YAP188, YPM188 - ALKAPHOT TABLETS

GFS Chemicals, Inc.

Part Number: **YAP188, YPM188**
Version No: **1.1**
Safety Data Sheet according to OSHA HazCom Standard (2024) requirements

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S.GHS.USA.EN

SECTION 1 Identification

Product Identifier

Product name	YAP188, YPM188 - ALKAPHOT TABLETS
Chemical Name	Not Applicable
Synonyms	YAP188, YPM188
Chemical formula	Not Applicable
Other means of identification	Not Available

Recommended use of the chemical and restrictions on use

Relevant identified uses	Testing Water

Name, address, and telephone number of the chemical manufacturer, importer, or other responsible party

Registered company name	**GFS Chemicals, Inc.**	**YSI Inc.**
Address	PO Box 245 Powell OH 43065 United States	1700/1725 Brannum Ln Yellow Springs OH 45387 United States
Telephone	740-881-5501|800-858-9682	(937) 767-7241
Fax	740-881-5989	Not Available
Website	www.gfschemicals.com	www.ysi.com
Email	service@gfschemicals.com	MSDSinfo@ysi.com

Emergency phone number

Association / Organisation	**ChemTrec**	**CHEMTREC**
Emergency telephone number(s)	800-424-9300	(800) 424-9300
Other emergency telephone number(s)	Not Available	011 703-527-3887

SECTION 2 Hazard(s) identification

Classification of the substance or mixture

Considered a Hazardous Substance by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200). Not classified as Dangerous Goods for transport purposes.

NFPA 704 diamond



Note: The hazard category numbers found in GHS classification in section 2 of this SDSs are NOT to be used to fill in the NFPA 704 diamond. Blue = Health, Red = Fire, Yellow = Reactivity and White = Special (Oxidizer or water reactive substances)

Classification	Skin Corrosion/Irritation Category 2, Serious Eye Damage/Eye Irritation Category 1

Label elements

Hazard pictogram(s)	
Signal word	**Danger**

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Hazard statement(s)

H315	Causes skin irritation.
H318	Causes serious eye damage.

Hazard(s) not otherwise classified

Not Applicable

Precautionary statement(s) Prevention

P280	Wear protective gloves, protective clothing, eye protection and face protection.
P264	Wash all exposed external body areas thoroughly after handling.

Precautionary statement(s) 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/doctor/physician/first aider.
P302+P352	IF ON SKIN: Wash with plenty of water.
P332+P313	If skin irritation occurs: Get medical advice/attention.
P362+P364	Take off contaminated clothing and wash it before reuse.

Precautionary statement(s) Storage

Not Applicable

Precautionary statement(s) Disposal

Not Applicable
No further product hazard information.

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
63-42-3	80-100	alpha-lactose
124-04-9	5-10	adipic acid
61-90-5	<5.5	L-leucine
151-21-3	<5.5	sodium lauryl sulfate
7646-93-7	<1	potassium bisulfate
76-60-8	<0.5	bromocresol green
144-55-8	<0.1	sodium bicarbonate

SECTION 4 First-aid measures

Description of first aid measures

Eye Contact	If this product comes in contact with the eyes: ▸ Immediately hold eyelids apart and flush the eye continuously with running water. ▸ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▸ Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes. ▸ Transport to hospital or doctor without delay. ▸ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	If skin contact occurs: ▸ Immediately remove all contaminated clothing, including footwear. ▸ Flush skin and hair with running water (and soap if available). ▸ Seek medical attention in event of irritation.
Inhalation	▸ If dust is inhaled, remove from contaminated area. ▸ Encourage patient to blow nose to ensure clear passage of breathing. ▸ If irritation or discomfort persists seek medical attention.
Ingestion	▸ Immediately give a glass of water. ▸ First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor.

Most important symptoms and effects, both acute and delayed

See Section 11

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5 Fire-fighting measures

Extinguishing media

- Water spray or fog.
- Foam.
- Dry chemical powder.

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- BCF (where regulations permit).
- Carbon dioxide.

Special hazards arising from the substrate or mixture

Fire Incompatibility	▸ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result

Special protective equipment and precautions for fire-fighters

Fire Fighting	▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear breathing apparatus plus protective gloves. ▸ Prevent, by any means available, spillage from entering drains or water courses. ▸ Use water delivered as a fine spray to control fire and cool adjacent area. ▸ **DO NOT** approach containers suspected to be hot. ▸ Cool fire exposed containers with water spray from a protected location. ▸ If safe to do so, remove containers from path of fire. ▸ Equipment should be thoroughly decontaminated after use.
Fire/Explosion Hazard	▸ Combustible solid which burns but propagates flame with difficulty; it is estimated that most organic dusts are combustible (circa 70%) - according to the circumstances under which the combustion process occurs, such materials may cause fires and / or dust explosions. ▸ Organic powders when finely divided over a range of concentrations regardless of particulate size or shape and suspended in air or some other oxidizing medium may form explosive dust-air mixtures and result in a fire or dust explosion (including secondary explosions). ▸ Avoid generating dust, particularly clouds of dust in a confined or unventilated space as dusts may form an explosive mixture with air, and any source of ignition, i.e. flame or spark, will cause fire or explosion. Dust clouds generated by the fine grinding of the solid are a particular hazard; accumulations of fine dust (420 micron or less) may burn rapidly and fiercely if ignited - particles exceeding this limit will generally not form flammable dust clouds; once initiated, however, larger particles up to 1400 microns diameter will contribute to the propagation of an explosion. ▸ In the same way as gases and vapours, dusts in the form of a cloud are only ignitable over a range of concentrations; in principle, the concepts of lower explosive limit (LEL) and upper explosive limit (UEL) are applicable to dust clouds but only the LEL is of practical use; - this is because of the inherent difficulty of achieving homogeneous dust clouds at high temperatures (for dusts the LEL is often called the "Minimum Explosible Concentration", MEC). ▸ When processed with flammable liquids/vapors/mists,ignitable (hybrid) mixtures may be formed with combustible dusts. Ignitable mixtures will increase the rate of explosion pressure rise and the Minimum Ignition Energy (the minimum amount of energy required to ignite dust clouds - MIE) will be lower than the pure dust in air mixture. The Lower Explosive Limit (LEL) of the vapour/dust mixture will be lower than the individual LELs for the vapors/mists or dusts. ▸ A dust explosion may release of large quantities of gaseous products; this in turn creates a subsequent pressure rise of explosive force capable of damaging plant and buildings and injuring people. ▸ Usually the initial or primary explosion takes place in a confined space such as plant or machinery, and can be of sufficient force to damage or rupture the plant. If the shock wave from the primary explosion enters the surrounding area, it will disturb any settled dust layers, forming a second dust cloud, and often initiate a much larger secondary explosion. All large scale explosions have resulted from chain reactions of this type. ▸ Dry dust can be charged electrostatically by turbulence, pneumatic transport, pouring, in exhaust ducts and during transport. ▸ Build-up of electrostatic charge may be prevented by bonding and grounding. ▸ Powder handling equipment such as dust collectors, dryers and mills may require additional protection measures such as explosion venting. ▸ All movable parts coming in contact with this material should have a speed of less than 1-meter/sec. ▸ A sudden release of statically charged materials from storage or process equipment, particularly at elevated temperatures and/ or pressure, may result in ignition especially in the absence of an apparent ignition source. ▸ One important effect of the particulate nature of powders is that the surface area and surface structure (and often moisture content) can vary widely from sample to sample, depending of how the powder was manufactured and handled; this means that it is virtually impossible to use flammability data published in the literature for dusts (in contrast to that published for gases and vapours). ▸ Autoignition temperatures are often quoted for dust clouds (minimum ignition temperature (MIT)) and dust layers (layer ignition temperature (LIT)); LIT generally falls as the thickness of the layer increases. Combustion products include: , ▸ carbon monoxide (CO) , ▸ carbon dioxide (CO2) , ▸ other pyrolysis products typical of burning organic material. May emit corrosive fumes. Dust Explosion Hazard Class 1 Dusts fall into one of three Kst* classes. Class 1 dusts; Kst 1-200 m3/sec; Class 2 dusts; 201-299 m3/sec. Class 3 dusts; Kst 300 or more. Most agricultural dusts (grains, flour etc.) are Class 1; pharmaceuticals and other speciality chemicals are typically Class 1 or 2; most unoxidised metallic dusts are Class 3. The higher the Kst, the more energetically the dust will burn and the greater is the explosion risk and the greater is the speed of the explosion.. Standard test conditions, used to derive the Kst, are representative of industrial conditions, but do not represent and absolute worst case. Increased levels of turbulence increase the speed of the explosion dramatically. * Kst - a normalised expression of the burning dust pressure rise rate over time. Dusts with Minimum Ignition Energies (MIEs) ranging between 20 and 100 mJ may be sensitive to ignition. They require that: · plant is grounded · personnel might also need to be grounded · the use of high resistivity materials (such as plastics) should be restricted or avoided during handling or in packaging The majority of ignition accidents occur within or below this range. The MIE of a dust/air mix depends on the particle size the water content and the temperature of the dust. The finer and the dryer the dust the lower the MIE. Higher temperatures cause lower MIE and an increased risk of dust explosion. Quoted values for MIE generally are only representative. Characteristics may change depending upon the process and conditions of use or any changes made to the dust during use, including further grinding or mixing with other products. In order to obtain more specific data for dust, as used, it is recommended that further characterisation testing.is performed.

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

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Methods and material for containment and cleaning up

Minor Spills	▸ Clean up all spills immediately. ▸ Avoid breathing dust and contact with skin and eyes. ▸ Wear protective clothing, gloves, safety glasses and dust respirator. ▸ Use dry clean up procedures and avoid generating dust. ▸ Sweep up, shovel up or ▸ Vacuum up (consider explosion-proof machines designed to be grounded during storage and use). ▸ Place spilled material in clean, dry, sealable, labelled container.
Major Spills	Moderate hazard. ▸ **CAUTION**: Advise personnel in area. ▸ Alert Emergency Services and tell them location and nature of hazard. ▸ Control personal contact by wearing protective clothing. ▸ Prevent, by any means available, spillage from entering drains or water courses. ▸ Recover product wherever possible. ▸ **IF DRY:** Use dry clean up procedures and avoid generating dust. Collect residues and place in sealed plastic bags or other containers for disposal. **IF WET:** Vacuum/shovel up and place in labelled containers for disposal. ▸ **ALWAYS:** Wash area down with large amounts of water and prevent runoff into drains. ▸ If contamination of drains or waterways occurs, advise Emergency Services.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

Precautions for safe handling

Safe handling	▸ Avoid skin contact, including inhalation. ▸ Wear protective clothing when risk of exposure occurs. ▸ Use in a well-ventilated area. ▸ Prevent concentration in hollows and sumps. ▸ **DO NOT** enter confined spaces until atmosphere has been checked. ▸ **DO NOT** allow material to come in direct contact with human skin or eyes. ▸ **DO NOT** allow material to come in contact with exposed food or food contact surfaces. ▸ Suitable PPE must be worn at all times. ▸ Avoid contact with incompatible materials. ▸ When handling, **DO NOT** eat, drink or smoke. ▸ Keep containers securely sealed when not in use. ▸ Avoid physical damage to containers. ▸ Always wash hands with soap and water after handling. ▸ Work clothes should be laundered separately. Launder contaminated clothing before re-use. ▸ Use good occupational work practice. ▸ Observe manufacturer's storage and handling recommendations contained within this SDS. ▸ Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained. ▸ Organic powders when finely divided over a range of concentrations regardless of particulate size or shape and suspended in air or some other oxidizing medium may form explosive dust-air mixtures and result in a fire or dust explosion (including secondary explosions) ▸ Minimise airborne dust and eliminate all ignition sources. Keep away from heat, hot surfaces, sparks, and flame. ▸ Establish good housekeeping practices. ▸ Remove dust accumulations on a regular basis by vacuuming or gentle sweeping to avoid creating dust clouds. ▸ Use continuous suction at points of dust generation to capture and minimise the accumulation of dusts. Particular attention should be given to overhead and hidden horizontal surfaces to minimise the probability of a "secondary" explosion. According to NFPA Standard 654, dust layers 1/32 in.(0.8 mm) thick can be sufficient to warrant immediate cleaning of the area. ▸ Do not use air hoses for cleaning. ▸ Minimise dry sweeping to avoid generation of dust clouds. Vacuum dust-accumulating surfaces and remove to a chemical disposal area. Vacuums with explosion-proof motors should be used. ▸ Control sources of static electricity. Dusts or their packages may accumulate static charges, and static discharge can be a source of ignition. ▸ Solids handling systems must be designed in accordance with applicable standards (e.g. NFPA including 654 and 77) and other national guidance. ▸ Do not empty directly into flammable solvents or in the presence of flammable vapors. ▸ The operator, the packaging container and all equipment must be grounded with electrical bonding and grounding systems. Plastic bags and plastics cannot be grounded, and antistatic bags do not completely protect against development of static charges. Empty containers may contain residual dust which has the potential to accumulate following settling. Such dusts may explode in the presence of an appropriate ignition source. ▸ Do NOT cut, drill, grind or weld such containers. ▸ In addition ensure such activity is not performed near full, partially empty or empty containers without appropriate workplace safety authorisation or permit.
Other information	▸ Store in original containers. ▸ Keep containers securely sealed. ▸ Store in a cool, dry area protected from environmental extremes. ▸ Store away from incompatible materials and foodstuff containers. ▸ Protect containers against physical damage and check regularly for leaks. ▸ Observe manufacturer's storage and handling recommendations contained within this SDS. For major quantities: ▸ Consider storage in bunded areas - ensure storage areas are isolated from sources of community water (including stormwater, ground water, lakes and streams}. ▸ Ensure that accidental discharge to air or water is the subject of a contingency disaster management plan; this may require consultation with local authorities.

Conditions for safe storage, including any incompatibilities

Suitable container	▸ Lined metal can, lined metal pail/ can. ▸ Plastic pail. ▸ Polyliner drum. ▸ Packing as recommended by manufacturer. ▸ Check all containers are clearly labelled and free from leaks. ▸ Glass container is suitable for laboratory quantities
Storage incompatibility	Adipic acid ▸ may ignite or explode in contact with strong oxidisers ▸ is incompatible with sulfuric acid, caustics, ammonia, aliphatic amines, alkanolamines, isocyanates, alkylene oxides, epichlorohydrin

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- may generate electrostic charges due to low conductivity

Reducing sugar-based material.
Autooxidation of reducing sugars may produce up to 3000 ppm carbon monoxide under moderately alkaline conditions. High pH aqueous solutions of saccharides (aldoses, ketoses) or polysaccharides based on these sugars may generate hazardous atmospheres in confined spaces.
Reducing sugars contain an aldehyde or free hemiacetal in the open-chain form. Sugars with ketone groups in their open chain form are capable of isomerising via a series of tautomeric shifts to produce an aldehyde group in solution. Therefore, ketone-bearing sugars like fructose are considered reducing sugars but it is the isomer containing an aldehyde group which is reducing since ketones cannot be oxidized without decomposition of the sugar.
Many disaccharides, like lactose and maltose, also have a reducing form, as one of the two units may have an open-chain form with an aldehyde group. However, sucrose and trehalose, in which the anomeric carbons of the two units are linked together, are non-reducing disaccharides since neither of the rings is capable of opening.
In glucose polymers such as starch and starch-derivatives like glucose syrup, maltodextrin and dextrin the macromolecule begins with a reducing sugar, a free aldehyde. More hydrolysed starch contains more reducing sugars. The percentage of reducing sugars present in these starch derivatives is called dextrose equivalent (DE).
Dilute solutions of all sugars are subject to fermentation, either by yeast or by other microorganisms or enzymes derived from these, producing gases which can pressurise and burst sealed containers.
Some microorganisms will produce hydrogen or methane, adding a fire and explosion hazard.

- Reacts with metals producing flammable / explosive hydrogen gas
- Avoid reaction with oxidising agents

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Not Available

Emergency Limits

Ingredient	TEEL-1	TEEL-2	TEEL-3
sodium lauryl sulfate	3.9 mg/m3	43 mg/m3	260 mg/m3
potassium bisulfate	7 mg/m3	77 mg/m3	460 mg/m3
bromocresol green	13 mg/m3	140 mg/m3	840 mg/m3
sodium bicarbonate	13 mg/m3	140 mg/m3	840 mg/m3

Ingredient	Original IDLH	Revised IDLH
alpha-lactose	Not Available	Not Available
adipic acid	Not Available	Not Available
L-leucine	Not Available	Not Available
sodium lauryl sulfate	Not Available	Not Available
potassium bisulfate	Not Available	Not Available
bromocresol green	Not Available	Not Available
sodium bicarbonate	Not Available	Not Available

Exposure controls

Appropriate engineering controls

Assess operations based upon available dust explosion information to determine the suitability of preventative or protective systems as precautionary measures against possible dust explosions. If prevention is not possible, consider protection by use of containment, venting or suppression of dust handling equipment. Where explosion venting is considered to be the most appropriate method of protection, vent areas should preferably be calculated based on Kst rather than an St value. If nitrogen purging is considered as the protective system, it must operate with an oxygen level below the limiting oxygen concentration. The system should include an oxygen monitoring and shut-down facility in the event of excessive oxygen being detected.

The maximum surface temperature of enclosures potentially exposed to this material should be based on values obtained by taking 2/3 of the minimum ignition temperature (MIE) of the dust cloud. The effect of dust layers should be reviewed.

An isolated (insulated) human body can readily produce electrostatic discharges in excess of 50 mJ, but have been recorded up to 100 mJ.
Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.
The basic types of engineering controls are:
Process controls which involve changing the way a job activity or process is done to reduce the risk.
Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment. Ventilation can remove or dilute an air contaminant if designed properly. The design of a ventilation system must match the particular process and chemical or contaminant in use.
Employers may need to use multiple types of controls to prevent employee overexposure.

- Local exhaust ventilation is required where solids are handled as powders or crystals; even when particulates are relatively large, a certain proportion will be powdered by mutual friction.
- Exhaust ventilation should be designed to prevent accumulation and recirculation of particulates in the workplace.
- If in spite of local exhaust an adverse concentration of the substance in air could occur, respiratory protection should be considered. Such protection might consist of:

(a): particle dust respirators, if necessary, combined with an absorption cartridge;
(b): filter respirators with absorption cartridge or canister of the right type;
(c): fresh-air hoods or masks

- Build-up of electrostatic charge on the dust particle, may be prevented by bonding and grounding.
- Powder handling equipment such as dust collectors, dryers and mills may require additional protection measures such as explosion venting.

Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to efficiently remove the contaminant.

Type of Contaminant:	Air Speed:
direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)	1-2.5 m/s (200-500 ft/min)
grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).	2.5-10 m/s (500-2000 ft/min)

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	Within each range the appropriate value depends on: Lower end of the range / Upper end of the range 1: Room air currents minimal or favourable to capture / 1: Disturbing room air currents 2: Contaminants of low toxicity or of nuisance value only / 2: Contaminants of high toxicity 3: Intermittent, low production. / 3: High production, heavy use 4: Large hood or large air mass in motion / 4: Small hood-local control only Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 4-10 m/s (800-2000 ft/min) for extraction of crusher dusts generated 2 metres distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.
Individual protection measures, such as personal protective equipment	
Eye and face protection	▸ Safety glasses with side shields. ▸ Chemical goggles. [AS/NZS 1337.1, EN166 or national equivalent] ▸ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59].
Skin protection	See Hand protection below
Hands/feet protection	The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application. The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice. Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended. Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include: · frequency and duration of contact, · chemical resistance of glove material, · glove thickness and · dexterity Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent). · When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended. · When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended. · Some glove polymer types are less affected by movement and this should be taken into account when considering gloves for long-term use. · Contaminated gloves should be replaced. As defined in ASTM F-739-96 in any application, gloves are rated as: · Excellent when breakthrough time > 480 min · Good when breakthrough time > 20 min · Fair when breakthrough time < 20 min · Poor when glove material degrades For general applications, gloves with a thickness typically greater than 0.35 mm, are recommended. It should be emphasised that glove thickness is not necessarily a good predictor of glove resistance to a specific chemical, as the permeation efficiency of the glove will be dependent on the exact composition of the glove material. Therefore, glove selection should also be based on consideration of the task requirements and knowledge of breakthrough times. Glove thickness may also vary depending on the glove manufacturer, the glove type and the glove model. Therefore, the manufacturers technical data should always be taken into account to ensure selection of the most appropriate glove for the task. Note: Depending on the activity being conducted, gloves of varying thickness may be required for specific tasks. For example: · Thinner gloves (down to 0.1 mm or less) may be required where a high degree of manual dexterity is needed. However, these gloves are only likely to give short duration protection and would normally be just for single use applications, then disposed of. · Thicker gloves (up to 3 mm or more) may be required where there is a mechanical (as well as a chemical) risk i.e. where there is abrasion or puncture potential Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended. Experience indicates that the following polymers are suitable as glove materials for protection against undissolved, dry solids, where abrasive particles are not present. ▸ polychloroprene. ▸ nitrile rubber. ▸ butyl rubber. ▸ fluorocaoutchouc. ▸ polyvinyl chloride. Gloves should be examined for wear and/ or degradation constantly.
Body protection	See Other protection below
Other protection	▸ Overalls. ▸ P.V.C apron. ▸ Barrier cream. ▸ Skin cleansing cream. ▸ Eye wash unit.

Respiratory protection

Type -P Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

· Respirators may be necessary when engineering and administrative controls do not adequately prevent exposures.
· The decision to use respiratory protection should be based on professional judgment that takes into account toxicity information, exposure measurement data, and frequency and likelihood of the worker's exposure - ensure users are not subject to high thermal loads which may result in heat stress or distress due to personal protective equipment

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(powered, positive flow, full face apparatus may be an option).
· Published occupational exposure limits, where they exist, will assist in determining the adequacy of the selected respiratory protection. These may be government mandated or vendor recommended.
· Certified respirators will be useful for protecting workers from inhalation of particulates when properly selected and fit tested as part of a complete respiratory protection program.
· Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU)
· Use approved positive flow mask if significant quantities of dust becomes airborne.
· Try to avoid creating dust conditions.

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Appearance	Beige

Physical state	Divided Solid|Powder	**Relative density (Water = 1)**	Not Available
Odour	Not Available	**Partition coefficient n-octanol / water**	Not Available
Odour threshold	Not Available	**Auto-ignition temperature (°C)**	Not Available
pH (as supplied)	Not Available	**Decomposition temperature (°C)**	Not Available
Melting point / freezing point (°C)	Not Available	**Viscosity (cSt)**	Not Available
Initial boiling point and boiling range (°C)	Not Available	**Molecular weight (g/mol)**	Not Available
Flash point (°C)	Not Available	**Taste**	Not Available
Evaporation rate	Not Available	**Explosive properties**	Not Available
Flammability	Not Applicable	**Oxidising properties**	Not Available
Upper Explosive Limit (%)	Not Available	**Surface Tension (dyn/cm or mN/m)**	Not Applicable
Lower Explosive Limit (%)	Not Available	**Volatile Component (%vol)**	Not Available
Vapour pressure (kPa)	Not Available	**Gas group**	Not Available
Solubility in water	Miscible	**pH as a solution (1%)**	Not Available
Vapour density (Air = 1)	Not Available	**VOC g/L**	Not Available
Heat of Combustion (kJ/g)	Not Available	**Ignition Distance (cm)**	Not Available
Flame Height (cm)	Not Available	**Flame Duration (s)**	Not Available
Enclosed Space Ignition Time Equivalent (s/m3)	Not Available	**Enclosed Space Ignition Deflagration Density (g/m3)**	Not Available
Nanoform Solubility	Not Available	**Nanoform Particle Characteristics**	Not Available
Particle Size	Not Available		

SECTION 10 Stability and reactivity

Reactivity	See section 7
Chemical stability	Product is considered stable and hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 Toxicological information

Information on toxicological effects

a) Acute Toxicity	Based on available data, the classification criteria are not met.
b) Skin Irritation/Corrosion	There is sufficient evidence to classify this material as skin corrosive or irritating.
c) Serious Eye Damage/Irritation	There is sufficient evidence to classify this material as eye damaging or irritating
d) Respiratory or Skin sensitisation	Based on available data, the classification criteria are not met.
e) Mutagenicity	Based on available data, the classification criteria are not met.
f) Carcinogenicity	Based on available data, the classification criteria are not met.
g) Reproductivity	Based on available data, the classification criteria are not met.
h) STOT - Single Exposure	Based on available data, the classification criteria are not met.
i) STOT - Repeated Exposure	Based on available data, the classification criteria are not met.
j) Aspiration Hazard	Based on available data, the classification criteria are not met.

Inhaled	The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an

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	occupational setting. Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled. If prior damage to the circulatory or nervous systems has occurred or if kidney damage has been sustained, proper screenings should be conducted on individuals who may be exposed to further risk if handling and use of the material result in excessive exposures.
Ingestion	The material has **NOT** been classified by EC Directives or other classification systems as "harmful by ingestion". This is because of the lack of corroborating animal or human evidence.
Skin Contact	This material can cause inflammation of the skin on contact in some persons. The material may accentuate any pre-existing dermatitis condition Skin contact is not thought to have harmful health effects (as classified under EC Directives); the material may still produce health damage following entry through wounds, lesions or abrasions.
Eye	If applied to the eyes, this material causes severe eye damage.
Chronic	Long-term exposure to the product is not thought to produce chronic effects adverse to the health (as classified by EC Directives using animal models); nevertheless exposure by all routes should be minimised as a matter of course. Sodium lauryl sulfate has been reported to cause lung irritation and allergy resulting in hyperactive airway dysfunction, fatigue, malaise and aches. Significant symptoms of exposure can persist for more than two years and can be activated by a variety of non-specific environmental stimuli such as exhaust, perfumes and passive smoking. Adipic acid may damage to the liver and lungs. It increases the acidity of the blood, thus altering normal body processes. Moderate to long term exposure may cause depression, difficulty in breathing, inco-ordination and convulsions. Long term exposure to high dust concentrations may cause changes in lung function i.e. pneumoconiosis, caused by particles less than 0.5 micron penetrating and remaining in the lung.

YAP188, YPM188 - ALKAPHOT TABLETS	**TOXICITY**	**IRRITATION**
	Not Available	Not Available
alpha-lactose	**TOXICITY**	**IRRITATION**
	Oral (Rat) LD50: >10000 mg/kg[2]	Not Available
adipic acid	**TOXICITY**	**IRRITATION**
	Dermal (rabbit) LD50: >7940 mg/kg[2]	Eye (Rodent - rabbit): 10mg - Mild
	Inhalation (Rat) LC50: >7.7 mg/l4h[2]	Eye (Rodent - rabbit): 20mg/24H - Moderate
	Oral (Mouse) LD50; 1900 mg/kg[2]	Eye: adverse effect observed (irritating)[1]
		Skin (Rodent - rabbit): 0.25gm - Mild
		Skin: no adverse effect observed (not irritating)[1]
L-leucine	**TOXICITY**	**IRRITATION**
	Oral (Rat) LD50: >2000 mg/kg[1]	Eye: no adverse effect observed (not irritating)[1]
		Skin: no adverse effect observed (not irritating)[1]

Continued...

sodium lauryl sulfate

TOXICITY	IRRITATION
dermal (rat) LD50: >2000 mg/kg[1]	Eye (Rodent - rabbit): 1%/1H - Severe
Oral (Rat) LD50: 1288 mg/kg[2]	Eye (Rodent - rabbit): 1%/1H - Severe
	Eye (Rodent - rabbit): 100mg
	Eye (Rodent - rabbit): 100mg/24H - Moderate
	Eye (Rodent - rabbit): 100uL/24H - Severe
	Eye (Rodent - rabbit): 10mg - Moderate
	Eye (Rodent - rabbit): 20mg/24H - Moderate
	Eye (Rodent - rabbit): 250ug - Mild
	Eye (Rodent - rabbit): 2mg
	Eye (Rodent - rabbit): 5pph/1H - Mild
	Eye: adverse effect observed (irreversible damage)[1]
	Eye: adverse effect observed (irritating)[1]
	Skin (Human - man): 5%/24H - Mild
	Skin (Human): 0.06%/24H - Mild
	Skin (Human): 0.1%/24H - Moderate
	Skin (Human): 0.1%/3W(intermittent)
	Skin (Human): 0.1%/48H
	Skin (Human): 0.25%
	Skin (Human): 0.3%/3W - Mild
	Skin (Human): 0.5%/23H
	Skin (Human): 0.5%/24H
	Skin (Human): 0.5%/24H - Mild
	Skin (Human): 0.5%/47H - Mild
	Skin (Human): 0.5%/4D
	Skin (Human): 0.50%/96H
	Skin (Human): 1%/4H
	Skin (Human): 1%/8H
	Skin (Human): 10%/22H - Mild
	Skin (Human): 10%/24H - Severe
	Skin (Human): 10pph/24H - Moderate
	Skin (Human): 2%/18H - Mild
	Skin (Human): 2%/2H - Mild
	Skin (Human): 20%/6H
	Skin (Human): 250mg/24H - Mild
	Skin (Human): 25mg/24H - Mild
	Skin (Human): 3%/48H - Moderate
	Skin (Human): 5%/24H
	Skin (Human): 5%/48H - Mild
	Skin (Mammal - dog): 25mg/24H - Mild
	Skin (Mammal - pig): 25mg/24H - Mild
	Skin (Rodent - guinea pig): 25250ppm/14D - Mild
	Skin (Rodent - guinea pig): 25250ppm/24H - Mild
	Skin (Rodent - guinea pig): 25250ppm/48H - Severe
	Skin (Rodent - guinea pig): 25250ppm/72H - Severe
	Skin (Rodent - guinea pig): 25mg/24H - Mild
	Skin (Rodent - guinea pig): 5%/9H(intermittent)
	Skin (Rodent - mouse): 1pph/4H - Severe
	Skin (Rodent - mouse): 25mg/24H - Moderate
	Skin (Rodent - mouse): 5%/24H - Moderate
	Skin (Rodent - rabbit): 1%/24H
	Skin (Rodent - rabbit): 1%/72H
	Skin (Rodent - rabbit): 10mg/24H
	Skin (Rodent - rabbit): 2.5%/24H - Severe
	Skin (Rodent - rabbit): 250mg/24H - Moderate
	Skin (Rodent - rabbit): 25mg/24H - Moderate
	Skin (Rodent - rabbit): 25mg/24H - Moderate
	Skin (Rodent - rabbit): 5%/1H - Mild
	Skin (Rodent - rabbit): 5%/24H - Moderate
	Skin (Rodent - rabbit): 500mg/24H - Severe
	Skin (Rodent - rabbit): 50mg/24H - Mild

Continued...

		Skin (Rodent - rat): 1%/4H
		Skin (Rodent - rat): 10%/1H
		Skin: adverse effect observed (corrosive)[1]
		Skin: adverse effect observed (irritating)[1]
potassium bisulfate	**TOXICITY**	**IRRITATION**
	Oral (Rat) LD50: >2000 mg/kg[1]	Skin: no adverse effect observed (not irritating)[1]
bromocresol green	**TOXICITY**	**IRRITATION**
	Not Available	Not Available
sodium bicarbonate	**TOXICITY**	**IRRITATION**
	Oral (Mouse) LD50; 3360 mg/kg[2]	Eye (Rodent - rabbit): 100mg/30S - Mild
		Eye: no adverse effect observed (not irritating)[1]
		Skin (Human): 30mg/3D (intermittent) - Mild
		Skin: no adverse effect observed (not irritating)[1]

Legend:	***1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances***

ALPHA-LACTOSE	Equivocal tumorigenic agent by RTECS criteria.
ADIPIC ACID	Non-mutagenic* Draize Eye Irritation Test: Rabbit, Score 18.2/110 - moderately irritating. Skin irritation (rabbit): 4 hr (FSHA); 0.0 on an scale of 8.0 - non-irritating.* Non-sensitising to rabbit skin * * Supreme Resources MSDS Adipic acid: **Acute toxicity:** In limited studies in animals and humans it was shown that adipic acid is absorbed after oral administration, partially metabolized to various metabolites and CO2 which are excreted via urine and breath, respiration. None of the studies was conducted according to GLP. Adipic acid is of very low acute toxicity. Clinical signs at lethal doses included acute dilatation of the heart and acute congestive hyperaemia, ulceration of glandular stomach (bleeding-corrosive gastritis), intestinal atony, pale liver and reddening of intestinal mucosa. In an inhalation test similar to OECD TG 403 in rats neither mortality nor symptoms were observed during and after 4 hour exposure to 7700 mg/m3 of adipic acid. Reduced appetite and activity were the only effects reported following occlusive dermal administration of 7940 mg/kg bw of adipic acid to 2 rabbits for 24 hours. In rabbits, 50 % adipic acid suspensions were slightly irritating to the intact skin and moderately irritating to scarified skin. The neat material was a severe eye irritant in rabbits, with symptoms being reversible within 16 days. Respiratory irritation in animals is not sufficiently examined. Workers exposed over an extensive period (average. 9.2 years) complained of respiratory irritation at adipic acid concentrations of 0.47-0.79 mg/m3. Due to the acidic character of the substance, a local irritation potential is plausible. Despite the wide dispersive use of adipic acid, only very few cases of skin or respiratory tract sensitisation reactions are reported in humans. A sensitisation study in animals according to validated guidelines is not available. Overall, sensitisation is not expected for adipic acid. **Repeat dose toxicity:** There is no repeated inhalation toxicity study with histopathological examination of the nose available. Systemic effects after repeated inhalation have not been investigated in fully valid studies. There are no studies on repeated dermal application available. In a limited 2-year oral study adipic acid was of low repeated dose toxicity, however it was not tested according to modern standards. The NOAEL was 1 % for male rats (approx. 750 mg/kg bw/day) and higher doses (3 and 5 %) caused body weight retardation with no indication of specific target organ toxicity. The NOAEL for female rats was 1 % (approx. 750 mg/kg bw/day), the highest dose tested in females. In one volunteer no overt toxic symptoms were seen after oral administration of 7 g adipic acid per day for 10 days. **Genotoxicity:** A variety of mutagenicity tests in vitro and in vivo have failed to demonstrate that adipic acid possesses genotoxic potential. A number of good quality Ames tests in ***Salmonella typhimurium*** similar to OECD TG 471 and an examination of chromosome damage in human lung cells in culture produced negative results. In gavage studies in male rats it did not induce chromosome damage in the bone marrow or dominant lethal mutations in a dose-response or time-trend pattern. **Carcinogenicity:** Adipic acid was not carcinogenic in a limited two-years feeding study where male rats were fed with up to 5 % (3750 mg/kg bw/day) adipic acid and female rats with 1 % (750 mg/kg bw/day). **Reproductive toxicity:** No specific studies on fertility have been conducted. In a two-year feeding study in rats histopathological examination of testes, ovaries, and uterus revealed no evidence of an adverse effect on the reproductive organs up to the highest doses tested (males approx. 3750 mg/kg bw/day, females approx. 750 mg/kg bw/day). Based on the available data there is no reason to expect specific reproductive toxicity of adipic acid. **Developmental toxicity:** Adipic acid was not embryo- or foetotoxic and not teratogenic up to the highest tested doses of 288, 263, and 250 mg/kg bw/day via oral administration to rats, mice, and rabbits, respectively. In none of these studies signs of maternal toxicity have been observed and the highest dose was well below the limit dose of 1000 mg/kg bw which would be a precondition for a fully valid negative study. In view of the low systemic toxicity of the compound, however, this endpoint seems to be adequately covered despite the limitations of the studies
L-LEUCINE	Reproductive effector in rats. Fetotoxicity and specific developmental abnormalities recorded.
SODIUM LAURYL SULFATE	Eye (None) None: None None rabbit None 250 ugSkin (rabbit):25 mg/24 hr-moderate Skin (None) None: None rabbit None 50 mg/24Eye (rabbit) 10: mg- Alkyl sulfates are irritating to the skin, harmful if swallowed and at risk of causing serious damage to the eyes. They are metabolised by the liver and excreted via urine. They produce dose-dependent toxicity depending on their structure. They do not cause cancer, reproductive or genetic defects. However, at levels that are toxic to the mother, it may produce foetal defects during organ formation.
POTASSIUM BISULFATE	The material may produce respiratory tract irritation, and result in damage to the lung including reduced lung function.
BROMOCRESOL GREEN	No significant acute toxicological data identified in literature search. For phenolphthalein Phenolphthalein is absorbed in the small bowel and is conjugated in the liver and eliminated in the bile. As it passes through the small intestine, it is partially deconjugated and reabsorbed. Phenolphthalein and its metabolite may enhance oxygen radical production and cause oxidative damage. Repeated oral intake may induce abnormal red blood cells, abnormal sperm cell production, malignant lymphomas, chromosomal aberrations and gene mutations. The main target organ for the toxic effects of phenolphthalein is reported to be the intestine. Long-term use or overdose has been associated with loss of appetite, abdominal and electrolyte disturbances, dehydration, mal-absorption and mal-functioning colon, weight loss, cardiac arrhythmia, muscle weakness and prostration. There may be complications of kidney, muscle and central nervous system failure. Indiscriminate use of phenolphthalein results in chronic constipation and laxative dependence, loss of normal bowel function and bowel irritation. There may be gastrointestinal bleeding, iron-deficient anaemia, acute pancreatitis and multiple organ damage in cases of massive

Continued...

	overdose, including liver failure and disseminated intravascular coagulation. It can produce allergic skin reactions and cancer buts no evidence of reproductive toxicity.
SODIUM BICARBONATE	Oral (human-infant) TDLo: 1260 mg/kg Skin (human): 30 mg/3d-I-mild
YAP188, YPM188 - ALKAPHOT TABLETS & SODIUM LAURYL SULFATE	For alkyl sulfates; alkane sulfonates and alpha-olefin sulfonates Most chemicals of this category are not defined substances, but mixtures of homologues with different alkyl side chains. Common physical and/or biological pathways result in structurally similar breakdown products, and are, together with the surfactant properties, responsible for similar environmental behavior and essentially identical hazard profiles with regard to human health. Acute toxicity: These substances are well absorbed after ingestion; penetration through the skin is however, poor. After absorption, these chemicals are distributed mainly to the liver. In animals, signs of poisoning by mouth include lethargy, hair standing up, decreased motor activity and breathing rate, and diarrhea. Poisoning from skin contact caused irritation, tremor, tonic-clonic convulsions, breathing failure, and weight loss. The C-12-akyl sulfate sodium salt caused the greatest effect. In eye irritation tests, C-12 containing alkyl sulfates at greater than 10% concentration were severely irritating and produced irreversible effects on the cornea. With increasing alkyl chain length, the irritating potential decreases, and the longer species are only mildly irritant. Animal studies have not shown alkyl sulfates and C14-18 alpha-olefin sulfonates to cause skin sensitization. However there is anecdotal evidence to suggest sodium lauryl sulfate causes sensitization of the lung, resulting in hyperactive airway dysfunction and lung allergy, accompanied by fatigue, malaise and aching. Significant symptoms of exposure can persist for more than two years, and can be activated by a variety of non-specific environmental stimuli, such as exhaust, perfumes and passive smoking. Airborne sulfonates may be responsible for respiratory allergies, and in some cases, minor skin allergies. Repeated skin contact with some sulfonated surfactants has produced skin inflammation was sensitization in predisposed individuals. Repeat dose toxicity: The liver seems to be the only organ that is affected by repeated exposure, with elevated levels of liver enzymes, an increase in liver weight and enlargement of liver cells being seen. Genetic toxicity: Alkyl sulfates and alkyl-olefin sulfonates do not appear to cause mutations or genetic toxicity. Cancer-causing potential: Animal testing suggested that alkyl sulfates and alpha-olefin sulfonates do not have cancer-causing potential. Reproductive toxicity: In animal testing, these substances only caused harm to the foetus and/or offspring at levels which were toxic to the mother. Developmental toxicity: Alkane sulfonates are not considered to be toxic to development.
ADIPIC ACID & SODIUM LAURYL SULFATE & POTASSIUM BISULFATE & BROMOCRESOL GREEN	Asthma-like symptoms may continue for months or even years after exposure to the material ends. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur after exposure to high levels of highly irritating compound. Main criteria for diagnosing RADS include the absence of previous airways disease in a non-atopic individual, with sudden onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. Other criteria for diagnosis of RADS include a reversible airflow pattern on lung function tests, moderate to severe bronchial hyperreactivity on methacholine challenge testing, and the lack of minimal lymphocytic inflammation, without eosinophilia. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. On the other hand, industrial bronchitis is a disorder that occurs as a result of exposure due to high concentrations of irritating substance (often particles) and is completely reversible after exposure ceases. The disorder is characterized by difficulty breathing, cough and mucus production.
ADIPIC ACID & POTASSIUM BISULFATE	The material may produce moderate eye irritation leading to inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.
SODIUM LAURYL SULFATE & BROMOCRESOL GREEN	Based on laboratory and animal testing, exposure to the material may result in irreversible effects and mutations in humans.
POTASSIUM BISULFATE & SODIUM BICARBONATE	The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.

Acute Toxicity	✗	**Carcinogenicity**	✗
Skin Irritation/Corrosion	✓	**Reproductivity**	✗
Serious Eye Damage/Irritation	✓	**STOT - Single Exposure**	✗
Respiratory or Skin sensitisation	✗	**STOT - Repeated Exposure**	✗
Mutagenicity	✗	**Aspiration Hazard**	✗

Legend: ✗ ***– Data either not available or does not fill the criteria for classification***
✓ ***– Data available to make classification***

SECTION 12 Ecological information

Toxicity

YAP188, YPM188 - ALKAPHOT TABLETS

Endpoint	Test Duration (hr)	Species	Value	Source
Not Available	Not Available	Not Available	Not Available	Not Available

alpha-lactose

Endpoint	Test Duration (hr)	Species	Value	Source
Not Available	Not Available	Not Available	Not Available	Not Available

adipic acid

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	31.3mg/l	1
EC50	48h	Crustacea	85.7mg/l	1
NOEC(ECx)	504h	Crustacea	6.3mg/l	2
EC50	96h	Algae or other aquatic plants	26.6mg/l	1
LC50	96h	Fish	97mg/l	2

L-leucine

Endpoint	Test Duration (hr)	Species	Value	Source
EC50(ECx)	24h	Crustacea	>1000mg/L	2
LC50	96h	Fish	>10000mg/L	2

Continued...

sodium lauryl sulfate	**Endpoint**	**Test Duration (hr)**	**Species**	**Value**	**Source**
	EC50	72h	Algae or other aquatic plants	4.8mg/l	2
	EC50	48h	Crustacea	0.939mg/l	1
	EC0(ECx)	72h	Algae or other aquatic plants	30mg/l	1
	EC50	96h	Algae or other aquatic plants	0.4-3.7mg/L	4
	LC50	96h	Fish	0.59mg/L	4
potassium bisulfate	**Endpoint**	**Test Duration (hr)**	**Species**	**Value**	**Source**
	EC50	48h	Crustacea	2564mg/l	2
	EC50(ECx)	120h	Algae or other aquatic plants	1900mg/l	2
bromocresol green	**Endpoint**	**Test Duration (hr)**	**Species**	**Value**	**Source**
	Not Available	Not Available	Not Available	Not Available	Not Available
sodium bicarbonate	**Endpoint**	**Test Duration (hr)**	**Species**	**Value**	**Source**
	EC50	48h	Crustacea	101mg/l	2
	NOEC(ECx)	240h	Algae or other aquatic plants	26.8mg/l	2
	EC50	96h	Algae or other aquatic plants	650mg/L	4
	LC50	96h	Fish	833.28mg/L	4
Legend:	***Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. US EPA, Ecotox database - Aquatic Toxicity Data 4. ECETOC Aquatic Hazard Assessment Data 5. NITE (Japan) - Bioconcentration Data 6. METI (Japan) - Bioconcentration Data 7. Vendor Data***				

Environmental Fate: Adipic acid undergoes deprotonating under environmental conditions thus it usually exists as an anion. It is non-volatile and has low adsorptive potential that prefers to enter the water environment. Study shows that adipic acid is readily biodegradable.
Terrestrial Fate: When adipic acid is released on land, it will leach into the ground and may undergo biodegradation. There is no available information about the degradation of adipic acid in soil system.
Aquatic Fate: When released into water, adipic acid will readily undergo biodegradation.
Atmospheric Fate: When released in air, adipic acid will be associated with aerosols and will undergo gravitational settling. Vaporized adipic acid may be removed through reaction with hydroxyl radicals.
Ecotoxicity:
Fish LC50 (96h): 88-97 mg/l
Fish LC50 (96h): Danio rerio >1000 mg/l (pH 7.4-7.7)
Daphnia magna EC50 (48h): 85.6 mg/l
Algae EC50 (96h): Desmodesmus subspicatus 26.6 mg/l; (72h) 31.3 mg/l (growth inhibition)

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
alpha-lactose	LOW	LOW
adipic acid	LOW	LOW
L-leucine	HIGH	HIGH
sodium lauryl sulfate	HIGH	HIGH
potassium bisulfate	HIGH	HIGH
bromocresol green	HIGH	HIGH
sodium bicarbonate	LOW	LOW

Bioaccumulative potential

Ingredient	Bioaccumulation
alpha-lactose	LOW (LogKOW = -5.12)
adipic acid	LOW (LogKOW = 0.08)
L-leucine	LOW (LogKOW = -1.52)
sodium lauryl sulfate	LOW (BCF = 7.15)
potassium bisulfate	LOW (BCF = 3.162)
bromocresol green	LOW (LogKOW = 7.86)
sodium bicarbonate	LOW (LogKOW = -4.01)

Mobility in soil

Ingredient	Mobility
alpha-lactose	LOW (Log KOC = 10)
adipic acid	LOW (Log KOC = 21.48)
L-leucine	LOW (Log KOC = 7.842)
sodium lauryl sulfate	LOW (Log KOC = 10220)
potassium bisulfate	LOW (Log KOC = 6.124)
bromocresol green	LOW (Log KOC = 24890000)
sodium bicarbonate	HIGH (Log KOC = 1)

Continued...

Other adverse effects

One or more ingredients within this SDS has the potential of causing ozone depletion and/or photochemical ozone creation.

SECTION 13 Disposal considerations

Waste treatment methods

Product / Packaging disposal	Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked. A Hierarchy of Controls seems to be common - the user should investigate: ▸ Reduction ▸ Reuse ▸ Recycling ▸ Disposal (if all else fails) This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate. In most instances the supplier of the material should be consulted. ▸ **DO NOT** allow wash water from cleaning or process equipment to enter drains. ▸ It may be necessary to collect all wash water for treatment before disposal. ▸ In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first. ▸ Where in doubt contact the responsible authority.

SECTION 14 Transport information

Labels Required

Marine Pollutant	NO

Land transport (DOT): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Air transport (ICAO-IATA / DGR): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Sea transport (IMDG-Code / GGVSee): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

14.7. Maritime transport in bulk according to IMO instruments

14.7.1. Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

14.7.2. Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

Product name	Group
alpha-lactose	Not Applicable
adipic acid	Not Applicable
L-leucine	Not Applicable
sodium lauryl sulfate	Not Applicable
potassium bisulfate	Not Applicable
bromocresol green	Not Applicable
sodium bicarbonate	Not Applicable

14.7.3. Transport in bulk in accordance with the IGC Code

Product name	Ship Type
alpha-lactose	Not Applicable
adipic acid	Not Applicable
L-leucine	Not Applicable
sodium lauryl sulfate	Not Applicable
potassium bisulfate	Not Applicable
bromocresol green	Not Applicable
sodium bicarbonate	Not Applicable

SECTION 15 Regulatory information

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

alpha-lactose is found on the following regulatory lists

US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

adipic acid is found on the following regulatory lists

US - Massachusetts - Right To Know Listed Chemicals
US - New Jersey Right to Know Hazardous Substances
US - Pennsylvania - Hazardous Substance List
US CWA (Clean Water Act) - List of Hazardous Substances
US New York City Community Right-to-Know: List of Hazardous Substances
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

L-leucine is found on the following regulatory lists

Continued...

US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

sodium lauryl sulfate is found on the following regulatory lists

US - New Jersey Right to Know Hazardous Substances
US DOE Temporary Emergency Exposure Limits (TEELs)
US EPA Pesticide Chemical Search - Antimicrobial
US EPA Pesticide Chemical Search - Biopesticides
US EPA Pesticide Chemical Search - Conventional Chemical
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

potassium bisulfate is found on the following regulatory lists

US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Corrosives
US - New Jersey Right to Know Hazardous Substances
US DOE Temporary Emergency Exposure Limits (TEELs)
US EPA Pesticide Chemical Search - Antimicrobial
US New York City Community Right-to-Know: List of Hazardous Substances
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

bromocresol green is found on the following regulatory lists

US DOE Temporary Emergency Exposure Limits (TEELs)
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

sodium bicarbonate is found on the following regulatory lists

US DOE Temporary Emergency Exposure Limits (TEELs)
US EPA Pesticide Chemical Search - Antimicrobial
US EPA Pesticide Chemical Search - Biopesticides
US EPA Pesticide Chemical Search - Conventional Chemical
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

Additional Regulatory Information

Not Applicable

Federal Regulations

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Section 311/312 hazard categories

Flammable (Gases, Aerosols, Liquids, or Solids)	No
Gas under pressure	No
Explosive	No
Self-heating	No
Pyrophoric (Liquid or Solid)	No
Pyrophoric Gas	No
Corrosive to metal	No
Oxidizer (Liquid, Solid or Gas)	No
Organic Peroxide	No
Self-reactive	No
In contact with water emits flammable gas	No
Combustible Dust	No
Carcinogenicity	No
Acute toxicity (any route of exposure)	No
Reproductive toxicity	No
Skin Corrosion or Irritation	Yes
Respiratory or Skin Sensitization	No
Serious eye damage or eye irritation	Yes
Specific target organ toxicity (single or repeated exposure)	No
Aspiration Hazard	No
Germ cell mutagenicity	No
Simple Asphyxiant	No
Hazards Not Otherwise Classified	No

US. EPA CERCLA Hazardous Substances and Reportable Quantities (40 CFR 302.4)

Name	Reportable Quantity in Pounds (lb)	Reportable Quantity in kg
adipic acid	5000	2270

US. EPCRA Section 313 Toxic Release Inventory (TRI) (40 CFR 372)

None Reported

Additional Federal Regulatory Information

Continued...

Not Applicable

State Regulations

US. California Proposition 65

None Reported

Additional State Regulatory Information

Not Applicable

National Inventory Status

National Inventory	Status
Australia - AIIC / Australia Non-Industrial Use	Yes
Canada - DSL	Yes
Canada - NDSL	No (alpha-lactose; adipic acid; L-leucine; potassium bisulfate; bromocresol green; sodium bicarbonate)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	No (bromocresol green)
Korea - KECI	No (L-leucine)
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	All chemical substances in this product have been designated as TSCA Inventory 'Active'
Taiwan - TCSI	Yes
Mexico - INSQ	Yes
Vietnam - NCI	Yes
Russia - FBEPH	Yes
UAE - Control List (Banned/Restricted Substances)	No (alpha-lactose; adipic acid; L-leucine; sodium lauryl sulfate; bromocresol green; sodium bicarbonate)
Legend:	***Yes = All CAS declared ingredients are on the inventory*** ***No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.***

SECTION 16 Other information

Revision Date	10/05/2018
Initial Date	10/06/2018

Other information

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

Definitions and abbreviations

- PC—TWA: Permissible Concentration-Time Weighted Average
- PC—STEL: Permissible Concentration-Short Term Exposure Limit
- IARC: International Agency for Research on Cancer
- ACGIH: American Conference of Governmental Industrial Hygienists
- STEL: Short Term Exposure Limit
- TEEL: Temporary Emergency Exposure Limit。
- IDLH: Immediately Dangerous to Life or Health Concentrations
- ES: Exposure Standard
- OSF: Odour Safety Factor
- NOAEL: No Observed Adverse Effect Level
- LOAEL: Lowest Observed Adverse Effect Level
- TLV: Threshold Limit Value
- LOD: Limit Of Detection
- OTV: Odour Threshold Value
- BCF: BioConcentration Factors
- BEI: Biological Exposure Index
- DNEL: Derived No-Effect Level
- PNEC: Predicted no-effect concentration
- MARPOL: International Convention for the Prevention of Pollution from Ships
- IMSBC: International Maritime Solid Bulk Cargoes Code
- IGC: International Gas Carrier Code
- IBC: International Bulk Chemical Code

- AIIC: Australian Inventory of Industrial Chemicals
- DSL: Domestic Substances List
- NDSL: Non-Domestic Substances List
- IECSC: Inventory of Existing Chemical Substance in China
- EINECS: European INventory of Existing Commercial chemical Substances
- ELINCS: European List of Notified Chemical Substances
- NLP: No-Longer Polymers
- ENCS: Existing and New Chemical Substances Inventory
- KECI: Korea Existing Chemicals Inventory
- NZIoC: New Zealand Inventory of Chemicals
- PICCS: Philippine Inventory of Chemicals and Chemical Substances
- TSCA: Toxic Substances Control Act
- TCSI: Taiwan Chemical Substance Inventory

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- INSQ: Inventario Nacional de Sustancias Químicas
- NCI: National Chemical Inventory
- FBEPH: Russian Register of Potentially Hazardous Chemical and Biological Substances

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