SAFETY DATA SHEET

REV	Description	Date	C.R. No.	Orig	Chkd	Apprd
1	New	10 Jan 2010		PD	CB	JS
2	BQ Inc Address update	23-04-2013	2332	ES	PD	CB
3	FMC change to PeroxyChem	07-Jul-14	2703	ES	EB	CB
4	Update in line with US CLP	09-12-2015		SS	CB	DH
5	Update format align with GHS	01-12-2017	3506	JC	SPM	CB

SAFETY DATA SHEET

Bioquell Hydrogen Peroxide Sterilant HPV-AQ

SDS Ref. No.: TD075-SP-011
Date Revised: 1 Dec 2017
Revision No.: 5

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name:	Bioquell Hydrogen Peroxide Sterilant HPV-AQ
Synonyms:	Hydrogen Peroxide Solution 20 to 40%
General Use:	Bioquell Hydrogen Peroxide Sterilant is a sterilant for use in conjunction with Bioquell Hydrogen Peroxide Vapor generating equipment. Bioquell Hydrogen Peroxide Vapor is intended for a use as a sterilant in treating enclosures up to 3500 ft^3. This product must be used in as instructed in the Bioquell use manual. Bioquell Hydrogen Peroxide Sterilant may not be used on food-contact surfaces unless followed by a potable water rinse.
Manufacturer	BIOQUELL INC 702 Electronic Drive, Suite 200 Horsham, PA 19044 (215) 682 0225 (General Information) ed.striefsky@bioquell.com (Email - General Information) Contact: Ed Striefsky
Emergency Telephone Number	For medical or transportation emergencies, call: 1-866-519-4752 (3E Company - U.S.A.) access code: 333809

2. HAZARDS IDENTIFICATION

Classification

OSHA Regulatory Status
This chemical is considered hazardous by the 2012 OSHA hazard communication standard (29 CFR 1910.1200) and the 2015 Workplace Hazardous Materials Information System (WHMIS)

Acute toxicity – Oral	Category 4
Acute toxicity – Inhalation (Vapors)	Category 4
Skin corrosion / irritation	Category 2 Sub-category B
Serious eye damage / eye irritation	Category 1
Specific target organ toxicity (single exposure)	Category 3
Oxidizing Liquids	Category 2

GHS Label Elements, including precautionary statements

EMERGENCY OVERVIEW

DANGER

Hazard statements
H318 – Causes serious eye damage
H302 – Harmful if swallowed
H332 – Harmful if inhaled
H335 – May cause respiratory irritation
H315 – Causes skin irritation
H272 – May intensify fire; oxidizer

Precautionary Statements – Prevention
P261 – Avoid breathing mist / vapors / spray
P270 – Do not eat, drink or smoke when using this product
P280 – Wear protective gloves / protective clothing / eye protection / face protection
P210 – Keep away from heat / sparks / open flames / hot surfaces – no smoking
P221 – Take any precaution to avoid mixing with combustibles / flammables
P220 – Keep / store away from clothing / flammable materials / combustibles

Precautionary Statements – Response
P305+P351+P338 – IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 – immediately call a POISON CENTER or doctor
P302+P352 – IF ON SKIN: Wash with plenty of water
P332+P313 – If skin irritation occurs: Get medical advice /attention
P362+P364 – Take off all contaminated clothing and wash it before reuse
P304+P340 – IF INHALED: Remove person to fresh air and keep comfortable for breathing
P301+P312+P330 – IF SWALLOWED; Call a POISON CENTER or doctor if you feel unwell. Rinse mouth
P370+P378 – In case of fire: use water for extinction

Hazards not otherwise classified (HNOC)
No hazards not otherwise classified were identified.

Other information
Keep container in a cool place out of direct sunlight. Store only in well vented containers. Do not store on wooden pallets. Do not return unused material to its original container. Avoid contamination – contamination could cause decomposition and generation of oxygen which may result in high pressure and possible container rupture. Empty containers should be triple rinsed with water before discarding.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Formula: HO – OH
Chemical nature: Aqueous solution

Chemical Name	CAS#	Weight %
Hydrogen Peroxide	7722-84-1	35%
Water	7732-18-5	65%

Occupational exposure limits, if available are listed in Section 8.

4. FIRST AID MEASURES

Eye Contact: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing. Seek immediate medical attention / advice.

Skin Contact: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15 – 20 minutes. Call a poison control center or doctor for further treatment advice.

Ingestion: Rinse mouth. Do not induce vomiting. If conscious, give 2 glasses of water. Get immediate medical attention. Never give anything by mouth to an unconscious person

Inhalation: Move to fresh air. If person is not breathing, contact emergency medical services, then give artificial respiration, preferably mouth-to-mouth if possible. Call a poison control center or doctor for further treatment advice.

Most important symptoms and effects, both acute and delayed: In case of accidental ingestion, necrosis may result from mucous membrane burns (mouth, esophagus and stomach). Oxygen rapid release may cause stomach swelling and hemorrhaging, which may produce major, or even fatal, injury to organs if a large amount has been ingested.

	In case of skin contact, may cause burns, erythema, blisters or even necrosis. Hydrogen peroxide irritates respiratory system and, if inhaled, may cause inflammation and pulmonary edema. The effects may not be immediate.
Indication of immediate medical attention and special treatment needed, if necessary:	Hydrogen peroxide at these concentrations is a strong oxidant. Direct contact with the eye is likely to cause corneal damage especially if not washed immediately. Careful ophthalmologic evaluation is recommended and the possibility of local corticosteroid therapy should be considered. Because of the likelihood of corrosive effects on the gastrointestinal tract after ingestion, and the unlikelihood of systemic effects, attempts at evacuating the stomach via emesis induction or gastric lavage should be avoided. There is a remote possibility, however, that a nasogastric or orogastric tube may be required for the reduction of severe distension due to gas formation

5. FIRE FIGHTING MEASURES

Suitable extinguishing media:	Water. Do not use any other substance.
Specific hazards arising from the chemical:	In closed unventilated containers, risk of rupture due to the increased pressure from decomposition. Contact with combustible material may cause fire.
Hazardous combustion products:	On decomposition, product releases oxygen, which may intensify fire.
Explosion data **Sensitivity to mechanical impact:**	Not sensitive.
Sensitivity to static discharge:	Not sensitive.
Protective equipment and precautions for firefighters:	Use water spray to cool fired exposed surfaces and protect personnel. Move containers from fire area if you can do so without risk. As in any fire, wear self-contained breathing apparatus and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Avoid contact with skin, eyes and clothing. Wear personal protective equipment. Isolate and post spill area. Keep people away from and upwind of spill/leak. Eliminate all sources of ignition and remove combustible materials.
Other:	Combustible materials exposed to hydrogen peroxide should be immediately submerged in or rinsed with large amounts of water to ensure that all hydrogen peroxide is removed. Residual hydrogen peroxide that is allowed to dry (upon evaporation hydrogen peroxide can concentrate) on organic materials such as paper, fabrics, cotton, leather, wood or other combustibles can cause the material to ignite and result in a fire.
Environmental precautions:	Do not flush into surface water or sanitary sewer system; if discharged into sewers or water courses, dilute with plenty of water. See Section 12 for additional ecological information.
Methods for containment:	Dike to collect large liquid spills. Stop leak and contain spill if this can be done safely. Small spillage: Dilute with large quantities of water.
Methods for cleaning up:	Flush area with flooding quantities of water. Hydrogen peroxide may be decomposed by adding sodium metabisulfite or sodium sulfite after diluting to about 5%.

7. HANDLING AND STORAGE

Handling:	Keep/store away from clothing/combustible materials. Wear personal protective equipment (see section 8). Never return unused hydrogen peroxide to original container. Contamination may cause decomposition and generation of oxygen gas which could result in high pressures and possible container rupture. Empty containers should be triple rinsed with water before discarding. Utensils used for handling hydrogen peroxide should only be made of glass, stainless steel, aluminum or plastic. Pipes and equipment should be passivated before first use. Use only in well-ventilated areas. Hydrogen peroxide should be stored only in vented containers and transferred only in a prescribed manner.

Storage: Keep containers in cool areas out of direct sunlight and away from combustibles. Provide mechanical general and / or local exhaust ventilation to prevent release of vapor or mist into work environment. Containers must be vented. Keep/ store only in original container. Store rooms or warehouses should be made of non-combustible materials with impermeable floors. In case of release, spillage should flow to safe area. Containers should be visually inspected on a regular basis to detect any abnormalities. (Swollen containers, increases in temperature etc.).

Incompatible products: Combustible materials. Copper alloys, galvanized iron. Strong reducing agents. Heavy metals. Iron. Contact with metals, metallic ions, alkalis, reducing agents and organic matter (such as alcohols or terpenes) may produce self-accelerated thermal decomposition.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure guidelines:

Chemical name	**ACGIH TLV**	**OSHA PEL**	**NIOSH**	**Mexico**
Hydrogen Peroxide 7722-84-1	1 ppm (TWA)	TWA: 1 ppm TWA: 1.4 mg/m^3	IDLH: 75 pm TWA: 1ppm TWA:1.4 mg/m^3	TWA: 1ppm TWA:1.5 mg/m^3 STEL 2ppm STEL:3 mg/m^3
Chemical name	**British Columbia**	**Quebec**	**Ontario TWAEV**	**Alberta**
Hydrogen Peroxide 7722-84-1	TWA: 1ppm	TWA: 1ppm TWA:1.4 mg/m^3	TWA: 1ppm	TWA: 1ppm TWA:1.4 mg/m^3

Appropriate engineering controls

Engineering measures: Ensure that eye wash stations and safety showers are close to the workstation location. Ensure adequate ventilation.

Individual protection measures, such as personal protective equipment

Eye/face protection: Use chemical splash-type mono-goggles and a full-face shield made of polycarbonate, acetate, polycarbonate/acetate, PETG or thermoplastic.

Skin and body protection:	For body protection wear impervious clothing such as an approved splash protective suit made of SBR Rubber, PVC (PVC Outershell Polyester Substrate), Gore-Tex (Polyester trilaminate Gore-Tex), or a specialized HAZMAT Splash or Protective Suite (Level A, B, or C). For foot protection, wear approved boots made of NBR, PVC, Polyurethane, or neoprene. Overboots made of Latex or PVC, as well as firefighter boots or specialized HAZMAT boots are also permitted. DO NOT wear any form of boot or overboots made of nylon or nylon blends. DO NOT use cotton, wool or leather, as these materials react RAPIDLY with higher concentrations of hydrogen peroxide. Completely submerge hydrogen peroxide contaminated clothing or other materials in water prior to drying. Residual hydrogen peroxide, if allowed to dry on materials such as paper, fabrics, cotton, leather, wood or other combustibles can cause the material to ignite and result in a fire.
Hand protection:	For hand protection, wear approved gloves made of nitrile, PVC, or neoprene. DO NOT use cotton, wool or leather for these materials react RAPIDLY with higher concentrations of hydrogen peroxide. Thoroughly rinse the outside of gloves with water prior to removal. Inspect regularly for leaks
Respiratory protection:	If concentrations in excess of 10 ppm are expected, use NIOSH/DHHS approved self-contained breathing apparatus (SCBA), or other approved atmospheric-supplied respirator (ASR) equipment (e.g., a full-face airline respirator (ALR)). DO NOT use any form of air-purifying respirator (APR) or filtering face piece (AKA dust mask), especially those containing oxidizable sorbants such as activated carbon
Hygiene measures:	Avoid breathing vapors, mist or gas. Clean water should be available for washing in case of eye or skin contamination
General information:	Protective engineering solutions should be implemented and in use before personal protective equipment is considered

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Clear, colorless liquid
Color	Colorless
Physical State	Liquid
Odor:	Odorless
Boiling Point:	108ºC/226ºF (35%)
Decomposition temperature	100ºC (adiabatic)
Density / Weight per Volume Density:	1.13 g/cm @20ºC
Evaporation Rate:	>1 (n-butyl Acetate = 1)
Flash Point:	Non combustible
Auto-ignition temperature	Not combustible
Flammability (solid, gas)	Not flammable
Flammability limit in air	Not applicable
Upper flammability limit:	No information available
Lower flammability limit:	No information available
Freezing Point:	-33ºC/-27ºF (35%)
Melting Point:	-0.43ºC
Odor Threshold:	Not available
Oxidizing Properties:	Strong oxidizer
Partition coefficient	Log Kow = -1.5 @ 20ºC
pH::	(as is) 2.0 to 3.7
Solubility in Water:	(in H2O % by wt.) 100% completely soluble
Solubility in other solvents	No information available
Specific Gravity:	1.13
Vapor Density:	(Air = 1): Not available
Vapor Pressure:	23 mmHg @ 30ºC (35%)
Viscosity kinematic	1.10 cP @ 20ºC
Viscosity dynamic	No information available
Explosive properties	No information available
Molecular weight	34
Bulk density	Not applicable

10. STABILITY AND REACTIVITY

Reactivity:	Reactive and oxidizing agent
Conditions to Avoid:	Excessive heat, contamination, exposure to UV-rays; pH Variations.
Chemical stability:	Stable under normal conditions. Decomposes on heating. Stable under recommended storage conditions.
Hazardous Polymerization:	Change does not occur
Possibility of hazardous reactions:	Contact with organic substances may cause fire or explosion. Contact with metals metallic ions, alkalis, reducing agents and organic matter (such as alcohols or terpenes) may produce self-accelerated thermal decomposition
Incompatible Materials:	Combustible materials. Copper alloys, galvanized iron. Strong reducing agents. Heavy metals. Iron. Contact with metals, metallic ions, alkalis, reducing agents and organic matter (such as alcohols or terpenes) may produce self-accelerated thermal decomposition.
Hazardous Decomposition Products:	Oxygen which supports combustion. Liable to produce over pressure in container.

11. TOXICOLOGICAL INFORMATION

LD50 Oral:	35% solution: LD50 1193mg/kg bw (rat)
LD50 Dermal:	35% solution: LD50 >2000mg/kg bw (rabbit)
LC50 Inhalation:	50% solution: LC50 >170 mg/m^3 (rat) (4-hr) Hydrogen peroxide vapors: LC0 9400 mg/m^3 (mouse) (5–15 minutes) Hydrogen peroxide vapors: LC50 > 2160 mg/m^3 (mouse)
Serious eye damage/eye irritation:	Corrosive. Risk of serious damage to eyes
Skin corrosion/irritation:	Moderately irritating (rabbit).
Sensitization:	Did not cause sensitization on laboratory animals

Information on toxicological effects

Symptoms: Vapors, mists or aerosols of hydrogen peroxide can cause upper airway irritation, inflammation of the nose, hoarseness, shortness of breath, and a sensation of burning or tightness in the chest. Prolonged exposure to concentrated vapor or to dilute solutions can cause irritation and temporary bleaching of skin and hair. Exposure to vapor, mist or aerosol can cause stinging pain and tearing of eyes.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Carcinogenicity: This product contains hydrogen peroxide. The International Agency for Research on Cancer (IARC) has concluded that there is inadequate evidence for carcinogenicity of hydrogen peroxide in humans, but limited evidence in experimental animals (Group 3 - not classifiable as to its carcinogenicity to humans). The American Conference of Governmental Industrial Hygienists (ACGIH) has concluded that hydrogen peroxide is a 'Confirmed Animal Carcinogen with Unknown Relevance to Humans' (A3).

Chemical Name	IARC	NTP	OSHA	Other
Hydrogen Peroxide	3	Not listed	Not listed	(ACGIH) A3

Mutagenicity: This product is not recognized as mutagenic by Research Agencies. In vivo tests did not show mutagenic effects

Reproductive toxicity: No toxicity to reproduction in animal studies

STOT – single exposure: May cause respiratory irritation

STOT – repeated exposure: Not classified

Target Organ effects: Eyes, nose, throat, lungs and skin.

Aspiration hazard: Aspiration risk: May cause lung damage if swallowed

12. ECOLOGICAL INFORMATION

Ecotoxicity

Ecotoxicity effects: Hydrogen peroxide is naturally produced by sunlight (between 0.1 and 4 ppb in air 0.001 to 0.1 mg/L in water). Not expected to have significant environmental effects.

Active ingredient	Duration	Species	Value	Units
Hydrogen peroxide	96-h LC50	Fish Pimephales promelas	16.4	mg/L
	72–h LC50	Fish Leuciscus idus	35	mg/L
	48-h EC50	Daphnia pulex	2.4	mg/L
	24 h EC50	Daphnia magna	7.7	mg/L
	72h EC50	Algae Skeletonema costatum	1.38	mg/L
	21 d NOEC	Daphnia magna	0.63	mg/L

Persistence and degradability: Hydrogen peroxide in the aquatic environment is subject to various reduction or oxidation processes and decomposes into water and oxygen. Hydrogen peroxide half-life in freshwater ranged from 8 hours to 20 days, in air from 10-20 hrs, and in soils, from minutes to hours depending upon microbiological activity and metal contaminants.

Bioaccumulation: Material may have some potential to bioaccumulate but will likely degrade in most environments before accumulation can occur.

Mobility: Will likely be mobile in the environment due to its water solubility but will likely degrade over time.

Other adverse effects: Decomposes into oxygen and water – no adverse effects

13. DISPOSAL CONSIDERATIONS

Waste disposal methods: Dispose of in accordance with local regulations. Can be disposed as waste water, when in compliance with local regulations.

US EPA waste number: D001

Contaminated packaging: Dispose of in accordance with local regulations. Containers – empty as thoroughly as possible. Triple rinse containers before disposal. Avoid contamination; impurities accelerate decomposition. Never return product to original container**.**

14. TRANSPORT INFORMATION

DOT

Proper Shipping Name:	HYDROGEN PEROXIDE, AQUEOUS SOLUTION
Primary Hazard Class / Division:	5.1 (Oxidizer)
Hazard Class, Subsidiary:	8 (Corrosive)
UN/ID Number:	UN 2014
Packing Group:	II

TDG

Proper Shipping Name:	HYDROGEN PEROXIDE, AQUEOUS SOLUTION
Primary Hazard Class / Division:	5.1 (Oxidizer)
Hazard Class, Subsidiary:	8 (Corrosive)
UN/ID Number:	UN 2014
Packing Group:	II

ICAO/IATA

Primary Hazard Class / Division:	Air regulation permit shipment of Hydrogen peroxide (<=40%) in non-vented containers for Air Cargo Only aircraft, as well as for Passenger and Cargo aircraft.

IMDG / IMO

Proper Shipping Name:	HYDROGEN PEROXIDE, AQUEOUS SOLUTION
Primary Hazard Class / Division:	5.1 (Oxidizer)
Hazard Class, Subsidiary:	8 (Corrosive)
UN/NA Number:	UN 2014
Packing Group:	II
Label(s):	Oxidizer, Corrosive

Other Information:

Protect from physical damage. Keep containers in upright position. Containers should not be stacked in transit. Do not store containers on wooden pallets.

15. REGULATORY INFORMATION

United States federal regulations

SARA Title III (Superfund Amendments and Reauthorization Act)

Section 313 of title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations Part 372.

Section 311/312 Hazard Categories:

Fire Hazard	Yes
Acute Health Hazard	Yes
Chronic health hazard	No
Sudden release of pressure hazard	No
Reactive hazard	No

Clean water act

This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act 940 CFR 122.21 and 40 CFR 122.42)

CERCLA/EPCRA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Response Compensation and Liability Act (CERCLA) or as an extremely hazardous substance (EHS) under the Emergency Planning and Community Right to Know Act (EPCRA)/ Superfunds Amendments and Reauthorization Act (SARA). This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) OR THE Superfund Amendment and Reauthorization Act (SARA) (40CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material.

Chemical name	Hazardous substances RQs (40 CFR 302.4)	Extremely hazardous substances RQs (40 CFR 355 Appendix A)	SARA Section 302 EHS Threshold planning Quantity (40 CRF 355)
Hydrogen peroxide 7722-84-1		1000lb	1000lb

Hydrogen peroxide RQ is for concentrations of >52% only

FIFRA INFORMATION

EPA Pesticide registration number 72372-1

This chemical is a pesticide product registered by the Environmental Protection Agency and is subject to certain labeling requirements under federal pesticide law. These requirements differ from the classification criteria and hazard information required for safety data sheets, and for workplace labels of non-pesticide chemicals. Following is the hazard information as required on the pesticide label:

DANGER
Corrosive, causes eye and skin damage.
Harmful if swallowed.
Strong oxidizing agent.
This pesticide is toxic to birds, mammals, fish and aquatic invertebrates.

US State Regulations

This product contains the following substances regulated under state Right-to-know laws:

Chemical name	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Hydrogen peroxide	X	X	X		X

International Inventories

Component	TSCA (United States)	DSL (Canada)	EINECS/ELINCS (Europe)	ENCS (Japan)	China (IECSC)	KECL (Korea)	PICCS (Philippines)	AICS (Australia)	NZIoC (New Zealand)
Hydrogen peroxide 7722-84-1 (35)	X	X	X	X	X	X	X	X	X

Mexico Grade **Serious risk, Grade 3**

16. OTHER INFORMATION

NFPA	**Health Hazards** 3	**Flammability** 0	**Stability** 1	**Special Hazards** OX
HMIS	**Health Hazards** 3	**Flammability** 0	**Physical hazard** 1	**Special precautions** H

NFPA/HMIS Ratings Legend Severe = 4; Serious = 3; Moderate = 2; Slight = 1; Minimal = 0
Special Hazards: OX = Oxidizer
Protection = H (Safety goggles, gloves, apron, the use of supplied air or SCBA respirator is required in lieu of a vapor cartridge respirator)

Uniform Fire Code Oxidizer: Class 2--Liquid

Revision date: 2017-01-12

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Prepared By: Bioquell UK Ltd
Revision Summary:
This SDS replaces Revision 4, dated June 5, 2016
Changes in information are as follows:
Document reformatted and brought in line with GHS requirements
WHMIS data moved from Section 16