BLAZETAMER380™ Safety, Human Health, Water and Environmental Profile

Technical Safety and Environmental Report

Safety Data Sheet | Occupational Safety | Human Toxicology | Wildlife | Aquatic Life | Water Quality | PFOS/PFOA/PFAS | Environmental Fate

Purpose of this report
This report consolidates the available product safety, human-health, animal, aquatic, water-quality, PFOS/PFOA/PFAS and environmental information for BLAZETAMER380™. It is intended to provide a clear, technically defensible summary for agency review. It distinguishes between statements directly supported by the product Safety Data Sheet and testing, modeled ecological risk conclusions, and areas where the available record does not support a categorical claim.

Executive Summary

BLAZETAMER380™ is a water-based polyacrylamide copolymer emulsion formulated for wildland fire suppression. The 2023 Safety Data Sheet states that the material is not considered hazardous under the OSHA Hazard Communication Standard, 29 CFR 1910.1200. The SDS assigns HMIS ratings of Health 1, Flammability 0 and Physical Hazard 0 and describes the product as noncombustible. The product is used only after substantial dilution with water.

Available mammalian toxicity testing reports acute oral LD50 values greater than 5,050 mg/kg and acute dermal LD50 values greater than 2,020 mg/kg for both the concentrate and mixed fire chemical. The mixed product was reported as practically or minimally irritating to the eyes and as having very low skin irritation. The SDS further states that the product is not expected to be a skin or respiratory sensitizer and is not considered a mutagenic, reproductive or carcinogenic hazard based on the information cited in the SDS.

Water-quality testing performed by the Australian Water Quality Centre evaluated BLAZETAMER380™ in Hope Valley Reservoir water at 0.00065% and 0.000065%, equivalent to approximately 6.5 ppm and 0.65 ppm by volume. Under those test conditions, the laboratory reported no adverse impact on the measured nutrient parameters or conventional water-treatment performance, including coagulation, flocculation, sedimentation, filtration and chlorination. These results support a favorable assessment at the tested trace concentrations, but they are not a drinking-water standard and do not establish that every concentration has no effect on water.

The U.S. Forest Service ecological risk assessment evaluated BLAZETAMER380™ as a whole product and also screened its individual ingredients. Whole-product aquatic spill and overspray modeling produced low risk quotients in the modeled scenarios. Terrestrial product-level risk quotients for representative mammals and birds were also very low. However, conservative ingredient-specific modeling identified potential aquatic risks in some direct-stream or runoff scenarios. Accordingly, the environmental record supports low risk when the product is used appropriately, but it does not support intentional discharge into waterways or a claim of zero aquatic risk.

Independent ALS laboratory analysis of a BLAZETAMER380™ sample found the tested PFAS compounds, including PFOS and PFOA, below the applicable laboratory reporting limits. The most accurate statement is that the analyzed PFAS compounds were not detected above reporting limits in the tested sample, rather than claiming absolute analytical zero.

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Overall evidence-based characterization
The available record supports describing BLAZETAMER380™ as a low-concentration water enhancer with a favorable acute human-health and terrestrial-wildlife profile when used as directed, with trace-level reservoir-water testing that did not adversely affect the measured treatment and nutrient parameters. Standard PPE, spill containment and waterway-avoidance practices remain appropriate, and environmental claims should remain specific to the conditions and endpoints actually tested.

2. Product Identity and Safety Data Sheet Overview

2.1 Product identification and intended use

The BLAZETAMER380™ Safety Data Sheet, Version 4.0, was issued May 30, 2023 by BioCentral Laboratories Ltd. It identifies BLAZETAMER380™ as a fire suppressant for aerial firefighting and as a Class A fire-suppression and retarding liquid. The SDS states that normal use involves significant dilution with water, approximately 1:150 to 1:1500.

The preparation is described as a polyacrylamide copolymer emulsion containing surfactants and performance additives. The composition section identifies hydrotreated light petroleum distillates (CAS 64742-47-8) at 0-20%, with the balance consisting of ingredients determined not to be hazardous, including water.

2.2 Hazard classification

The SDS states that BLAZETAMER380™ is not considered hazardous under the OSHA Hazard Communication Standard, 29 CFR 1910.1200. This classification is important, but it does not mean that exposure controls are unnecessary. The SDS retains handling, first-aid, spill-control and PPE recommendations because even products that are not classified as hazardous can cause irritation, slips or other operational hazards.

Rating system	Health	Flammability	Physical / instability
HMIS	1	0	0
NFPA	1	0	0

3. Physical and Chemical Characteristics

The physical properties in the SDS are consistent with a water-based polymer emulsion rather than a flammable solvent-based firefighting chemical.

Property	SDS description
Form / appearance	White, milky liquid
Odor	Mild
pH	Approximately 6.4
Specific gravity	Approximately 0.998
Water solubility	Miscible
Freezing point	Approximately 0 C / 32 F
Boiling point	Greater than 100 C / 212 F
Flammability	Noncombustible
Flash point	Not applicable
Kinematic viscosity	Greater than 20.5 mm2/s at 40 C / 104 F

The SDS states that the material is chemically stable under normal storage and handling conditions. Extremes of temperature and direct sunlight should be avoided. Hazardous polymerization is not expected to occur.

4. Occupational Safety, PPE and Handling

4.1 Routine handling

The principal routine safety approach is standard industrial hygiene rather than extraordinary hazard controls. The SDS directs users to avoid unnecessary inhalation of vapors and mists and to avoid skin and eye contact. Containers should remain sealed when not in use, and work areas should be adequately ventilated. Good hygiene practices, including washing before eating, drinking or smoking, are recommended.

4.2 Personal protective equipment

The SDS recommends eye protection such as safety glasses with side shields, chemical goggles or a face shield depending on the task. Impervious gloves such as neoprene, nitrile or laminated-film gloves are recommended. Suitable protective workwear is advised, with a chemical-resistant apron where larger quantities are handled. If mists or vapors are generated and engineering controls do not adequately control exposure, an approved vapor/mist respirator may be appropriate.

No occupational exposure limit is established for the mixture itself. The SDS references a 5 mg/m3 time-weighted average for mineral-oil mist under OSHA and ACGIH sources. As with all chemicals, the SDS recommends keeping exposure as low as reasonably practicable.

4.3 Practical operational hazards

Slip hazard
The SDS specifically warns that spilled product can produce extremely slippery surfaces on nonporous materials. For field crews, mixing bases, loading areas and aircraft support sites, this is one of the most immediate operational hazards and should be included in spill-response planning.

Because the material is water-based, the SDS also notes that a spill on electrical equipment can cause short-circuiting. Spills should therefore be contained with an absorbent and recovered rather than indiscriminately washed down.

5. First Aid, Spill Response, Storage and Transportation

5.1 First aid

Exposure route	SDS first-aid direction
Inhalation	Move the affected person to fresh air. Keep at rest and obtain medical attention if symptoms develop or persist.
Ingestion	Do not induce vomiting. Rinse the mouth thoroughly with water and seek medical attention.
Skin	Wash thoroughly with soap and water. Seek medical attention if symptoms develop.
Eyes	Flush continuously with running water for several minutes; remove contact lenses where practical; obtain medical attention if symptoms persist.

5.2 Accidental release

The SDS recommends appropriate PPE, ventilation, containment of the spill where possible, use of inert absorbent material and collection into a suitable labeled container. It states that the material should not simply be diluted as a spill-control method and that waste should be disposed of in accordance with applicable regulations. If contamination of waterways or sewers occurs, local water and waste-management authorities should be informed as required.

5.3 Storage

BLAZETAMER380™ should be stored in a cool, dry, well-ventilated area, protected from freezing and direct sunlight, in suitable labeled containers that remain tightly closed. Storage conditions should comply with applicable regulations.

5.4 Transportation

The SDS states that BLAZETAMER380™ is not classified as Dangerous Goods under U.S. Department of Transportation criteria, the IATA Dangerous Goods Regulations for air transport or the International Maritime Dangerous Goods Code for sea transport. Normal container integrity, load securement, labeling and spill-prevention practices still apply.

6. Human Health and Toxicology

6.1 Acute toxicity

The acute mammalian test results in the SDS and supporting USDA/USFS records indicate relatively low acute oral and dermal toxicity. The reported LD50 values are summarized below.

Endpoint	Concentrate	Mixed fire chemical	Interpretation
Acute oral LD50	>5,050 mg/kg	>5,050 mg/kg	Low acute oral toxicity in the reported testing
Acute dermal LD50	>2,020 mg/kg	>2,020 mg/kg	Low acute dermal toxicity in the reported testing
Skin irritation	Non-irritating to slightly irritating; index about 1.1	Non-irritating to slightly irritating; index 0.0	Mixed product showed very low irritation
Eye irritation	Mild/slight to minimally irritating	Practically non-irritating to mildly/minimally irritating	Eye protection remains appropriate during handling

An LD50 greater than 5,000 mg/kg is a favorable acute-toxicity result, but it is not a statement that the product is intended for ingestion. The SDS notes that ingestion can irritate the gastrointestinal tract and cause nausea or vomiting.

6.2 Inhalation, skin and eye effects

The SDS states that vapors or mists may irritate the nose, throat and respiratory system and that repeated exposure could aggravate an existing respiratory disorder. Skin contact may cause mild irritation, redness or itching, particularly after prolonged or repeated exposure. Eye contact may cause transient redness, swelling, stinging or tearing. These are handling considerations rather than evidence of high systemic toxicity.

6.3 Sensitization, mutagenicity, carcinogenicity and reproduction

The SDS states that BLAZETAMER380™ is not expected to be a respiratory or skin sensitizer, is not considered a mutagenic hazard, is not considered toxic to reproduction and is not expected to cause specific-target-organ toxicity from single or repeated exposure. It also states that the product is not considered a carcinogenic hazard based on the sources it cites. The hydrotreated mineral-oil component is described as highly refined; the SDS notes that highly refined mineral oil is placed in IARC Group 3, meaning it is not classifiable as to carcinogenicity to humans.

Important qualification
These conclusions are SDS hazard classifications based on the available data cited in that document. They should not be converted into claims that every possible exposure level or exposure route is risk free.

7. Animals, Wildlife and Terrestrial Ecological Risk

7.1 Mammalian and wildlife evidence

The U.S. Forest Service ecological risk assessment modeled representative terrestrial species including deer, coyote, deer mouse, rabbit, American kestrel, red-winged blackbird and bobwhite quail. For BLAZETAMER380™ as a formulated product, the reported terrestrial risk quotients across modeled application rates were well below 1. The USFS product-risk summary did not identify formulated-product risk to sensitive or non-sensitive terrestrial species at the evaluated rates.

This is strong evidence of a low modeled acute terrestrial-wildlife risk profile under the assumptions used in the assessment. It does not establish zero risk to every species, life stage or exposure route. The USFS assessment itself notes uncertainty related to representative species, real-world residue levels, food and drinking-water exposure and site-specific environmental conditions.

7.2 Livestock and domestic animals

The source package reviewed for this report does not contain dedicated livestock-specific studies for horses, cattle, sheep, goats, dogs, cats or poultry. The mammalian acute-toxicity and wildlife modeling provide relevant context, but the available evidence does not support a categorical statement that BLAZETAMER380™ has been specifically demonstrated harmless to every domestic animal species. Concentrate should not be intentionally fed to animals or introduced into animal drinking-water systems.

8. Water Quality and Water-Treatment Evidence

8.1 Australian Water Quality Centre study

The Australian Water Quality Centre conducted a study specifically to assess whether accidental introduction of BLAZETAMER380™ during firefighting could adversely affect reservoir-water quality or conventional water-treatment performance. Hope Valley Reservoir water was spiked with BLAZETAMER380™ and then subjected to simulated coagulation, flocculation, sedimentation, filtration and chlorination.

The two BLAZETAMER380™ concentrations evaluated were 0.00065% and 0.000065%, approximately 6.5 ppm and 0.65 ppm by volume.

BLAZETAMER380™ concentration	Total phosphorus (mg/L)	Nitrite + nitrate (mg/L)	Study result
0% control	0.028	0.046	Baseline
0.00065%	0.029	0.046	No material nutrient change reported
0.000065%	0.032	0.043	No material nutrient change reported

The laboratory reported no significant difference in treatment behavior, including floc formation, settling behavior, treated-water color, turbidity, ultraviolet absorbance at 254 nm and dissolved organic carbon. Trihalomethane formation after chlorination was also reported as similar among the samples, with differences within experimental error. The laboratory concluded that the tested accidental introduction scenario would not adversely affect reservoir-water quality or water-treatment process operation.

8.2 Appropriate interpretation

At the trace concentrations evaluated by the Australian Water Quality Centre, BLAZETAMER380™ did not adversely affect the measured nutrient parameters or conventional reservoir-water treatment performance. These results do not constitute a drinking-water standard and do not authorize intentional addition of BLAZETAMER380™ to potable-water sources.

9. Fish, Aquatic Organisms and Waterway Risk

9.1 Acute aquatic toxicity

The USFS ecological risk assessment lists a whole-product 96-hour rainbow trout LC50 of 246 mg/L and a 48-hour Daphnia magna LC50 of 212 mg/L for BLAZETAMER380™. The SDS separately reports acute fish, Daphnia, algae and bacteria test results, reflecting the fact that multiple aquatic receptors have been evaluated.

Aquatic endpoint	Reported result	Source
Rainbow trout, 96-hour LC50	246 mg/L	USFS ecological risk assessment
Daphnia magna, 48-hour LC50	212 mg/L	USFS ecological risk assessment / SDS
Chlorella vulgaris, 96-hour EC50	>1,000 mg/L	SDS
Chlorella vulgaris NOEC	708 mg/L	SDS
Pseudomonas putida EC50, 18-hour	892 mg/L	SDS

LC50 and EC50 are acute laboratory toxicity endpoints. A higher value generally indicates lower acute toxicity, but these values are not no-effect limits, discharge standards or drinking-water standards.

9.2 USFS ecological risk modeling

For modeled accidental spills using the whole BLAZETAMER380™ product, USFS estimated risk quotients below 1 for the aquatic receptors with available whole-product data. For mixed-for-application product, the small-stream risk quotients were approximately 0.00408 for rainbow trout and 0.00473 for Daphnia; the corresponding large-stream values were approximately 0.000140 and 0.000162.

The assessment also evaluated individual ingredients separately. In some conservative runoff and direct-stream scenarios, ingredient-specific or additive risk estimates exceeded the threshold for sensitive aquatic species. The assessment intentionally used conservative assumptions, including conservative toxicity values and, in many scenarios, no credit for environmental degradation. These results are the reason the strongest environmental position is not “no aquatic risk,” but rather low whole-product modeled risk accompanied by continued waterway avoidance and spill control.

10. PFOS, PFOA and PFAS Analytical Testing

An ALS Environmental Certificate of Analysis evaluated a BLAZETAMER380™ sample collected in March 2019 for a broad panel of per- and polyfluoroalkyl substances. The analytical panel included perfluoroalkyl sulfonic acids, perfluoroalkyl carboxylic acids, sulfonamides and fluorotelomer sulfonic acids.

Analyte	Laboratory result	Reporting limit
PFOS - perfluorooctane sulfonic acid	<0.02 mg/kg	0.02 mg/kg
PFOA - perfluorooctanoic acid	<0.02 mg/kg	0.02 mg/kg
PFHxS - perfluorohexane sulfonic acid	<0.02 mg/kg	0.02 mg/kg
PFNA - perfluorononanoic acid	<0.02 mg/kg	0.02 mg/kg
PFDA - perfluorodecanoic acid	<0.02 mg/kg	0.02 mg/kg
Sum PFHxS + PFOS	<0.02 mg/kg	0.02 mg/kg

11. Environmental Fate, Persistence and Bioaccumulation

11.1 Polymer behavior and degradation

The SDS states that non-degraded anionic polyacrylamide can be resistant to microbial degradation, which it attributes to the polymer's very high molecular weight. The SDS further states that exposure to ultraviolet light can break the macromolecule into smaller oligomers through photolysis, after which the smaller material can become bioavailable and undergo biomineralization.

This wording is more technically appropriate than making a simple universal claim that the concentrate rapidly biodegrades. Environmental fate depends on sunlight, water, soil, temperature, chemistry, concentration and other site-specific factors.

11.2 Bioaccumulation

The SDS states that anionic polyacrylamide has no potential to bioaccumulate, describing it as water soluble and insoluble in octanol. This supports a low-bioaccumulation characterization for the polymer component. The statement should be applied to the polymer behavior described by the SDS and not generalized beyond the tested or characterized components.

11.3 Soil and vegetation

The 2020 USFS ecological risk assessment states that sufficient information was not identified to quantitatively evaluate phytotoxicity or effects of water enhancers on vegetation diversity. Accordingly, the available federal assessment does not support a blanket statement that BLAZETAMER380™ has no effect on every plant species or soil system.

The assessment also notes that water enhancers generally do not contain nitrogen or phosphorus compounds at concentrations expected to stimulate vegetative growth. This distinguishes the water-enhancer category from firefighting products whose primary active chemistry relies on high nutrient-salt loading.

12. Overall Environmental Characterization

The environmental record for BLAZETAMER380™ is strongest when described in terms of low application concentration, low acute mammalian toxicity, low modeled terrestrial-wildlife risk, favorable whole-product aquatic risk quotients in modeled spill/overspray scenarios, absence of detected PFOS/PFOA above laboratory reporting limits in the tested sample, and trace-concentration reservoir-water testing that found no adverse effects on the measured treatment endpoints.

The record also contains important limitations. The SDS directs users to prevent entry into waterways. The USFS ecological risk assessment identified some potential ingredient-specific aquatic risks under conservative scenarios. Plant and vegetation-diversity data are limited. The Australian Water Quality Centre study evaluated only two trace concentrations in one reservoir water. These limitations should be stated openly in any agency submission because they make the overall report more credible and technically defensible.

13. Conclusion

BLAZETAMER380™ has a comparatively favorable safety profile for a firefighting chemical used at low concentrations in water. The SDS does not classify it as hazardous under the OSHA Hazard Communication Standard, describes it as noncombustible and assigns low HMIS and NFPA hazard ratings. Acute mammalian testing reports oral LD50 values above 5,050 mg/kg and dermal LD50 values above 2,020 mg/kg, while the mixed product demonstrates low skin and eye irritation.

The water-quality evidence is also favorable within the boundaries of the testing. The Australian Water Quality Centre found no adverse impact on the measured reservoir-water nutrient parameters or conventional treatment-process operation at approximately 6.5 ppm and 0.65 ppm. These results provide useful evidence for accidental trace exposure but are not a drinking-water standard and should not be used to justify deliberate introduction into water supplies.

USFS ecological modeling indicates very low formulated-product terrestrial risk for representative wildlife and low whole-product risk quotients for modeled accidental aquatic spills. At the same time, ingredient-specific modeling identifies some conservative scenarios of potential aquatic concern. That combination supports responsible use with waterway avoidance rather than a claim of universal environmental harmlessness.

Independent ALS analysis found PFOS, PFOA and the other tested PFAS analytes below their laboratory reporting limits in the tested BLAZETAMER380™ sample. The SDS also states that the anionic polyacrylamide component is not expected to bioaccumulate and describes environmental breakdown through photolysis followed by biomineralization of smaller degradation products.

For agency and government use, the strongest position is therefore evidence based and specific: BLAZETAMER380™ has low acute human and mammalian toxicity, low modeled terrestrial-wildlife risk, favorable trace-level water-treatment results and PFOS/PFOA results below laboratory reporting limits in the tested sample, while standard PPE, spill containment, environmental controls and waterway-avoidance requirements remain necessary.

14. References

1. BioCentral Laboratories Ltd. BLAZETAMER380™ Safety Data Sheet, Infosafe No. MTB1X, Version 4.0, issued May 30, 2023.
2. Australian Water Quality Centre. Assessment of BlazeTamer and BLAZETAMER380™ on Water Treatment Process Performance, Reference Q11/1215, February 24, 2012.
3. U.S. Forest Service. Ecological Risk Assessment of Wildland Fire-Fighting Chemicals: Water Enhancers, October 2020.
4. U.S. Forest Service / supporting laboratories. BlazeTamer mammalian toxicity, rainbow trout toxicity, eye/skin irritation and related qualification test records, 2003-2010 compilation.
5. ALS Environmental. Certificate of Analysis, Work Order EM1904178, BLAZE TAMER 380 PFAS analytical panel, March 2019.

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