Safety Data Sheet

Hyper LTS® Cartridge

contains

HYPROX® 600 AS

ID 40.1.0

MMM Münchener Medizin Mechanik GmbH
Semmelweisstraße 6
D-82152 Planegg
www.mmmgroup.com

REV 1.0 | 2021 - 06

1 Safety information

The Hyper LTS® low-temperature hydrogen peroxide sterilizer from MMM Münchener Medizin Mechanik GmbH uses a hydrogen peroxide solution as the sterilizing agent. This solution is used in a nominal concentration required for the sterilization process and specified by MMM Münchenener Medizin Mechanik GmbH of

- 59 % +/- 0,5 %

filled in special containers and distributed under the trade name Hyper LTS® Cartridge for use exclusively with the Hyper LTS® sterilizer.

Product Details

Trade name:	Hyper LTS® Cartridge
Variant:	Hyper LTS® 150 Cartridges
Manufacturer:	Münchener Medizin Mechanik GmbH, Semmelweis-strasse 6, D-82152 Planegg
Filler:	SODI Industriepark AG, Zürcherstrasse 42, CH-5330 Bad Zurzach
Content:	Hydrogen peroxide in solution with a nominal concentration of 59% +/- 0.5%.
Trade name of the content:	Hyprox® 600 AS

Hydrogen peroxide solution details

Manufacturer:	Evonik Resource Efficiency GmbH RE-ES-PS Hanau Postfach 1345 D-63403 Hanau, Germany
Trade name:	Hyprox® 600 AS

All hazardous substance information required by EC 1907/2006 is included in the safety data sheet of the manufacturer of the hydrogen peroxide solution (see attachment). Please refer to the manufacturer's safety data sheet for the product Hyprox® 600 AS.

Annex

Safety data sheet on Hyprox® 600 AS from Evonik Resource Efficiency GmbH.

SAFETY DATA SHEET

1. Identification

Product identifier: HYPROX® 600 AS

Other means of identification

Recommended use: Not available.
Recommended restrictions: Not known.

Manufacturer/Importer/Distributor Information

Company Name	:	Evonik Resource Efficiency GmbH RE-ES-PS Hanau Postfach 1345 63403 Hanau Germany
Telephone	:	+49 6181 59 4787
E-mail	:	sds-hu@evonik.com

Emergency telephone number:

24-Hour Health Emergency	:	+49 2365 49 2232

2. Hazard(s) identification

According to Hazardous Product Regulations

Physical Hazards

Oxidizing liquids	Category 2

Health Hazards

Acute toxicity (Oral)	Category 4
Acute toxicity (Inhalation)	Category 4
Skin corrosion	Sub-category 1B
Serious Eye Damage/Eye Irritation	Category 1
Specific Target Organ Toxicity - Single Exposure	Category 3[1.]

Target Organs

1. Respiratory system

Environmental Hazards

Acute hazards to the aquatic environment	Category 2

Label Elements

Hazard Symbol:

Signal Word: Danger

Hazard Statement:
May intensify fire; oxidizer.
Harmful if swallowed or if inhaled.
Causes severe skin burns and eye damage.
May cause respiratory irritation.
Toxic to aquatic life.

Precautionary Statements

Prevention: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Keep away from clothing and other combustible materials. Avoid breathing dust/fume/gas/mist/vapors/spray. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. Avoid release to the environment. Wear protective gloves/protective clothing/eye protection/face protection.

Response: IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower]. IF INHALED: Remove person to fresh air and keep comfortable for breathing. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor. Wash contaminated clothing before reuse. In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.

Storage: Store in a well-ventilated place. Keep container tightly closed. Store locked up.

Disposal: Dispose of contents/ container to an approved waste disposal plant.

Other hazards: Product is a strong oxidizing agent. Release of oxygen may support combustion. Danger of decomposition under influence of heat. Risk of decomposition in contact with incompatible substances, impurities, metals, alkalis, reducing agents. Risk of explosion with organic solvents. This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

3. Composition/information on ingredients

Mixtures

aqueous solution, clear

Chemical Identity	Common name and synonyms	CAS number	Content in percent (%)*
Hydrogen peroxide		7722-84-1	>=59,5 - <60%

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First-aid measures

Description of necessary first-aid measures

General information: Pay attention to self-protection. Remove victims from hazardous area. Immediately remove soiled or soaked clothing and remove it to a safe distance. Keep victim warm, in a stabilized position and covered. Do not leave victims unattended. If the casualty is unconscious: Place the victim in the recovery position.

Inhalation: Potential for exposure by inhalation if aerosols or mists are generated. Move victims into fresh air. With labored breathing: Provide with oxygen. Consult a doctor. If the casualty is not breathing: Perform mouth-to-mouth resuscitation, notify emergency physician immediately.

Skin Contact: Wash off affected area immediately with plenty of water for at least 15 minutes. If symptoms persist, consult a physician for treatment.

Eye contact: With eye held open, thoroughly rinse immediately with plenty of water for at least 10 minutes. Consult an ophthalmologist immediately if the symptoms persist. When dealing with caustic substances, notify emergency physician immediately (key words: burns in eye).

Ingestion: Rinse mouth. Immediately give large quantities of water to drink. Do NOT induce vomiting. Obtain medical attention. When dealing with caustic substances, notify emergency physician immediately.

Personal Protection for First-aid Responders: In the case of fire, wear respiratory protective equipment independent of surrounding air and chemical protective suit.

Most important symptoms/effects, acute and delayed

Symptoms: Strongly irritating to corrosive. daze, Headache, vertigo, somnolence (sleepiness), nausea. Health injuries may be delayed.

Hazards: Strongly irritating to corrosive. Harmful by inhalation. Harmful if swallowed. Vapours may cause drowsiness and dizziness.

Indication of immediate medical attention and special treatment needed

Treatment: The initial focus is only on the local action, characterized by quickly progressing deep tissue damage. In the eye, caustic/ irritating and harmful liquids cause, depending on the intensity of exposure, various levels of irritation, destruction, and ablation of the epithelium of the conjunctiva and cornea, corneal clouding, edema and ulcerations. Danger! Possible loss of eyesight! Superficial irritations and damage up to ulcerations and scarring develop on the skin. After accidental absorption in the body, the pathology

and clinical findings are dependent on the kinetics of the substance (quantity of absorbed substance, the absorption time, and the effectiveness of early elimination measures (first aid)/ excretion - metabolism). A specific action of the substance is unknown. In case of substances with high water solubility, irritations up to formation of necrosis in the upper respiratory tract may result after inhalation of caustic/ irritating aerosols and mists. The initial focus is on the local action: signs of irritation of the respiratory tract such as coughing, burning behind the sternum, tears, burning in the eyes or nose. There is a risk of pulmonary edema!

5. Fire-fighting measures

Suitable (and unsuitable) extinguishing media

Suitable extinguishing media:	Water spray, foam, dry powder or carbon dioxide. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Unsuitable extinguishing media:	Organic compounds.
Specific hazards arising from the chemical:	The product itself does not burn. Involved in fire, it may decompose yielding oxygen. Release of oxygen may support combustion. Contact with the following substances may cause inflammation: flammable substances. Risk of overpressure and burst due to decomposition in confined spaces and pipes.

Special protective equipment and precautions for firefighters

Special fire fighting procedures:	Evacuate personnel to safe areas. Keep out unprotected persons. Keep unauthorized personnel away. With large-scale fire, violent decomposition or even explosion is possible. In the case of fire, cool the containers that are at risk with water or dilute with water (flooding). or In case of fire, remove the endangered containers and bring to a safe place, if this can be done safely. Ensure there are sufficient retaining facilities for water used to extinguish fire. Contaminated fire-extinguishing water must be disposed of in accordance with the regulations issued by the appropriate local authorities. Fire residues should be disposed of in accordance with the regulations. Water used to extinguish fire should not enter drainage systems, soil or stretches of water.
Special protective equipment for fire-fighters:	In the case of fire, wear respiratory protective equipment independent of surrounding air and chemical protective suit.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures:	Use personal protective equipment. Evacuate personnel to safe areas. Keep out unprotected persons. Keep unauthorized personnel away.
Accidental release measures:	In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. Evacuate area and do not approach spilled product.

For emergency responders:	In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. Make safe or remove all sources of ignition. Do not inhale vapours / aerosols. Avoid contact with eyes, skin, and clothing. Shut off leak, if possible and safe to do. Isolate defective containers immediately, if possible and safe to do. Place defective containers in waste receptacle (waste packaging receptacle) made of plastic (not metal). Do not seal defective containers or waste receptacles airtight (danger of bursting due to product decomposition). Never return spilled product into its original container for re-use. (Risk of decomposition.).
Methods and material for containment and cleaning up:	In case of larger quantities: Collect product in suitable containers (e. g. made of plastic) using appropriate equipment (e. g. liquid pump). Dispose of absorbed material in accordance with the regulations. Keep away from flammable substances. Keep away from incompatible substances. Rinse away any residue with plenty of water. With small amounts: Absorb with liquid-binding material, e. g.: diatomaceous earth or universal binder. Dispose of absorbed material in accordance with the regulations. Rinse away any residue with plenty of water. Pack and label wastes like the pure substance. Do not detach label from the delivery containers prior to disposal.
Environmental Precautions:	Observe regulations on prevention of water pollution (check, dam up, cover up). Dam with sand or earth Do not use: textiles, saw dust, combustible substances. Do not allow substance to enter soil, bodies of water or sewage canals. If the product contaminates rivers and lakes or drains inform respective authorities.

7. Handling and storage

Precautions for safe handling:	Handle in accordance with good industrial hygiene and safety practice. Use personal protective equipment. Check the proper condition of personal safety equipment before use. Observe ergonomic requirements when selecting personal safety equipment. Avoid impurities and heat effect. Never return spilled product into its original container for re-use. (Risk of decomposition.). Do not inhale vapour, aerosols, mist. Ensure there is good room ventilation. Set up safety and operation procedures. Provide for installation of emergency shower and eye bath.

Conditions for safe storage, including any incompatibilities:

Temperature requirement during storage max. 40 °C. Keep containers tightly closed in a cool, well-ventilated place. clean, dry. Jointless smooth concrete floor. Recommendation: Acid-proof floor. Avoid sun rays, heat, heat effect. Keep away from sources of ignition - No smoking. Keep away from flammable substances. Keep away from incompatible substances. Do not store together with: alkalis, reductants, metallic salts (risk of decomposition). Do not store together with: inflammable substances (risk of fire). Do not store together with: organic solvents (risk of explosion). Only use containers which are specially permitted for: hydrogen peroxide For transport, storage and tank installations only use suitable materials. Use adequate venting devices on all packages, containers and tanks and check correct operation periodically. Do not confine product in unvented vessels or between closed valves. Risk of overpressure and burst due to decomposition in confined spaces and pipes. Packages, containers and tanks should regularly be checked by visual observation for any sign of abnormality, e.g. corrosion, exert pressure (bulging), temperature increase etc. Transport and store container in upright position only. Store containers in such a manner that liquids released are collected in a catch vessel in case of leaks. Take measures to prevent the build up of electrostatic charge. Always close container tightly after removal of product. Ensure tightness at all times. Avoid leackage. Do not keep the container sealed. Avoid residues of the product on the containers. Measures for storing in tank installations. These should include at least: Compatible materials, adequate separation, adequate venting area, venting devices, temperature measurement, earthing (grounding), bund in case of leakage. Prior to the first filling and operation of a tank installation all parts of the facility including all pipes must be thoroughly cleaned and flushed through. Metal elements of the installation must first be pickled and passivated sufficiently. For detailed information on design specifications for the construction of tank- and dosing installations ask the producer for advice. Regularly verify the availability of water to deal with emergencies (for cooling, tank flooding, fire fighting) and check correct operation periodically. - Suitable container material: stainless steel: 1.4571 or 1.4541, passivated aluminium: min. 99.5 % passivated aluminium magnesium alloys, passivated Polyethylene. polypropylene Polyvinyl chloride (PVC). polytetrafluoroethylene glass ceramics. - Inadequate materials are: Iron. Mild steel. Copper Bronze brass zinc tin Lead Silver

8. Exposure controls/personal protection

Control Parameters

Occupational Exposure Limits

Observe national threshold limit values.

Biological Limit Values

Observe national threshold limit values.

Appropriate Engineering Controls

Ensure suitable suction/aeration at the work place and with operational machinery. Suitable measuring processes are: OSHA method ID 006 OSHA method VI-6

Individual protection measures, such as personal protective equipment

General information: No data available.

Eye/face protection: wear basket-shaped glasses or safety goggles with side-shields. When handling larger quantities: protective screen

Skin Protection

Hand Protection: Material: Butyl rubber.
Break-through time: > 480 min
Guideline: DIN EN 374Material: Natural Rubber/Natural latex (NR)
Break-through time: < 120 min
Guideline: DIN EN 374Material: Nitrile rubber/Nitrile latex (NBR)
Break-through time: < 120 min
Guideline: DIN EN 374Material: Nitrile.
Break-through time: < 30 min
Guideline: DIN EN 374

Other: Select materials and equipment for physical protection depending on the concentration and volume of hazardous substances and the workplace involved. Wear suitable protective clothing. for example: Usual lab protective clothing Light-duty chemical protective clothing (type2) (DIN EN 943-1 / DIN EN 943-2) When handling larger quantities: Heavy-duty chemical protective clothing (type1) (DIN EN 943-1 / DIN EN 943-2) Foot protection: Wear safety boots, high, protection class S2 or S4 (DIN EN 20345) Do not wear leather shoes. Do not wear protective clothes containing cotton. Suitable materials are: PVC, neoprene, nitrile rubber, natural rubber.

Respiratory Protection: If workplace exposure limit is exceeded apply Respiratory protective equipment. If necessary: Provide with fresh air. If open handling is unavoidable: Wear respiratory protection Note time limit for wearing respiratory protective equipment. When handling for a short time: Full mask with filter: Type NO-P3, code colour blue-white Full face mask with filter: type CO-P3, color code black/white Wear filter apparatus equipped with a gas filter only if the ambient oxygen content is > 17 % (v/v) and the entire ambient concentration of pollutants including hydrogen peroxide is at maximum at: 0.1 % (v/v) in case of filter class 1, 0.5 % (v/v) in case of filter class 2, or 1.0 % (v/v) in case of filter class 3. in the event of prolonged exposure during handling: Self-contained breathing apparatus (EN 133) Observe limited wearing time of 30 minutes. A self-contained breathing apparatus must be worn if the ambient oxygen content is < 17 % (v/v) or if the situation is uncertain.

Hygiene measures: The work-place related airborne concentrations have to be kept below of the indicated exposure limits. Avoid contact with eyes, skin, and clothing. Do not inhale vapour, aerosols, mist. Ensure there is good room ventilation. Immediately rinse contaminated or saturated clothing with water. Take off immediately all contaminated clothing. Any contaminated protective equipment is to be cleaned after use. Contaminated work clothing should not be allowed out of the workplace. No eating, drinking, smoking, or snuffing tobacco at work. Wash hands before breaks and at the end of workday. Preventive skin protection Use barrier cream regularly.

9. Physical and chemical properties

Appearance

Physical state:	liquid
Form:	liquid
Color:	colourless, clear

Odor:	stinging
Odor Threshold:	No data available.
pH:	< 2 (20 °C)
Freezing point:	-56 °C
Boiling Point:	119 °C
Flash Point:	does not flash
Evaporation Rate:	No data available.
Flammability (solid, gas):	Not applicable liquid
Flammability Limit - Upper (%):	No data available.
Flammability Limit - Lower (%):	No data available.
Vapor pressure:	2,99 hPa (25 °C) tested substance: hydrogen peroxide 100 %
Vapor density (air=1):	No data available.
Density:	1,241 g/cm3 (20 °C)
Relative density:	1,2364 (25 °C)
Solubility(ies)	
Solubility in Water:	miscible
Solubility (other):	No data available.
Partition coefficient (n-octanol/water):	-1,57 (calculated) tested substance: hydrogen peroxide 100 %
Autoignition Temperature:	The substance or mixture is not classified as pyrophoric. The substance or mixture is not classified as self heating.
Decomposition Temperature:	No data available.
Kinematic viscosity:	No data available.
Dynamic viscosity:	No data available.
Explosive properties:	Not explosive
Oxidizing properties:	The substance or mixture is classified as oxidizing with the category 2. UN Test O.2 (oxidizing liquids)
Other information	
Molecular weight:	34,02 g/mol
Dust Explosion Limit, Upper:	No data available.
Dust Explosion Limit, Lower:	No data available.
Minimum ignition temperature:	No data available.
Metal Corrosion:	(UN Manual of Tests and Criteria Part III, Sec. 37) Not corrosive to metals The data are derived from the evaluations or test results achieved with similar products (conclusion by analogy).
Peroxides:	The substance or mixture is not classified as organic peroxide.
Self Ignition Temperature:	The substance or mixture is not classified as pyrophoric. The substance or mixture is not classified as self heating.

10. Stability and reactivity

Reactivity: Product is a(n) oxidizing agent and reactive.

Chemical Stability:	Stable under recommended storage conditions. Commercial products are stabilised to reduce risk of decomposition due to contamination.
Possibility of hazardous reactions:	Danger of decomposition if exposed to heat When coming in contact with the product, impurities, decomposition catalysts, incompatible substances, combustible substances, may lead to self-accelerated, exothermic decomposition and the formation of oxygen. Risk of overpressure and burst due to decomposition in confined spaces and pipes. Release of oxygen may support combustion. Mixtures with organic materials (e.g. solvents) can display explosive properties.
Conditions to avoid:	sun rays, heat, heat effect
Incompatible Materials:	impurities, decomposition catalysts, metals metallic salts, alkalis, hydrochloric acid, reducing agents. (Risk of decomposition.). flammable substances (Danger of fire). organic solvents (danger of explosion)
Hazardous Decomposition Products:	Steam Oxygen

11. Toxicological information

Information on likely routes of exposure

Inhalation:	No data available.
Skin Contact:	No data available.
Eye contact:	No data available.
Ingestion:	No data available.

Symptoms related to the physical, chemical and toxicological characteristics

Inhalation:	No data available.
Skin Contact:	No data available.
Eye contact:	No data available.
Ingestion:	No data available.

Information on toxicological effects

Acute toxicity (list all possible routes of exposure)

Oral

Product:	LD 50 (Rat): 801 mg/kg
	LD 50 (Rat): 872 mg/kg

Dermal

Product:	LD 50 (Rabbit): > 2.000 mg/kg Hydrogen peroxide (H_2O_2)

Inhalation
Product: Acute toxicity estimate: 2,5 mg/l

Repeated dose toxicity
Product: No data available.

Skin Corrosion/Irritation
Product Corrosive

Serious Eye Damage/Eye Irritation
Product: Study (Rabbit): Risk of serious damage to eyes.
hydrogen peroxide, 35 %

Respiratory or Skin Sensitization
Product: Sensitization test, (Magnusson-Kligman test) (Guinea Pig): Not a skin sensitizer.
literature

Carcinogenicity
Product: Clues to possible carcinogenic effects in animal experiments: Up to date there is no evidence of increased tumour risk. Hydrogen peroxide is not a carcinogenic substance according to MAK, IARC, NTP, OSHA, ACGIH.

Germ Cell Mutagenicity

In vitro
Product: Bacterial reverse mutation assay: positive and negative literature
Chromosomal aberration (OECD TG 473): positive literature
Genetic mutation in mammal cells (OECD TG 476): positive literature

In vivo
Product: No data available.

Reproductive toxicity
Product: No data available.

Specific Target Organ Toxicity - Single Exposure
Product: Respiratory tract irritation.

Specific Target Organ Toxicity - Repeated Exposure
Product: No data available.

Target Organs
Specific Target Organ Toxicity - Single Exposure: Respiratory system

Aspiration Hazard
Product: No data available.

Other effects: No data available.

12. Ecological information

Ecotoxicity:

Acute hazards to the aquatic environment:

Fish
Product: No data available.

Aquatic Invertebrates
Product: No data available.

Chronic hazards to the aquatic environment:

Fish
Product: No data available.

Aquatic Invertebrates
Product: No data available.

Toxicity to Aquatic Plants
Product: No data available.

Persistence and Degradability

Biodegradation
Product: Readily biodegradable Semiquantitative measurement of concentration over time. Hydrogen peroxide (H_2O_2)

BOD/COD Ratio
Product: No data available.

Bioaccumulative potential
Bioconcentration Factor (BCF)
Product: None. Hydrogen peroxide quickly decomposes to oxygen and water.

Partition Coefficient n-octanol / water (log Kow)
Product: Log Kow: -1,57 (calculated) tested substance: hydrogen peroxide 100 %

Mobility in soil: No data available.

Other adverse effects: No data available.

13. Disposal considerations

Disposal methods: Disposal according to local authority regulations. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated Packaging: Rinse empty containers before disposal; recommended cleaning agent: water. Offer rinsed packaging material to local recycling facilities. Do not reuse empty containers and dispose of in accordance with the regulations issued by the appropriate local authorities. Dispose of containers that have not been emptied completely and/or cleaned like of substance.

14. Transport information

International Regulations

IATA-DGR

UN/ID No.	:	UN 2014
Proper shipping name	:	Hydrogen peroxide, aqueous solution
Class	:	5.1
Subsidiary risk	:	8
Packing group	:	II
Labels	:	5.1 (8)
Packing instruction (cargo aircraft)	:	554
Packing instruction (passenger aircraft)	:	550
Remarks	:	Transport prohibited.

IMDG-Code

UN number	:	UN 2014
Proper shipping name	:	HYDROGEN PEROXIDE, AQUEOUS SOLUTION
Class	:	5.1
Subsidiary risk	:	8
Packing group	:	II
Labels	:	5.1 (8)
EmS Code	:	F-H, S-Q
Marine pollutant	:	no
Remarks	:	Protect from heat. On deck only. Product-specific regulation s on storing substances separately., "Separated from" permanganates and class 4.1., Canada: ERAP 2-1008-072, ER 24 hour number 251-443-1634

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable for product as supplied.

Special precautions for user

The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

15. Regulatory information

International regulations

Montreal protocol

Not applicable

Stockholm convention

Not applicable

Rotterdam convention

Not applicable

Kyoto protocol

Not applicable

16.Other information, including date of preparation or last revision

Issue Date:	27.09.2019
Version #:	1.1
Further Information:	Data for the production of the safety data sheet from the studies available and from the literature. Further information about the characteristics of the product can be found in the product code of practice or in the Product-Brochure .
Revision Information:	Changes since the last version are highlighted in the margin. This version replaces all previous versions.
Disclaimer:	This information and all further technical advice is based on our present knowledge and experience. However, it implies no liability or other legal responsibility on our part, including with regard to existing third party intellectual property rights, especially patent rights. In particular, no warranty, whether express or implied, or guarantee of product properties in the legal sense is intended or implied. We reserve the right to make any changes according to technological progress or further developments. The customer is not released from the obligation to conduct careful inspection and testing of incoming goods. Performance of the product described herein should be verified by testing, which should be carried out only by qualified experts in the sole responsibility of a customer. Reference to trade names used by other companies is neither a recommendation, nor does it imply that similar products could not be used.