ground and bond all containers and handling equipment. For large spills, warn public of downwind explosion hazard. Check area with combustible gas detector before reentering area. Use appropriate safety equipment. •
WASTE DISPOSAL	• Waste material should be disposed of in a approved incinerator or in a designated landfill site, in compliance with all federal, provincial and local government regulations.

7. Handling and Storage

HANDLING	• Keep away from heat, sparks and flame. Avoid contact with eyes, skin and clothing. Do not ingest. Avoid breathing mist or vapor. Wash thoroughly after handling. Do not enter confined spaces unless adequately ventilated. Never use air pressure for transferring product. No smoking or open flame in storage, use or handling areas. Vapors are heavier than air and will collect in low areas. Vapors form from this product and may travel or be moved by air currents and ignited by pilot lights, other flames, smoking, sparks, heaters, electrical equipment, static discharges or other ignition sources at locations distant from product handling point and may flash back explosively. Bond and ground containers during transfer operations. Use non-sparking tools. Empty containers may contain hazardous product residues. Do not cut, drill, grind, weld or perform similar operations on or near containers.
STORAGE	• Store in a cool, dry, well ventilated area, away from heat and ignition sources. Keep away from direct sunlight. Place away from incompatible materials. Peroxides can form if this product is stored in contact with air. Peroxides can be explosive. Shelf life: 20 months in original, sealed container.

8. Exposure Controls/Personnel Protection

ENGINEERING CONTROLS	• For personnel entry into confined spaces (i.e. bulk storage tanks) a proper confined space entry procedure must be followed including ventilation and testing of tank atmosphere. Local ventilation recommended where mechanical ventilation is ineffective in controlling airborne concentrations below the recommended occupational exposure limit. Concentrations in air should be maintained below lower explosive limit at all times or below the recommended threshold limit value if unprotected personnel are involved. Make up air should always be supplied to balance air exhausted (either generally or locally). Electrical and mechanical equipment should be explosion proof. Mechanical ventilation is recommended for all indoor situations to control fugitive emissions.
RESPITORY PROTECTION	• NIOSH approved supplied air respirator when airborne concentrations exceed exposure limits. Use a NIOSH-approved chemical cartridge respirator with organic vapor cartridges or use a NIOSH-approved supplied- air respirator. For high airborne concentrations, use a NIOSH -approved supplied-air respirator, either self-contained or airline breathing apparatus, operated in positive pressure mode.
PROTECTIVE GLOVES	• Use gloves chemically resistant to this material, examples of preferred glove barrier materials include: Polyethylene gloves. Natural rubber gloves. Neoprene gloves. Nitrile gloves. Ethyl Vinyl Alcohol Laminate (EVAL). Polyvinylchloride (PVC) gloves. Examples of acceptable glove barrier materials include: Polyvinyl alcohol gloves. NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials as

	well as the instructions/specifications provided by the glove supplier.
EYE PROTECTION	• Chemical goggles; also wear a face shield if splashing hazard exists.
SKIN PROTECTION	• Skin contact should be prevented through the use of suitable protective clothing, gloves and footwear, selected for conditions of use and exposure potential. Consideration must be given both to durability as well as permeation resistance.

Ingredient	Exposure Limit - ACGIH	Exposure - OSHA	Immediately Dangerous to Life or Health -IDLH
Isopropyl Alcohol	400 ppm STEL 200 ppm TWA	400 ppm TWA 980 mg/m³ TWA 500 ppm STEL 1225 mg/m³ STEL	2000 ppm

9. Physical and Chemical Properties

Physical state	:	Liquid.
Colour	:	Light Blue
Odour	:	Typical alcoholic odour.
Odour threshold	:	Approximately 0.1 to 5100 ppm for ethyl alcohol and 40 to 200 ppm for isopropyl alcohol, as reported in appendix 1 of the Canadian Standards Association guide Z94.4-M1982.
Boiling point	:	82 to 83 degrees C/180 to 181 degrees F
Melting point	:	Approximately minus 100 deg. C
Density	:	0.785 g/cm3 at 20°C (68°F)
Vapour density	:	2.1 (Air = 1)
Vapour pressure	:	4.26 KPA (33 hPa) @ 20 deg. C. for 100% Isopropanol
Relative Density (Liquid)	:	0.7882 @ 20 degrees. C.
Solubility in water	:	Complete
Solubility in oil-coefficient of water/oil distribution	:	Separates from oil
Partition coefficient N-octanol/water	:	0.032 approximately
pH	:	Not available.
Flash point	:	12 degrees C/54 degrees F (Tag closed cup, ASTM D-56)
Evaporation rate	:	1.5 (butyl acetate = 1)
Lower flammability limit	:	2.5% V/V for 100% Isopropyl alcohol
Upper flammability limit	:	12% V/V for 100% Isopropyl alcohol
Fire Hazards in Presence of Various Substances	:	Highly flammable in presence of open flames, sparks and static discharge, of heat.
Auto-ignition temperature	:	425 degrees C/797 degrees F
Decomposition temperature	:	Specific data not available
% volatiles by volume	:	Not available
Viscosity	:	Dynamic 2.4 mPa.s @ 20 deg. C.
Chemical formula	:	Isopropyl alcohol: CH3-CHOH-CH3 Molecular weight: 60.9 Water: H2O Molecular weight: 18.02

10. Stability and Reactivity

Chemical stability/reactivity	:	Stable
Materials to avoid	:	Aldehydes. Halogenated organics. Halogens. Strong acids. Strong oxidizers.
Possibility of hazardous reactions/ incompatibilities	:	Oxidizing materials
Hazardous combustion or decomposition products	:	Hazardous decomposition products depend upon temperature, air supply, and the presence of other materials.
Hazardous polymerization	:	Will not occur
Conditions to avoid	:	Product can decompose at elevated temperatures. Avoid contact with heat, sparks, open flame, and static discharge.

11. Toxicological Information

INGREDIENT	% V/V	TLV, ppm	LC50, ppm/4h	LC50, mg/kg	LD50, mg/kg
			Rat, Inhal.	Rat, Oral	Rabbit, Skin
Isopropyl Alcohol	4.76	400	16,970	4,420	13,000
Water	Balance	N/A	N/A	N/A	N/A

Reference: ACGIH (1988-1989), RTECS (1983).

INGESTION	• Low toxicity. Small amounts swallowed incidental to normal handling operations are not likely to cause injury. Swallowing larger amounts may cause injury. May cause central nervous system effects, such as headache, nausea, vomiting, abdominal pain, dizziness, confusion and breathing difficulties. Signs and symptoms of excessive exposure may include: Facial flushing. Low blood pressure. Irregular heartbeats. Aspiration into the lungs during ingestion or vomiting may lead to chemical pneumonitis.
SKIN	• Prolonged exposure not likely to cause significant skin irritation. May cause drying and flaking of the skin. Prolonged skin contact is unlikely to result in absorption of harmful amounts.
INHALATION	• With good ventilation, single exposure is not likely to be hazardous. In poorly ventilated areas, vapors or mists may accumulate and cause respiratory irritation. Prolonged excessive exposure may cause adverse effects. Excessive exposure (400 ppm) to isopropanol may cause eye, nose and throat irritation. Incoordination, confusion, hypotension, hypothermia, circulatory collapse, respiratory arrest and death may follow a longer duration or higher levels. Observations in animals include middle ear lining damage upon exposure to vapors of isopropanol. However, the relevance of this to humans is unknown.
EYES	• May cause pain disproportionate to the level of irritation to eye tissue. May cause moderate eye irritation. May cause corneal injury. Vapor may cause eye irritation experienced as mild discomfort and redness. May cause lachrymation (excessive tears).
ADDITIONAL INFORMATION	• Isopropanol is a moderate to severe eye irritant and a mild skin irritant. Repeated or prolonged skin contact can cause drying and cracking of the skin (dermatitis). There are no reports of harmful effects developing following short-term exposure to Isopropanol. Exposure produced mild - moderate irritation of the nose and throat. It can probably cause central nervous system (CNS) depression, based on animal information and comparison to related alcohols. Symptoms may include headache, nausea, dizziness, vomiting and incoordination. High exposures may result in unconsciousness and death. Ingestion of large amounts can result in symptoms of CNS depression. Isopropanol can probably be inhaled into the lungs (aspirated) during ingestion or vomiting. Aspiration can result in severe, lifethreatening lung damage. In rats and mice long-term exposure by inhalation or ingestion has produced decreased body weight, a reversible increase in motor activity, increased liver weight, and signs of central nervous system (CNS) depression. Decreased testes weight has been observed in mice, while increased testes weight has been observed in rats exposed to high concentrations. Kidney injury has been observed in rats (especially males) and mice exposed to high concentrations. These effects are believed to be species specific and unlikely to occur in humans. Observations in animals include: Lethargy. Isopropanol toxicity is synergistic with chloroform and carbon tetrachloride resulting in hepatotoxicity.

Acute Test of Product:
Acute Oral LD50: 5045 mg/kg (rat)
Acute Dermal LD50: 12800 mg/kg (rabbit)
Acute Inhalation LC50: 16000ppm for 8 hrs

12. Ecological Information

Ingredient	Ecotoxicity - Fish Species Data	Acute Crustaceans Toxicity:	Ecotoxicity - Freshwater Algae Data
Isopropyl Alcohol	11130 mg/L LC50 (Pimephales promelas) 96h static 9640 mg/L LC50 (Pimephales promelas) 96h flow-through	Not Available	1000 mg/L EC50 Desmodesmus subspicatus 72h 1000 mg/L EC50 Dermodesmus subspicatus 96h

	1400000ug/L LC50 (Lepomis macrochirus) 96h		

Other Information:
Ecotoxicity: Material is practically non-toxic to aquatic organisms on an acute basis (LC50 or EC50 > 100 mg/L in the most sensitive species tested).Material is readily biodegradable.

13. Disposal Considerations

DISPOSAL of WASTE METHOD	• Recover or recycle if possible. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations. Disposal of all wastes must be done in accordance with municipal, provincial and federal regulations.
CONTAMINATED PACKAGING	• Drain container thoroughly. After draining, vent in a safe place away from sparks and fire. Residues may cause an explosion hazard. Do not puncture, cut or weld uncleaned drums. Empty containers should be recycled or disposed of through an approved waste management facility.

14. Transport Information

Canada: UN number: 1219

UN	**:**	**UN number**	1219
UN	**:**	**Proper shipping name**	Isopropanol
UN	**:**	**Class**	3
UN	**:**	**Packing group**	II
UN	**:**	**Label**	

IMDG	**:**	**Proper shipping name**	Isopropanol
IMDG	**:**	**Packing group**	II
IMDG	**:**	**Class**	3
IMDG	**:**	**Marine pollutant**	No

IATA	**:**	**Proper shipping name**	Isopropanol
IATA	**:**	**Packing group**	II
IATA	**:**	**Class**	3

15. Regulatory Information

All ingredients are on the following inventories or are exempted from listing:

Country Notification	
Australia	AICS
Canada	DSL
China	IECS
EU	EINECS
Japan	ENCS/ISHL
Korea	ECL
New Zealand	NZIoC
Philippines	PICCS
USA	TSCA

16. Other Information

History *(please note that dates are in Canadian format [day/month/year])*

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Prepared by	**:**	**Flexible Solutions Ltd.**

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