SAFETY DATA SHEETS

This SDS packet was issued with item:

078081830

The safety data sheets (SDS) in this packet apply to the individual products listed below. Please refer to invoice for specific item number(s).

078781859

The safety data sheets (SDS) in this packet apply to one or more components included in the items listed below. Items listed below may require one or more SDS. Please refer to invoice for specific item number(s).

078074419 078081848 078081855 078082194

Merck Animal Health
One Merck Dr.
Whitehouse Station, NJ 08889

MATERIAL SAFETY DATA SHEET

Merck Animal Health urges each user or recipient of this MSDS to read the entire data sheet to become aware of the hazards associated with this material.

SECTION 1. IDENTIFICATION OF SUBSTANCE AND CONTACT INFORMATION

MSDS NAME: **NUFLOR Injectable Solution**

SYNONYM(S): NUFLOR Swine Injectable
NUFLOR Cattle Injectable

MSDS NUMBER: SP000757

EMERGENCY NUMBER(S): (908) 423-6000 (24/7/365) English Only

Transportation Emergencies - CHEMTREC:
(800) 424-9300 (Inside Continental USA)
(703) 527-3887 (Outside Continental USA)

Rocky Mountain Poison Center (For Human Exposure):
(303) 595-4869

Animal Health Technical Services:
For Animal Adverse Events: Small Animals and Horses: (800) 224-5318
For Animal Adverse Events: Livestock: (800) 211-3573
For Animal Adverse Events: Poultry: (800) 219-9286

INFORMATION: Animal Health Technical Services:
For Small Animals and Horses: (800) 224-5318
For Livestock: (800) 211-3573
For Poultry: (800) 219-9286

MERCK MSDS HELPLINE: (800) 770-8878 (US and Canada)
(908) 473-3371 (Worldwide)
Monday to Friday, 9am to 5pm (US Eastern Time)

SECTION 2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Viscous solution
Clear, Light gold color
Odor unknown
May cause allergic reactions in susceptible individuals.
May be irritating to eyes.
May cause effects to:
gastrointestinal tract
male reproductive system
fetus

May cause impaired fertility.
May cause developmental effects.
Toxic to aquatic organisms.
May cause long-term adverse effects in the aquatic environment.

POTENTIAL HEALTH EFFECTS:

No systemic toxicity, skin irritation, or skin sensitization was observed in acute animal studies using NUFLOR Injectable Solution. Slight eye irritation was observed in animals.

Only information about the ingredients that are expected to contribute significantly to the potential health hazard profile of the formulation(s) is presented.

This product is not for use in humans. Clinical effects in humans have not been determined.

Florfenicol, the active ingredient in this product, is a broad-spectrum antibiotic used in veterinary products. Florfenicol may cause allergic reactions in susceptible individuals. Based on animal studies, florfenicol may cause slight eye irritation, constipation, changes in blood cell counts, changes in stool, or liver effects. It may also cause developmental effects or effects to male reproductive organs.

Acute exposure to polyethelyene glycol may cause slight eye or skin irritation, abnormal taste, gas, nausea, vomiting, diarrhea, irregular heartbeat, low blood pressure, or fluid in the lungs. Repeated exposure of polyethylene glycol to damaged skin has been reported to cause kidney failure and necrosis. It may cause skin sensitization in sensitive individuals.

N-methyl-2-pyrrolidone (NMP) is a moderate to severe eye irritant in humans. Prolonged occupational exposure to low concentrations has caused chronic eye irritation and headache. Prolonged or repeated skin contact may cause dermatitis with blistering, edema, and erythema. In animal studies, fetotoxicity and teratogenicity was observed.

Propylene glycol is considered to be relatively non-toxic. It is a mild irritant to the eyes and has been reported to irritate the skin. It may cause skin sensitization resulting in allergic contact dermatitis in susceptible individuals. Inhalation exposure to saturated and supersaturated atmospheres of propylene glycol for prolonged periods of time produced no adverse effects. Propylene glycol may cause nervous system depression, acidosis, stupor, and seizures after chronic ingestion.

LISTED CARCINOGENS

No carcinogens or potential carcinogens listed by OSHA, IARC, NTP or ACGIH are present in concentrations >0.1% in this mixture.

SECTION 3. COMPOSITION AND INFORMATION ON INGREDIENTS

PRODUCT USE: Veterinary product

CHEMICAL FORMULA: Mixture.

The formulation for this product is proprietary information. Only hazardous ingredients in concentrations of 1% or greater and/or carcinogenic ingredients in concentrations of 0.1% or greater are listed in the Chemical Composition table. Active ingredients in any concentration are listed. For additional information about carcinogenic ingredients see Section 2.

CHEMICAL COMPOSITION

INGREDIENT	CAS NUMBER	PERCENT
Florfenicol	73231-34-2	30
N-Methyl-2-Pyrrolidone	872-50-4	20-30

Polyethylene Glycol	25322-68-3	30-40
Propylene Glycol	57-55-6	10-20

ADDITIONAL INFORMATION: This MSDS is written to provide health and safety information for individuals who will be handling the final product formulation during research, manufacturing, and distribution. For health and safety information for individual ingredients used during manufacturing, refer to the appropriate MSDS for each ingredient. Refer to the package insert or product label for handling guidance for the consumer.

SECTION 4. FIRST AID MEASURES

INHALATION: Remove to fresh air. If any trouble breathing, get immediate medical attention. Administer artificial respiration if breathing has ceased. If irritation or symptoms occur or persist, consult a physician.

SKIN CONTACT: In case of skin contact, while wearing protective gloves, carefully remove any contaminated clothing, including shoes, and wash skin thoroughly with soap and water. If irritation or symptoms occur or persist, consult a physician.

EYE CONTACT: In case of eye contact, immediately rinse eyes thoroughly with plenty of water. If wearing contact lenses, remove only after initial rinse, and continue rinsing eyes for at least 15 minutes. If irritation occurs or persists, consult a physician.

INGESTION: Rinse mouth and drink a glass of water. Do not induce vomiting unless under the direction of a qualified medical professional or Poison Control Center. If symptoms persist, consult a physician.

NOTE TO PHYSICIAN: This product contains florfenicol, a broad spectrum antibiotic which may cause allergic reactions in susceptible individuals.

SECTION 5. FIRE FIGHTING MEASURES

FLAMMABILITY DATA:

Flash Point: Not determined (liquids) or not applicable (solids).

SPECIAL FIRE FIGHTING PROCEDURES:
Wear full protective clothing and self-contained breathing apparatus (SCBA).

SUITABLE EXTINGUISHING MEDIA:
Carbon dioxide (CO2), extinguishing powder or water spray.

See Section 9 for Physical and Chemical Properties.

SECTION 6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS:
Wear appropriate personal protective equipment as specified in Section 8. Keep personnel away from the clean-up area.

SPILL RESPONSE / CLEANUP:
All spills should be handled according to site requirements and based on precautions cited in the MSDS. In the case of liquids, use proper absorbent materials. For laboratories and small-scale operations, incidental spills within a hood or enclosure should be cleaned by using a HEPA filtered vacuum or wet cleaning methods as appropriate. For large dry or liquid spills or those spills outside enclosure or hood, appropriate emergency response personnel should be notified. In manufacturing and large-scale operations, HEPA vacuuming prior to wet mopping or cleaning is required.

ENVIRONMENTAL PRECAUTIONS:
This product is toxic to aquatic organisms. Do not allow product to reach ground water, water course, sewage or drainage systems.

See Sections 9 and 10 for additional physical, chemical, and hazard information.

SECTION 7. HANDLING AND STORAGE

HANDLING:
Avoid skin and eye contact. Keep containers adequately sealed during material transfer, transport, or when not in use. Wash face, hands, and any exposed skin after handling. Do not eat, drink, or smoke when using this substance or mixture.

Appropriate handling of this material is dependent on many factors, including physical form, duration and frequency of process or task, and effectiveness of engineering controls. Site-specific risk assessments should be conducted to determine the feasibility and the appropriateness of all exposure control measures. See Section 8 (Exposure Controls) for additional guidance.

STORAGE:
Store in a cool, dry, well ventilated area.

See Section 8 for exposure controls and additional safe handling information.

SECTION 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

The following guidance applies to the handling of the active ingredient(s) in this formulation.

OCCUPATIONAL EXPOSURE BAND (OEB):
Florfenicol: OEB 2: 100-1000 mcg/m^3. Materials in an OEB 2 category are considered to be slight health hazards. The OEB is a range of airborne concentrations expressed as an 8-hour Time Weighted Average (8-hr. TWA) and is intended to be used with Industrial Hygiene Risk Assessment to assist with industrial hygiene sampling and selection of proper controls for worker protection. Consult your site safety and industrial hygiene staff for guidance on handling and control strategies.

OCCUPATIONAL EXPOSURE GUIDELINE (OEG):
An Occupational Exposure Guideline (OEG) of 80 mcg/m^3 (8-hr TWA) has been established for Florfenicol. Consult your site safety and industrial hygiene professional(s) for additional guidance.

HHC/OEG NOTATION(S):
Florfenicol: This material has a notation of "A" for its ability to cause immediate allergic hypersensitivity reactions or anaphylaxis.

EXPOSURE CONTROLS
The health hazard risks of handling this material are dependent on many factors, including physical form, duration and frequency of process or task, and effectiveness of engineering controls. Site-specific risk assessments should be conducted to determine the feasibility and the appropriateness of all exposure control measures. Exposure controls for normal operating or routine procedures follow a tiered strategy. Engineering controls are the preferred means of long-term or permanent exposure control. If engineering controls are not feasible, appropriate use of personal protective equipment (PPE) may be considered as alternative control measures. Exposure controls for non-routine operations must be evaluated and addressed as part of the site-specific risk assessment.

RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT (PPE):

Respiratory Protection:	Respiratory protective equipment (RPE) may be required for certain laboratory and large-scale manufacturing tasks if potential airborne breathing zone concentrations of substances exceed the relevant exposure limit(s). Workplace risk assessment should be completed before specifying and implementing RPE usage. Potential exposure points and pathways, task duration and frequency, potential employee contact with the substance, and the ability of the substance to be rendered airborne during specific tasks should be evaluated. Initial and ongoing strategies of quantitative exposure measurement should be obtained as required by the workplace risk assessment. All RPE must conform to local and regional specifications for efficacy and performance. Consult your site or corporate health and safety professional for additional guidance.
Skin Protection:	Gloves that provide an appropriate barrier to the skin are recommended if there is potential for contact with this material. Consult your site safety staff for guidance.
Eye Protection:	Safety glasses with side shields. Use of goggles or full face protection may be required based on hazard, potential for contact, or level of exposure. Consult your site safety staff for guidance.
Body Protection:	In small-scale or laboratory operations, lab coats or equivalent protection is required. Disposable Tyvek or other dust impermeable suit should be considered based on procedure or level of exposure. Use of additional PPE such as shoe coverings, gauntlets, hood, or head covering may be necessary. Consult your site safety staff for guidance. In large-scale or manufacturing operations, disposable Tyvek or other dust impermeable suit is recommended and based on level of exposure. Use of additional PPE such as shoe coverings, gauntlets, hood, or head covering may be necessary. Consult your site safety staff for guidance.

EXPOSURE LIMIT VALUES

See Occupational Exposure Guideline (OEG) listed above.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

FORM:	Viscous solution
COLOR:	Clear, Light gold color
ODOR:	Odor unknown
SOLUBILITY:	
Water:	Not determined

See Section 5 for flammability/explosivity information.

SECTION 10. STABILITY AND REACTIVITY

STABILITY/ REACTIVITY:
Stable under normal conditions.

INCOMPATIBLE MATERIALS / CONDITIONS TO AVOID:
Open flames and high temperatures. Strong acids and bases. Oxidizers.

HAZARDOUS DECOMPOSITION PRODUCTS / REACTIONS:
Carbon monoxide (CO). Carbon dioxide (CO2).

SECTION 11. TOXICOLOGICAL INFORMATION

The information presented below pertains to the formulated product unless indicated otherwise.

ACUTE TOXICITY DATA

INHALATION:
Florfenicol: No mortality occurred in rats exposed to florfenicol for 4 hours at 0.28 mg/L (the maximum concentration tested). Clinical effects included dry rales, anogenital staining, secretory discharge, soft stool, and decreased body weights. These effects were seen immediately or up to one-week post exposure. Some effects did not resolve by study termination.

No mortalities were reported in rats (0/6) following a 4-hour exposure to polyethylene glycol vapors generated at 170 deg C; however, mortality was observed in all rats (6/6) following an 8-hour exposure to polyethylene glycol vapors generated at 170 deg C.

Propylene glycol caused no adverse effects in monkeys or rats following exposure to saturated atmospheres for prolonged periods of time.

SKIN:
Dermal LD50 (rat): >2424 mg/kg

There were no deaths and no signs of systemic toxicity noted in an acute dermal toxicity study in rats.

Not irritating to the skin of rabbits.

EYE:
Nuflor Injectable Solution was slightly irritating to the eyes of rabbits. Conjunctival discharge and redness were observed 1-hour postinstillation. Effects were resolved by 24 hours.

ORAL:
Oral LD50 (rat): >2424 mg/kg
There were no deaths and no signs of systemic toxicity noted in an acute oral toxicity study in rats.

DERMAL AND RESPIRATORY SENSITIZATION:
Not a skin sensitizer in a dermal sensitization study in guinea pigs.

REPEAT DOSE TOXICITY DATA

SUBCHRONIC / CHRONIC TOXICITY:
Florfenicol was administered orally to dogs, rats, and mice at dosages as high as 100 to 400 mg/kg/day for up to 13 weeks. Effects including decreased body weight, changes in liver weight or liver enzyme levels, changes in testicular weight, testicular atrophy, decreased white blood cell counts, and decreased hemoglobin levels were observed at high dosages. Cellular changes in the liver or lymph nodes of rats and mice, and histopathologic changes in the brain and spinal cord of dogs were also noted at these high dosages. Although some effects were reversible after a 4-week withdrawal from treatment, testicular effects in rats persisted. Intramuscular injections of 45 mg/kg of florfenicol in swine produced diarrhea, injection site lesions, decreased body weight, decreased food and water consumption, changes in serum electrolytes and proteins, decreased red blood cell and white blood cell counts, decreased spleen weight, and decreased kidney weight.

In 52-week oral toxicity studies in dogs and rats, high dosages of florfenicol (12 and 48 mg/kg/day, respectively) increased liver weight and produced cellular changes in the gall bladder of dogs. In rats, florfenicol at the high dosage reduced body weight gain, reduced testicular weight, induced changes in hematologic and clinical chemistry parameters, and increased the incidence of testicular tubular atrophy. In two-year chronic studies in mice and rats, florfenicol caused similar effects as those observed in other long-term studies including reduced body weight gain, reduced red blood cell count, reduced hemoglobin levels, and testicular effects such as small testes, tubular atrophy and aspermatogenesis in both the high dosage rats (48 mg/kg/day) and mice (200 mg/kg/day).

Polyethylene glycol 400 produced no adverse effects in dogs and rats fed 2% in the diet for one or two years, respectively. Repeated dermal exposure to polyethylene glycol 300 for an eight-week period had no effect on mice. Repeated inhalation exposure to 1008 mg/m^3 of a higher molecular weight polyethylene glycol increased lung weight, and also produced reversible increases in neutrophil counts in male rats.

Inhalation toxicity of N-methyl-2-pyrrolidone (NMP) was evaluated in male and female rats exposed to 0.1, 0.5, or 1.0 mg/L for four weeks. Mortality was seen in animals in the high-dosage group during the first nine days of exposure. Treatment-related effects noted in the high-dosage group included lethargy, irregular heartbeat, increased neutrophils, decreased lymphocytes, pulmonary edema and congestion, necrosis in hemopoietic cells, and atrophy or necrosis in lymphoid tissue. Surviving animals recovered following a two-week of recovery period.

Mice and rats were fed NMP dosages ranging from 2,000 to 30,000 ppm and 500 to 10,000 ppm for 28 days in rats and mice, respectively. Decreased body weight gains as well as clinical chemical changes, indicating possible alterations in lipid, protein, and carbohydrate metabolism, occurred in male rats dosed with 18,000 ppm and in both sexes dosed with 30,000 ppm. In mice, swelling of the epithelium of the distal parts of the renal tubules was observed at dosages of 7,500 ppm or higher. The NOAELs for these studies were 6,000 ppm for male rats, 18,000 ppm for female rats, and 2,500 ppm for mice. In a reproductive study, rats exposed to 116 ppm of NMP for 100 exposure days had a detectable decrease in response to sound.

Propylene glycol caused no adverse effects in monkeys or rats exposed to saturated vapor concentrations for 12 to 18 months. Rats exposed to 25 or 50% (7.7 and 13.2 g/kg/day) propylene glycol in water died within 69 days in a 140 day study. In a separate study, a diet of 30% propylene glycol was not well tolerated in young rats, and dams could not bring their young to weaning; diets containing 40, 50, or 60% propylene glycol were lethal after a few days.

REPRODUCTIVE / DEVELOPMENTAL TOXICITY:
In a two-generation reproductive study, oral administration as high as 12 mg/kg/day of florfenicol reduced epididymal weights, decreased pup survival, and reduced lactation index in rats [NOAEL: 3 mg/kg/day].

There was no evidence of teratogenicity in rats administered florfenicol at dosages of 4, 12 or 40 mg/kg/day. Slight maternal toxicity, evidenced by decreased food and water consumption, was observed above 4 mg/kg/day. At 40 mg/kg/day, an increased incidence of delayed ossification and decreased fetal weight occurred. The NOAEL for maternal and fetal toxicity in rats was determined to be 4 mg florfenicol/kg/day.

Two teratogenicity studies were performed in mice. In the first study, the mice were administered florfenicol at dosages of 40, 120, or 400 mg/kg by gavage on days 6-15 of gestation. Florfenicol produced embryolethality at the 400 mg/kg/day dose level, which was evidenced by the high incidence of intrauterine deaths. Significant decreases in mean fetal body weight, soft tissue defects, and retarded skeletal ossification were also observed at 400 mg/kg/day. Skeletal ossification was less pronounced, in a dose-related fashion, at the lower doses tested (40 and 120 mg/kg/day). A developmental NOAEL could not be determined for these data [NOAEL for maternal: 120 mg/kg]. In the second teratogenicity study, florfenicol was retested at lower administered dosages of 1, 3, or 60 mg/kg/day. Maternal effects were limited to a slight increase in water consumption at the 60 mg/kg/day dose. There was no evidence of any adverse effects on the embryo/fetus at doses as high as 60 mg/kg/day in this study. However, based upon the retarded skeletal ossification effects observed in the first study at 40 mg/kg/day the NOAEL for the two studies combined was determined to be between 3 and 40 mg/kg/day.

Polyethylene glycol 200 was developmentally toxic in mice, causing malformations and other fetotoxicity, but elicited no similar response in rats at higher doses.

N-methyl-2-pyrrolidone (NMP) was not teratogenic to the offspring of rats exposed to 0.1 or 0.36 mg/L by inhalation from days 6 to 15 of gestation. No adverse reproductive effects were found in male or female rats exposed to airborne concentrations up to 116 ppm (6hr/day x 100 days) in a two-generation reproductive study. NMP was fetotoxic and teratogenic to the offspring of mice and rats following dermal, oral, or intraperitoneal exposure during gestation [NOEL: 1154 mg/kg/day (oral; mice); 237 mg/kg/day (oral and dermal; rats); LOEL: 166 mg/kg/day (IP; mice)]. Maternal toxicity was also observed in these studies.

Propylene glycol caused decreased food consumption, retarded growth, smaller litters, changes in breeding patterns, and inhibited weaning in rats that were fed 30% propylene glycol through six generations; however, this may have been due to nutritional insufficiency. Propylene glycol was not teratogenic in rabbits, monkeys or chickens.

MUTAGENICITY / GENOTOXICITY:
Florfenicol was negative in a bacterial mutagenicity study (Ames), a mammalian mutagenicity study (mouse lymphoma), a bone marrow micronucleus assay, an in vitro chromosomal aberration assay in CHO cells, a cytogenetics assay in bone marrow, and an unscheduled DNA synthesis assay in rat hepatocytes.

Polyethylene glycol was negative in a bacterial mutagenicity study (Ames), results were inconclusive in a bacterial DNA repair study.

N-methyl-2-pyrrolidone (NMP) induced aneuploidy in Saccharomyces. NMP was negative in a bacterial (Salmonella) mutagenicity assay, an in vitro mouse micronucleus assay, and in an in vitro chromosomal aberration assay in CHO cells.

Propylene glycol was negative in a bacterial mutagenicity study (Ames).

CARCINOGENICITY:
Florfenicol was not carcinogenic in a 2-year study in rats administered dosages up to 48 mg/kg/day for 5 days a week or in mice at dosages up to 200 mg/kg/day for 5 days per week.

N-methyl-2-pyrrolidone was not carcinogenic in rats exposed, by inhalation, to 0.04 to 0.4 mg/L for six hours/day for two years.

Propylene glycol was not carcinogenic when applied to the skin, or when given orally in mice and rats.

SECTION 12. ECOLOGICAL INFORMATION

There are no data for the final product or its formulation(s). The information presented below pertains to the following ingredient(s).

ECOTOXICITY DATA

INGREDIENT ECOTOXICITY

Florfenicol: 96-hr LC50 (bluegill): >830 mg/L
Florfenicol: 96-hr LC50 (trout): >780 mg/L
Florfenicol: 48-hr EC50 (daphnid): >330 mg/L
Florfenicol: Algae maximum cell density: MIC = 1.5 mg/L
Florfenicol: Algae maximum growth rate: MIC >2.9 mg/L

Propylene glycol: 96-hr LC50 (sheepshead minnow): 23,800 mg/L
Propylene glycol: 48-hr EC50 (daphnid): >43,500 mg/L
Propylene glycol: 72-hr EC50 (green algae): >19,000 mg/L

ENVIRONMENTAL DATA

OTHER INGREDIENT ENVIRONMENTAL DATA:

Florfenicol: log Pow (log octanol/water partition coefficient): 2.36
Florfenicol: Solubility 1.32 mg/ml at pH 7
Florfenicol: Biodegrablity: Not readily biodegradable but there is evidence of inherent biodegradability.

Propylene glycol is expected to be readily biodegradable.

ENVIRONMENTAL FATE AND EFFECTS:
Photolytic half-life of Florfenicol in synthetic humic water (SHW) or pure water (PW) was 196 days in SHW and 171 days in PW.

SECTION 13. DISPOSAL CONSIDERATIONS

MATERIAL WASTE:
Disposal must be in accordance with applicable federal, state/provincial, and/or local regulations. Incineration is the preferred method of disposal, when appropriate. Operations that involve the crushing or shredding of waste materials or returned goods must be handled to meet the recommended exposure limit(s).

PACKAGING AND CONTAINERS:
Disposal must be in accordance with applicable federal, state/provincial, and/or local regulations.

SPECIAL ENVIRONMENTAL HANDLING PROCEDURES:
This product contains materials that are harmful to the environment. Do not allow product to reach ground water, water courses, sewage or drainage systems.

SECTION 14. TRANSPORT INFORMATION

This material is not subject to the transportation regulations of DOT, IATA, IMO, and the ADR.

SECTION 15. REGULATORY INFORMATION

SECTION 15. REGULATORY INFORMATION

TSCA LISTING

INGREDIENT	TSCA
N-Methyl-2-Pyrrolidone	X
Polyethylene Glycol	X
Propylene Glycol	X

U.S. STATE REGULATIONS

INGREDIENT	California Proposition 65	CARTK	NJRTK	CTRTK	MARTK
N-Methyl-2-Pyrrolidone	D		3716		X
Propylene Glycol			3595		

INGREDIENT	PARTK	MNRTK	MIRTK	RIRTK
N-Methyl-2-Pyrrolidone	X			
Polyethylene Glycol		X		
Propylene Glycol	X	X		X

Fields in the above tables that do not contain data indicate that those materials have not been listed by local regulations.

SECTION 16. OTHER INFORMATION

Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained therein, and assume no responsibility regarding the suitability of this information for the user's intended purposes or for the consequence of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s).

The brand-names or trademarks indicated by CAPITAL LETTERS in this [M]SDS are the property of, licensed to, promoted or distributed by Merck & Co., Inc., its subsidiaries or related companies.

DEPARTMENT ISSUING MSDS:
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(800) 770-8878 (US and Canada)
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Monday to Friday, 9am to 5pm (US Eastern Time)

MSDS CREATION DATE: 04-Dec-1995

SUPERSEDES DATE: 21-Mar-2008

SECTIONS CHANGED (US SUBFORMAT): 1, 16
SIGNIFICANT CHANGES (US SUBFORMAT): Phone Number(s), OEB

MATERIAL SAFETY DATA SHEET

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Vet-A-Mix,
A Division of LLOYD, Inc.
Phone No. (712) 246-4000

P.O. Box 130, Shenandoah, IA 51601-0130
Pet-Form® Chewable Tablets
MSDS Date: 11/19/92 (Original)
12/19/95; 10/05/04; 6/28/06 (Revised)

Product Name: Pet-Form® Chewable Tablets

1. INGREDIENTS: (% w/w), unless otherwise noted

			EXPOSURE LIMITS, ppm	
COMPONENT	CAS#	%	OSHA PEL	ACGIH TLV (mg/m^3)
Dicalcium Phosphate	7757-93-9	26.0	--None Established--	
Calcium Carbonate	1317-65-3	7.1	30 mppcf	10 Total Dust 5 Respirable Dust
Glycerin	56-81-5	1.8	None	10 (mist)
Choline Chloride, 60%	67-48-1	1.5	--None Established--	

This document is prepared pursuant to the OSHA Hazard Communication Standard (29 CFR 1910.1200). Only those ingredients composing ≥1% (≥0.1% for carcinogens or suspect carcinogens) of the formula (w/w) and which have hazards identified are listed. The exposure limits associated with calcium carbonate dust and glycerin mist are not applicable to this product in the solid dosage form.

2. PHYSICAL DATA:

APPEARANCE: Brown elliptical shaped tablet.
Other physical data have not been determined.

3. FIRE AND EXPLOSION HAZARD DATA:

This has not been evaluated.
EXTINGUISHING MEDIA: Water fog, alcohol foam, CO_2, dry chemical.
SPECIAL FIRE FIGHTING PROCEDURES: A strong fire could cause evolution of toxic and flammable trimethylamine from the choline chloride.

4. REACTIVITY DATA:

This has not been evaluated. The product is expected to be stable under normal storage conditions; avoid strong oxidizers. Choline chloride is corrosive to steel, copper, brass and aluminum. The addition of alkaline material to choline chloride will release choline base and trimethylamine.

5. ENVIRONMENTAL AND DISPOSAL INFORMATION:

ACTION TO TAKE FOR SPILLS/LEAKS: Sweep up and dispose of in DOT-approved waste containers. Keep out of sewers, storm drains, surface waters and soil.

DISPOSAL METHOD: Dispose of contaminated product and materials used in cleaning up spills or leaks in a manner approved for this material. Consult appropriate federal, state and local regulatory agencies to ascertain proper disposal procedures.

6. HEALTH HAZARD DATA:

EYE: This product is not expected to irritate the eyes.
SKIN CONTACT: This product is not expected to irritate the skin.
INGESTION: This has not been evaluated.
INHALATION: Inhalation exposure under normal conditions of use is not likely to cause adverse effects, however irritation may occur if use conditions generate dust.

Dicalcium Phosphate--Oral LD50 (rat): 10,000 mg/kg; Dermal LD50 (rabbit): >7940 mg/kg
Choline Chloride 60% Powder--Oral LD50 (rat): 6640 mg/kg; I.P. LD50 (rat): 400 mg/kg;
Glycerin--Oral LD50 (rat): 17-27.2 g/kg; Rabbit (dermal): 500 mg/24 hr moderate irritation.

SIGNS AND SYMPTOMS OF EXPOSURE: Choline Chloride 60% Powder: Possible liver effects, kidney effects, gastrointestinal complications, nausea, vomiting, headache, skin irritation or rash, eye irritation, tearing or blurring of vision.

Glycerin**:** Repeated excessive exposure may cause kidney and liver effects, and increased fat levels in blood. Observations in animals include gastrointestinal irritation with very large oral doses. Birth defects are unlikely. Exposures having no adverse effects on the mother should have no effect on the fetus. Reproduction studies indicate that glycerin does not directly interfere with reproduction in animals. When animals were maintained on synthetic diets or dosed at extremely high levels, reproduction in females was affected -- perhaps due to altered nutritional states.

Potassium Chloride: May cause temporary eye irritation. May be irritating to skin of susceptible persons, particularly in cuts or open wounds. Repeated or prolonged contact may cause dermatitis. May be irritating to nose and throat upon inhalation. High concentrations of dust (up to 2000 mg/m^3) may cause perforation of the nasal septum. Long term exposure to high concentrations could cause chronic cough and mild bronchitis. There is no evidence of permanent lung damage. Ingestion of a large amount may cause irritation of the gastrointestinal tract, cramps, diarrhea, tingling of hands or feet, weak pulse and circulatory disturbances. Oral LD50 (rat): 3020 mg/kg; Eye Irritation (rabbit): 500 mg/24 hr: Severe irritant. RTECS, 1982, cites a mutation reference.

7. FIRST AID:

EYES: Immediately flush eyes with copious amounts of running water for 15 minutes.
SKIN: Wash with soap and water.
INGESTION: SEEK MEDICAL ATTENTION IMMEDIATELY. Treatment is by gastric lavage or emesis.
INHALATION: If a person has been exposed to excessive quantities of dust due to mishaps, move the person to fresh air. Give artificial respiration if not breathing.

Seek medical attention immediately if excessive exposure occurs.

8. HANDLING PRECAUTIONS:

There is no OSHA PEL or ACGIH TLV for this product. Under normal conditions of use, no special handling precautions are required in areas with adequate ventilation. However, under conditions of prolonged exposure in which quantities of dust are generated, mechanical ventilation, safety glasses with side shields, gloves and a NIOSH approved dust respirator are recommended.

SPECIAL PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Exercise reasonable care and caution.

REGULATORY INFORMATION: **(Not meant to be all-inclusive--selected regulations represented.)**

NOTICE: The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations. See MSDS for health and safety information.

U.S. REGULATIONS: SARA HAZARD CATEGORY: This product has been reviewed according to the federal EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to be exempt from reporting requirements. Nevertheless, potential reporters should check with their state emergency response commissions to determine if this product must be reported under applicable state requirements.

Dicalcium phosphate contains the following chemicals considered by the State of California's Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65) as causing cancer or reproductive toxicity and for which warnings are now required: Arsenic--CAS No. 7440-38-2; Cadmium--CAS No. 7440-43-9; Lead--CAS No. 7439-92-1.

1. IDENTIFICATION

Product Name: Pet-Form®

Synonyms: Chewable Vitamin Tablets

Company: **LLOYD, Inc.**
604 West Thomas Avenue
P.O. Box 130
Shenandoah, IA 51601-0130
USA
(712) 246-4000

Emergency Contact: National Capital Poison Center
(800) 222-1222

Recommended Use: Dietary supplement for dogs and cats.

2. HAZARDS IDENTIFICATION

WARNING

EYE: This product is not expected to irritate the eyes.

SKIN CONTACT: This product is not expected to irritate the skin.

INGESTION: This has not been evaluated.

INHALATION: Inhalation exposure under normal conditions of use is not likely to cause adverse effects, however irritation may occur if use conditions generate dust.

Dicalcium Phosphate--Oral LD50 (rat): 10,000 mg/kg; Dermal LD50 (rabbit): >7,940 mg/kg

Choline Chloride 60% Powder--Oral LD50 (rat): 6,640 mg/kg; I.P. LD50 (rat): 400 mg/kg; Glycerin--Oral LD50 (rat): 17-27.2 g/kg; Rabbit (dermal): 500 mg/24 hr moderate irritation.

SIGNS AND SYMPTOMS OF EXPOSURE:

Choline Chloride 60% Powder: Possible liver effects, kidney effects, gastrointestinal complications, nausea, vomiting, headache, skin irritation or rash, eye irritation, tearing or blurring of vision.

Glycerin: Repeated excessive exposure may cause kidney and liver effects, and increased fat levels in blood. Observations in animals include gastrointestinal irritation with very large oral doses. Birth defects are unlikely. Exposures having no adverse effects on the mother should have no effect on the fetus. Reproduction studies indicate that glycerin does not directly interfere with reproduction in animals. When animals were maintained on synthetic diets or dosed at extremely high levels, reproduction in females was affected -- perhaps due to altered nutritional states.

Potassium Chloride: May cause temporary eye irritation. May be irritating to skin of susceptible persons, particularly in cuts or open wounds. Repeated or prolonged contact may cause dermatitis. May be irritating to nose and throat upon inhalation. High concentrations of dust (up to 2,000 mg/m^3) may cause perforation of the nasal septum. Long term exposure to high concentrations could cause chronic cough and mild bronchitis. There is no evidence of permanent lung damage. Ingestion of a large amount may cause irritation of the gastrointestinal tract, cramps, diarrhea, tingling of hands or feet, weak pulse and circulatory disturbances. Oral LD50 (rat): 3,020 mg/kg; Eye Irritation (rabbit): 500 mg/24 hr: Severe irritant. RTECS, 1982, cites a mutation reference.

3. INFORMATION ON INGREDIENTS

(% w/w), unless otherwise noted

			EXPOSURE LIMITS, ppm	
			OSHA	ACGIH
COMPONENT	CAS#	%	PEL	TLV (mg/m^3)
Dicalcium Phosphate	7757-93-9	26.0	--None Established--	
Calcium Carbonate	1317-65-3	7.1	30 mppcf	10 Total Dust 5 Respirable Dust
Glycerin	56-81-5	1.8	None	10 (mist)
Choline Chloride, 60%	67-48-1	1.5	--None Established--	

This document is prepared pursuant to the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Only those ingredients composing ≥1% (≥0.1% for carcinogens or suspect carcinogens) of the formula (w/w) and which have hazards identified are listed. Starch dust has a minimum explosive limit of 0.04 oz/ft^3; no maximum limit. The exposure limit associated with glycerin mist is not applicable to the product in the solid dosage form.

4. FIRST AID MEASURES

EYES: Immediately flush eyes with copious amounts of running water for 15 minutes.

SKIN: Wash with soap and water.

INGESTION: SEEK MEDICAL ATTENTION IMMEDIATELY. Treatment is by gastric lavage or emesis.

INHALATION: If a person has been exposed to excessive quantities of dust due to mishaps, move the person to fresh air. Give artificial respiration if not breathing.

SEEK MEDICAL ATTENTION IMMEDIATELY IF EXCESSIVE EXPOSURE OCCURS.

5. FIREFIGHTING MEASURES

This has not been evaluated.

Extinguishing media: Water fog, alcohol foam, CO_2, dry chemical.

SPECIAL FIRE FIGHTING PROCEDURES: A strong fire could cause evolution of toxic and flammable trimethylamine from the choline chloride.

6. ACCIDENTAL RELEASE MEASURES

Action to take for spills/leaks: Sweep up and dispose of in DOT-approved waste containers. Keep out of sewers, storm drains, surface waters and soil.

7. HANDLING AND STORAGE

Special precautions to be taken in handling and storage: Exercise reasonable care and caution.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

There is no OSHA PEL or ACGIH TLV for this product. Under normal conditions of use, no special handling precautions are required in areas with adequate ventilation. However, under conditions of prolonged exposure in which quantities of dust are generated, mechanical ventilation, safety glasses with side shields, gloves and a NIOSH approved dust respirator are recommended.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Brown elliptical tablet.

Other physical data have not been determined.

10. STABILITY AND REACTIVITY

This has not been evaluated. The product is expected to be stable under normal storage conditions; avoid strong oxidizers. Choline chloride is corrosive to steel, copper, brass and aluminum. The addition of alkaline material to choline chloride will release choline base and trimethylamine.

11. TOXICOLOGICAL INFORMATION

N/A

12. ECOLOGICAL INFORMATION

Action to take for spills/leaks: Sweep up and dispose of in DOT-approved waste containers. Keep out of sewers, storm drains, surface waters and soil.

13. DISPOSAL CONSIDERATIONS

Dispose of contaminated product and materials used in cleaning up spills or leaks in a manner approved for this material. Consult appropriate federal, state and local regulatory agencies to ascertain proper disposal procedures.

14. TRANSPORT INFORMATION

No special transportation required

15. REGULATORY INFORMATION

(Not meant to be all-inclusive--selected regulations represented.)
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16. OTHER INFORMATION

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

SAFETY DATA SHEET

Florfenicol Liquid Formulation

Version	Revision Date:	SDS Number:	Date of last issue: 05/02/2017
6.0	10/17/2017	26291-00010	Date of first issue: 10/29/2014

SECTION 1. IDENTIFICATION

Product name : Florfenicol Liquid Formulation

Manufacturer or supplier's details

Company name of supplier : Merck & Co., Inc

Address : 2000 Galloping Hill Road
Kenilworth - New Jersey - USA 1685

Telephone : 908-740-4000

Telefax : 908-735-1496

Emergency telephone : 1-908-423-6000

E-mail address : EHSDATASTEWARD@merck.com

Recommended use of the chemical and restrictions on use

Recommended use : Veterinary product

SECTION 2. HAZARDS IDENTIFICATION

GHS classification in accordance with 29 CFR 1910.1200

Skin irritation : Category 2

Eye irritation : Category 2A

Reproductive toxicity : Category 1B

Specific target organ systemic toxicity - single exposure : Category 3

Specific target organ systemic toxicity - repeated exposure : Category 1 (Liver, Brain, Testes, Spinal cord, Blood, gallbladder)

GHS label elements

Hazard pictograms :

Signal Word : Danger

Hazard Statements : H315 Causes skin irritation.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.
H360Df May damage the unborn child. Suspected of damaging fertility.

H372 Causes damage to organs (Liver, Brain, Testes, Spinal cord, Blood, gallbladder) through prolonged or repeated exposure.

Precautionary Statements :

Prevention:

P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P260 Do not breathe mist or vapors.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response:

P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P312 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P332 + P313 If skin irritation occurs: Get medical advice/ attention.
P337 + P313 If eye irritation persists: Get medical advice/ attention.
P362 + P364 Take off contaminated clothing and wash it before reuse.

Storage:

P405 Store locked up.

Disposal:

P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards

None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Hazardous ingredients

Chemical name	CAS-No.	Concentration (% w/w)
Florfenicol	73231-34-2	>= 30 - < 50
Polyethylene glycol	25322-68-3	>= 30 - < 50
N-Methyl-2-pyrrolidone	872-50-4	>= 20 - < 30
Propylene glycol	57-55-6	>= 10 - < 20

SECTION 4. FIRST AID MEASURES

General advice	:	In the case of accident or if you feel unwell, seek medical advice immediately. When symptoms persist or in all cases of doubt seek medical advice.
If inhaled	:	If inhaled, remove to fresh air. Get medical attention.
In case of skin contact	:	In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.
In case of eye contact	:	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. If easy to do, remove contact lens, if worn. Get medical attention.
If swallowed	:	If swallowed, DO NOT induce vomiting. Get medical attention. Rinse mouth thoroughly with water.
Most important symptoms and effects, both acute and delayed	:	Causes skin irritation. Causes serious eye irritation. May cause respiratory irritation. May damage the unborn child. Suspected of damaging fertility. Causes damage to organs through prolonged or repeated exposure.
Protection of first-aiders	:	First Aid responders should pay attention to self-protection, and use the recommended personal protective equipment when the potential for exposure exists.
Notes to physician	:	Treat symptomatically and supportively.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	:	Water spray Alcohol-resistant foam Carbon dioxide (CO2) Dry chemical
Unsuitable extinguishing media	:	None known.
Specific hazards during fire fighting	:	Exposure to combustion products may be a hazard to health.
Hazardous combustion prod-	:	Carbon oxides

ucts		Nitrogen oxides (NOx)
Specific extinguishing methods	:	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Use water spray to cool unopened containers. Remove undamaged containers from fire area if it is safe to do so. Evacuate area.
Special protective equipment for fire-fighters	:	In the event of fire, wear self-contained breathing apparatus. Use personal protective equipment.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Use personal protective equipment. Follow safe handling advice and personal protective equipment recommendations.
Environmental precautions	:	Discharge into the environment must be avoided. Prevent further leakage or spillage if safe to do so. Prevent spreading over a wide area (e.g., by containment or oil barriers). Retain and dispose of contaminated wash water. Local authorities should be advised if significant spillages cannot be contained.
Methods and materials for containment and cleaning up	:	Soak up with inert absorbent material. For large spills, provide diking or other appropriate containment to keep material from spreading. If diked material can be pumped, store recovered material in appropriate container. Clean up remaining materials from spill with suitable absorbent. Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which regulations are applicable. Sections 13 and 15 of this SDS provide information regarding certain local or national requirements.

SECTION 7. HANDLING AND STORAGE

Technical measures	:	See Engineering measures under EXPOSURE CONTROLS/PERSONAL PROTECTION section.
Local/Total ventilation	:	Use with local exhaust ventilation.
Advice on safe handling	:	Do not get on skin or clothing. Do not breathe vapors or spray mist. Do not swallow. Do not get in eyes. Handle in accordance with good industrial hygiene and safety practice, based on the results of the workplace exposure

assessment
Keep container tightly closed.
Take care to prevent spills, waste and minimize release to the environment.

Conditions for safe storage : Keep in properly labeled containers.
Store locked up.
Keep tightly closed.
Keep in a cool, well-ventilated place.
Store in accordance with the particular national regulations.

Materials to avoid : Do not store with the following product types:
Strong oxidizing agents
Organic peroxides
Explosives
Gases

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredients with workplace control parameters

Ingredients	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
Florfenicol	73231-34-2	TWA	100 µg/m3 (OEB 2)	Merck
Polyethylene glycol	25322-68-3	TWA (aerosol)	10 mg/m³	US WEEL
N-Methyl-2-pyrrolidone	872-50-4	TWA	10 ppm	US WEEL
Propylene glycol	57-55-6	TWA	10 mg/m³	US WEEL

Biological occupational exposure limits

Ingredients	CAS-No.	Control parameters	Biological specimen	Sampling time	Permissible concentration	Basis
N-Methyl-2-pyrrolidone	872-50-4	5-Hydroxy-N-methyl-2-pyrrolidone	Urine	End of shift (As soon as possible after exposure ceases)	100 mg/l	ACGIH BEI

Engineering measures : Use appropriate engineering controls and manufacturing technologies to control airborne concentrations (e.g., dripless quick connections).
All engineering controls should be implemented by facility design and operated in accordance with GMP principles to protect products, workers, and the environment.
Laboratory operations do not require special containment.

Personal protective equipment

Respiratory protection : General and local exhaust ventilation is recommended to

maintain vapor exposures below recommended limits. Where concentrations are above recommended limits or are unknown, appropriate respiratory protection should be worn. Follow OSHA respirator regulations (29 CFR 1910.134) and use NIOSH/MSHA approved respirators. Protection provided by air purifying respirators against exposure to any hazardous chemical is limited. Use a positive pressure air supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstance where air purifying respirators may not provide adequate protection.

Hand protection
Material : Chemical-resistant gloves

Eye protection : Wear safety glasses with side shields or goggles.
If the work environment or activity involves dusty conditions, mists or aerosols, wear the appropriate goggles.
Wear a faceshield or other full face protection if there is a potential for direct contact to the face with dusts, mists, or aerosols.

Skin and body protection : Work uniform or laboratory coat.

Hygiene measures : Ensure that eye flushing systems and safety showers are located close to the working place.
When using do not eat, drink or smoke.
Wash contaminated clothing before re-use.
The effective operation of a facility should include review of engineering controls, proper personal protective equipment, appropriate degowning and decontamination procedures, industrial hygiene monitoring, medical surveillance and the use of administrative controls.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	viscous
Color	:	gold
Odor	:	No information available.
Odor Threshold	:	No data available
pH	:	No data available
Melting point/freezing point	:	No data available
Initial boiling point and boiling range	:	No data available
Flash point	:	No data available

Evaporation rate	:	No data available
Flammability (solid, gas)	:	Not applicable
Flammability (liquids)	:	No data available
Upper explosion limit / Upper flammability limit	:	No data available
Lower explosion limit / Lower flammability limit	:	No data available
Vapor pressure	:	No data available
Relative vapor density	:	No data available
Relative density	:	No data available
Density	:	No data available
Solubility(ies)		
Water solubility	:	No data available
Partition coefficient: n-octanol/water	:	Not applicable
Autoignition temperature	:	No data available
Decomposition temperature	:	No data available
Viscosity		
Viscosity, kinematic	:	No data available
Explosive properties	:	Not explosive
Oxidizing properties	:	The substance or mixture is not classified as oxidizing.
Particle size	:	Not applicable

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	Not classified as a reactivity hazard.
Chemical stability	:	Stable under normal conditions.
Possibility of hazardous reactions	:	Can react with strong oxidizing agents.
Conditions to avoid	:	None known.
Incompatible materials	:	Oxidizing agents
Hazardous decomposition products	:	No hazardous decomposition products are known.

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Inhalation
Skin contact
Ingestion
Eye contact

Acute toxicity

Not classified based on available information.

Product:

Acute oral toxicity	:	Acute toxicity estimate: > 5,000 mg/kg Method: Calculation method

Ingredients:

Florfenicol:

Acute oral toxicity	:	LD50 (Rat): > 2,000 mg/kg LD50 (Mouse): > 2,000 mg/kg LD50 (Dog): > 1,280 mg/kg
Acute inhalation toxicity	:	LC50 (Rat): > 0.28 mg/l Exposure time: 4 h
Acute dermal toxicity	:	Remarks: No data available
Acute toxicity (other routes of administration)	:	LD50 (Rat): 1,913 - 2,253 mg/kg Application Route: Intraperitoneal LD50 (Mouse): 100 mg/kg Application Route: Intravenous

Polyethylene glycol:

Acute oral toxicity	:	LD50 (Rat): > 5,000 mg/kg
Acute dermal toxicity	:	LD50 (Rabbit): > 5,000 mg/kg Remarks: Based on data from similar materials

N-Methyl-2-pyrrolidone:

Acute oral toxicity	:	LD50 (Rat): 4,150 mg/kg
Acute inhalation toxicity	:	LC50 (Rat): > 5.1 mg/l Exposure time: 4 h Test atmosphere: dust/mist Method: OECD Test Guideline 403 Assessment: The substance or mixture has no acute inhalation toxicity
Acute dermal toxicity	:	LD50 (Rat): > 5,000 mg/kg

Propylene glycol:

Acute oral toxicity	:	LD50 (Rat): > 5,000 mg/kg
Acute inhalation toxicity	:	LC50 (Rabbit): > 159 mg/l Exposure time: 4 h Test atmosphere: dust/mist
Acute dermal toxicity	:	LD50 (Rabbit): > 2,000 mg/kg Assessment: The substance or mixture has no acute dermal toxicity

Skin corrosion/irritation

Causes skin irritation.

Ingredients:

Florfenicol:

Species: Rabbit
Result: No skin irritation

Polyethylene glycol:

Species: Rabbit
Result: No skin irritation
Remarks: Based on data from similar materials

N-Methyl-2-pyrrolidone:

Species: Rabbit
Method: OECD Test Guideline 404
Result: Skin irritation

Propylene glycol:

Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation

Serious eye damage/eye irritation

Causes serious eye irritation.

Ingredients:

Florfenicol:

Species: Rabbit
Result: Mild eye irritation

Polyethylene glycol:

Species: Rabbit
Result: No eye irritation
Remarks: Based on data from similar materials

N-Methyl-2-pyrrolidone:

Species: Rabbit
Result: Irritation to eyes, reversing within 21 days

Propylene glycol:

Species: Rabbit
Result: No eye irritation
Method: OECD Test Guideline 405

Respiratory or skin sensitization

Skin sensitization

Not classified based on available information.

Respiratory sensitization

Not classified based on available information.

Ingredients:

Florfenicol:

Test Type: Maximization Test
Species: Guinea pig
Result: negative

N-Methyl-2-pyrrolidone:

Test Type: Local lymph node assay (LLNA)
Routes of exposure: Skin contact
Species: Mouse
Method: OECD Test Guideline 429
Result: negative
Remarks: Based on data from similar materials

Propylene glycol:

Test Type: Maximization Test
Routes of exposure: Skin contact
Species: Guinea pig
Result: negative

Germ cell mutagenicity

Not classified based on available information.

Ingredients:

Florfenicol:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Result: negative

Test Type: DNA damage and repair, unscheduled DNA synthesis in mammalian cells (in vitro)
Test system: rat hepatocytes
Result: negative

Test Type: In vitro mammalian cell gene mutation test
Test system: mouse lymphoma cells
Result: negative

Test Type: Chromosome aberration test in vitro
Test system: Chinese hamster ovary cells
Result: positive

Genotoxicity in vivo : Test Type: Micronucleus test
Species: Mouse
Cell type: Bone marrow
Application Route: Oral
Result: negative

Polyethylene glycol:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Result: negative
Remarks: Based on data from similar materials

N-Methyl-2-pyrrolidone:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
Species: Mouse
Application Route: Ingestion
Method: OECD Test Guideline 474
Result: negative

Propylene glycol:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Result: negative

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
Species: Mouse
Application Route: Intraperitoneal injection
Result: negative

Carcinogenicity

Not classified based on available information.

Ingredients:

Florfenicol:

Species: Rat
Application Route: oral (gavage)
Exposure time: 2 Years
Result: negative
Target Organs: Liver, Testes

Species: Mouse
Application Route: oral (gavage)
Exposure time: 2 Years
Result: negative
Target Organs: Testes, Blood

N-Methyl-2-pyrrolidone:

Species: Mouse
Application Route: Ingestion
Method: OECD Test Guideline 451
Result: positive
Remarks: The mechanism or mode of action may not be relevant in humans.

Species: Rat
Application Route: Inhalation
Result: negative

Propylene glycol:

Species: Rat
Application Route: Ingestion
Exposure time: 2 Years
Result: negative

IARC	No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
OSHA	No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.
NTP	No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

Reproductive toxicity

May damage the unborn child. Suspected of damaging fertility.

Ingredients:

Florfenicol:

Effects on fertility	:	Test Type: Two-generation reproduction toxicity study Species: Rat Application Route: Oral Fertility: LOAEL: 12 mg/kg body weight Result: decreased pup survival, reduced lactation
Effects on fetal development	:	Test Type: Embryo-fetal development Species: Rat General Toxicity Maternal: NOAEL: 4 mg/kg body weight Embryo-fetal toxicity.: LOAEL: 40 mg/kg body weight Result: No teratogenic effects., Fetotoxicity. Remarks: The effects were seen only at maternally toxic dos-

		es. Test Type: Embryo-fetal development Species: Mouse Application Route: oral (gavage) General Toxicity Maternal: NOAEL: 120 mg/kg body weight Embryo-fetal toxicity.: LOAEL: 40 mg/kg body weight Result: Fetotoxicity.
Reproductive toxicity - Assessment	:	Some evidence of adverse effects on sexual function and fertility, based on animal experiments., Some evidence of adverse effects on development, based on animal experiments.

Polyethylene glycol:

Effects on fertility	:	Test Type: Reproduction/Developmental toxicity screening test Species: Rabbit Application Route: Ingestion Result: negative Remarks: Based on data from similar materials
Effects on fetal development	:	Test Type: Fertility/early embryonic development Species: Rat Application Route: Ingestion Result: negative Remarks: Based on data from similar materials

N-Methyl-2-pyrrolidone:

Effects on fertility	:	Test Type: Two-generation reproduction toxicity study Species: Rat Application Route: Ingestion Method: OECD Test Guideline 416 Result: negative
Effects on fetal development	:	Test Type: Embryo-fetal development Species: Rat Application Route: Ingestion Method: OECD Test Guideline 414 Result: positive Test Type: Two-generation reproduction toxicity study Species: Rat Application Route: Ingestion Method: OECD Test Guideline 416 Result: positive
Reproductive toxicity - Assessment	:	Clear evidence of adverse effects on development, based on animal experiments.

Propylene glycol:

Effects on fertility	:	Test Type: Three-generation reproduction toxicity study Species: Mouse

Application Route: Ingestion
Result: negative

Effects on fetal development : Test Type: Embryo-fetal development
Species: Mouse
Application Route: Ingestion
Result: negative

STOT-single exposure

May cause respiratory irritation.

Ingredients:

N-Methyl-2-pyrrolidone:

Assessment: May cause respiratory irritation.

STOT-repeated exposure

Causes damage to organs (Liver, Brain, Testes, Spinal cord, Blood, gallbladder) through prolonged or repeated exposure.

Ingredients:

Florfenicol:

Target Organs: Liver, Brain, Testes, Spinal cord, Blood, gallbladder
Assessment: Causes damage to organs through prolonged or repeated exposure.

N-Methyl-2-pyrrolidone:

Routes of exposure: inhalation (vapor)
Assessment: No significant health effects observed in animals at concentrations of 1 mg/l/6h/d or less.

Repeated dose toxicity

Ingredients:

Florfenicol:

Species: Dog
NOAEL: 3 mg/kg
Exposure time: 13 Weeks
Target Organs: Liver, Testes, Brain, Spinal cord

Species: Mouse
NOAEL: 200 mg/kg
Exposure time: 13 Weeks
Target Organs: Liver, Testes

Species: Rat
NOAEL: 30 mg/kg
Exposure time: 13 Weeks
Target Organs: Liver, Testes

Species: Dog
NOAEL: 3 mg/kg

LOAEL: 12 mg/kg
Exposure time: 52 Weeks
Target Organs: Liver, gallbladder

Species: Rat
NOAEL: 1 mg/kg
LOAEL: 3 mg/kg
Exposure time: 52 Weeks
Target Organs: Testes

Polyethylene glycol:

Species: Rat
NOAEL: 1,100 mg/kg
Application Route: Ingestion
Exposure time: 13 Weeks
Remarks: Based on data from similar materials

N-Methyl-2-pyrrolidone:

Species: Rat
NOAEL: 0.5 mg/l
Application Route: inhalation (vapor)
Exposure time: 90 Days
Method: OECD Test Guideline 413

Species: Rat
NOAEL: 169 - 217 mg/kg
Application Route: Ingestion
Exposure time: 90 Days
Method: OECD Test Guideline 408

Species: Rabbit
NOAEL: 826 mg/kg
Application Route: Skin contact
Exposure time: 20 Days

Propylene glycol:

Species: Rat, male
NOAEL: 1,700 mg/kg
Application Route: Ingestion
Exposure time: 2 y

Aspiration toxicity

Not classified based on available information.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Ingredients:

Florfenicol:

Toxicity to fish	:	LC50 (Lepomis macrochirus (Bluegill sunfish)): > 830 mg/l

		Exposure time: 96 h Method: FDA 4.11 LC50 (Oncorhynchus mykiss (rainbow trout)): > 780 mg/l Exposure time: 96 h Method: FDA 4.11
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): > 330 mg/l Exposure time: 48 h Method: OECD Test Guideline 202
Toxicity to algae	:	EC50 (Pseudokirchneriella subcapitata (green algae)): > 2.9 mg/l Exposure time: 14 d Method: FDA 4.01 NOEC (Pseudokirchneriella subcapitata (green algae)): 2.9 mg/l Exposure time: 14 d Method: FDA 4.01 IC50 (Skeletonema costatum (marine diatom)): 0.0336 mg/l Exposure time: 72 h Method: ISO 10253 NOEC (Skeletonema costatum (marine diatom)): 0.00423 mg/l Exposure time: 72 h Method: ISO 10253 EC50 (Lemna gibba (gibbous duckweed)): 0.76 mg/l Exposure time: 7 d Method: OECD Test Guideline 221 NOEC (Lemna gibba (gibbous duckweed)): 0.39 mg/l Exposure time: 7 d Method: OECD Test Guideline 221 EC50 (Navicula pelliculosa (Freshwater diatom)): 61 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 NOEC (Navicula pelliculosa (Freshwater diatom)): 19 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 EC50 (Anabaena flos-aquae): 0.066 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 NOEC (Anabaena flos-aquae): 0.051 mg/l Exposure time: 72 h Method: OECD Test Guideline 201
M-Factor (Acute aquatic toxicity)	:	10

Toxicity to fish (Chronic toxicity)	:	NOEC (Pimephales promelas (fathead minnow)): 5.5 mg/l Exposure time: 32 d Method: OECD Test Guideline 210
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC (Daphnia magna (Water flea)): 1.5 mg/l Exposure time: 21 d Method: OECD Test Guideline 211
M-Factor (Chronic aquatic toxicity)	:	10

Polyethylene glycol:

Toxicity to fish	:	LC50 (Poecilia reticulata (guppy)): > 100 mg/l Exposure time: 96 h Remarks: Based on data from similar materials

N-Methyl-2-pyrrolidone:

Toxicity to fish	:	LC50 (Oncorhynchus mykiss (rainbow trout)): > 500 mg/l Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): > 1,000 mg/l Exposure time: 24 h Method: DIN 38412
Toxicity to algae	:	EC50 (Desmodesmus subspicatus (green algae)): 600.5 mg/l Exposure time: 72 h
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC (Daphnia magna (Water flea)): 12.5 mg/l Exposure time: 21 d Method: OECD Test Guideline 211

Propylene glycol:

Toxicity to fish	:	LC50 (Oncorhynchus mykiss (rainbow trout)): 40,613 mg/l Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Ceriodaphnia dubia (water flea)): 18,340 mg/l Exposure time: 48 h
Toxicity to algae	:	ErC50 (Skeletonema costatum (marine diatom)): 19,300 mg/l Exposure time: 72 h Method: OECD Test Guideline 201
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC (Ceriodaphnia dubia (water flea)): 13,020 mg/l Exposure time: 7 d
Toxicity to microorganisms	:	NOEC (Pseudomonas putida): > 20,000 mg/l Exposure time: 18 h

Persistence and degradability

Ingredients:

Polyethylene glycol:

Biodegradability	:	Result: Readily biodegradable. Biodegradation: 68 % Exposure time: 28 d Remarks: Based on data from similar materials

N-Methyl-2-pyrrolidone:

Biodegradability	:	Result: Readily biodegradable. Biodegradation: 73 % Exposure time: 28 d Method: OECD Test Guideline 301C

Propylene glycol:

Biodegradability	:	Result: Readily biodegradable. Biodegradation: 98.3 % Exposure time: 28 d Method: OECD Test Guideline 301F

Bioaccumulative potential

Ingredients:

Florfenicol:

Partition coefficient: n-octanol/water	:	log Pow: 0.373

Polyethylene glycol:

Bioaccumulation	:	Species: Fish Bioconcentration factor (BCF): 3.2 Remarks: Based on data from similar materials

N-Methyl-2-pyrrolidone:

Partition coefficient: n-octanol/water	:	log Pow: -0.46

Propylene glycol:

Partition coefficient: n-octanol/water	:	log Pow: -1.07

Mobility in soil

No data available

Other adverse effects

No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues	:	Dispose of in accordance with local regulations.
Contaminated packaging	:	Empty containers should be taken to an approved waste handling site for recycling or disposal. If not otherwise specified: Dispose of as unused product.

SECTION 14. TRANSPORT INFORMATION

International Regulations

UNRTDG

UN number	:	UN 3082
Proper shipping name	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Florfenicol)
Class	:	9
Packing group	:	III
Labels	:	9

IATA-DGR

UN/ID No.	:	UN 3082
Proper shipping name	:	Environmentally hazardous substance, liquid, n.o.s. (Florfenicol)
Class	:	9
Packing group	:	III
Labels	:	Miscellaneous
Packing instruction (cargo aircraft)	:	964
Packing instruction (passenger aircraft)	:	964
Environmentally hazardous	:	yes

IMDG-Code

UN number	:	UN 3082
Proper shipping name	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Florfenicol)
Class	:	9
Packing group	:	III
Labels	:	9
EmS Code	:	F-A, S-F
Marine pollutant	:	yes

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

Not applicable for product as supplied.

Domestic regulation

49 CFR

UN/ID/NA number	:	UN 3082
Proper shipping name	:	Environmentally hazardous substance, liquid, n.o.s. (Florfenicol)

Class	:	9
Packing group	:	III
Labels	:	CLASS 9
ERG Code	:	171
Marine pollutant	:	yes(Florfenicol)
Remarks	:	Above applies only to containers over 119 gallons or 450 liters., Shipment by ground under DOT is non-regulated; however it may be shipped per the applicable hazard classification to facilitate multi-modal transport involving ICAO (IATA) or IMO.

SECTION 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know

CERCLA Reportable Quantity

This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards	:	Skin corrosion or irritation Serious eye damage or eye irritation Reproductive toxicity Specific target organ toxicity (single or repeated exposure)
SARA 313	:	The following components are subject to reporting levels established by SARA Title III, Section 313:

N-Methyl-2-pyrrolidone	872-50-4	>= 20 - < 30 %

US State Regulations

Pennsylvania Right To Know

Polyethylene glycol	25322-68-3
Florfenicol	73231-34-2
N-Methyl-2-pyrrolidone	872-50-4
Propylene glycol	57-55-6

California Prop. 65

WARNING: This product can expose you to chemicals including N-Methyl-2-pyrrolidone, which is/are known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

California Permissible Exposure Limits for Chemical Contaminants

N-Methyl-2-pyrrolidone	872-50-4

The ingredients of this product are reported in the following inventories:

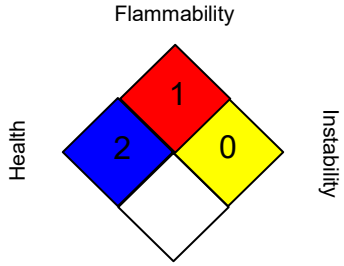
AICS	:	not determined
DSL	:	not determined

IECSC : not determined

SECTION 16. OTHER INFORMATION

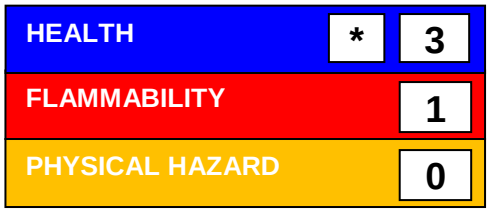
Further information

NFPA:



Special hazard.

HMIS® IV:



HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. The "*" represents a chronic hazard, while the "/" represents the absence of a chronic hazard.

Full text of other abbreviations

ACGIH BEI	:	ACGIH - Biological Exposure Indices (BEI)
US WEEL	:	USA. Workplace Environmental Exposure Levels (WEEL)
US WEEL / TWA	:	8-hr TWA

AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic sub-

stance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

Sources of key data used to compile the Material Safety Data Sheet	:	Internal technical data, data from raw material SDSs, OECD eChem Portal search results and European Chemicals Agency, http://echa.europa.eu/
Revision Date	:	10/17/2017

Items where changes have been made to the previous version are highlighted in the body of this document by two vertical lines.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and shall not be considered a warranty or quality specification of any type. The information provided relates only to the specific material identified at the top of this SDS and may not be valid when the SDS material is used in combination with any other materials or in any process, unless specified in the text. Material users should review the information and recommendations in the specific context of their intended manner of handling, use, processing and storage, including an assessment of the appropriateness of the SDS material in the user's end product, if applicable.

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