Environmental Assessment

1. **Date:** April 8, 2022

2. **Name of Applicant:** CHEP USA

3. **Address:** 5897 Windward Parkway
Alpharetta, Georgia 30005

All communication regarding this food contact notification (FCN) environmental assessment (EA) should be sent in care of the authorized representative

Rick Reiss, ScD
Exponent, Inc.
1800 Diagonal Road, Suite 500
Alexandria, VA 22314
Telephone: (571) 227-7228
Facsimile: (571) 227-7299
E-mail: rreiss@exponent.com

4. **Description of Proposed Action**

a) Requested action:

The action proposed in this notification is to permit use of the food contact substance (FCS) lignosulfonic acid, sodium salt in the treatment and assembly of wood pallets treated with the fungicide PQ-8. PQ-8 contains lignosulfonic acid, sodium salt as an ingredient. Specifically, it uses a commercial version of lignosulfonic acid, sodium salt sold under the trade name Polyfon T by Ingevity. Lignosulfonic acid, sodium salt incorporated in the PQ-8 formulation is proposed for use as an indirect food additive through the pre-manufacture process utilizing FDA Form 3480 "Notification for New Use of a Food Contact Substance."

Wood pallets treated with PQ-8, containing the FCS lignosulfonic acid, sodium salt, will be used in post-harvest hydrocooling and related processing of fruits and vegetables to prevent ripening or decay throughout distribution. PQ-8 contains the active ingredient copper quinolinolate, and will be applied at a rate of 40 micrograms of copper quinolinolate per cm^2.

In the PQ-8 formulation, lignosulfonic acid, sodium salt functions as a dispersing agent. In hydrocooling water used to prevent pre-market ripening of fruits and

vegetables, the FCS is not anticipated to exceed 3.1 ppm lignosulfonic acid, sodium salt [see migration description under Item 6(B) below].
CHEP USA is requesting approval to use wooden pallets treated with the fungicide PQ-8, containing the FCS lignosulfonic acid, sodium salt. The fungicide protects the wood from fungal damage and the wood pallets may be used in hydrocooling produce, which is an indirect food contact scenario.

Fresh produce continues to respire after harvest. To prevent produce breakdown (wilting, softening etc.) caused by natural respiration throughout the post-harvest distribution chain, the produce industry uses a variety of precooling techniques to slow the breakdown process. Precooling provides a non-chemical preservative method for fruit and vegetable processing, and keeps produce fresh through the distribution chain, maximizing the value of produce upon arrival at market.

Modern precooling techniques include vacuum cooling, pressure cooling, hydrocooling, HydroVac™ cooling and "icing." During precooling processes, commodities are stored on pallets and rotated through a hydrocooling container, typically by a conveyer belt[1].

In each precooling technique, raw produce is not in direct contact with pallets. Rather, produce is packaged in open storage containers, which are packed onto pallets. Open produce storage containers may be composed of wire mesh, plastic, or other materials.

b) **Need for action**:

CHEP USA is requesting approval to use wooden pallets treated with the fungicide PQ-8, containing the FCS lignosulfonic acid, sodium salt. Wood pallets may be used for the purpose of preventing produce decay during precooling of produce stored on treated pallets, preserving the market value of produce and ultimately providing safer foods for consumers.

The purpose of the lignosulfonic acid, sodium salt is to act as a dispersing agent. The wood is produced by a third-party supplier at lumber yards where the PQ-8 will be applied. The PQ-8 supplier (ISK Biocides) buys lignosulfonic acid, sodium salt from Ingevity.

c) **Locations of use/disposal**:

Use: As a component of finished pallets used in hydrocooling operations across the United States, the FCS is utilized in patterns corresponding to the needs and locations of produce hydrocooling operations throughout the country. Produce hydrocooling sites are typically located close to agricultural production and are

[1] For examples of hydrocoolers, see: TRJ Refrigeration Inc. (2019). Hydrocoolers. Available at: http://www.trj-inc.com/hydroCooler.html.

widely distributed across the United States. The FCS will be utilized in patterns corresponding to crop production, processing and demand.

Disposal: At the end of their service life, FCS-treated pallets may be disposed of in municipal solid waste (MSW) systems throughout the United States (either in a landfill or incinerated) or converted into mulch.

According to the U.S. Environmental Protection Agency (EPA)'s 2018 data[2] regarding MSW in the United States, a total of 292.4 million tons of MSW is generated annually, with approximately 50.0% disposed of in MSW landfills, 11.8% combusted with energy recovery, 23.6% recycled, 6.1% for other food management[3] and 8.5% composted.

Based upon a life cycle analysis further described in item 7(c) of this EA, provided as a confidential attachment to this EA (**Confidential Attachment L.1**), we anticipate that approximately 90% of pallet wood will be chipped for mulch and the remainder either landfill disposed (8%) or incinerated (2%).

Hydrocooling water is recycled through multiple hydrocooling cycles. Direct discharge to surface waters is not anticipated. However, such discharges would be regulated under National Pollutant Discharge Elimination System (NPDES) permitting. In accordance with an NPDES permit, wastewater would undergo pretreatment at the processing facility prior to direct discharge to surface waters or into a privately-owned treatment works system. More commonly, hydrocooling water would be directed through sanitary sewer systems into publicly-owned treatment works (POTWs) systems for standard wastewater treatment before movement into aquatic environments (i.e., surface water).

5. Identification of the Chemical Substance that is the Subject of the Proposed Action:

The fungicide PQ-8 contains lignosulfonic acid, sodium salt, sold under the trade name Polyfon T. The FCS in this notification is lignosulfonic acid, sodium salt.

As noted in 4(b) above, the proposed use of lignosulfonic acid, sodium salt is to act as a dispersing agent in PQ-8. Available information on the chemical identity of the FCS is provided in Table 1 below:

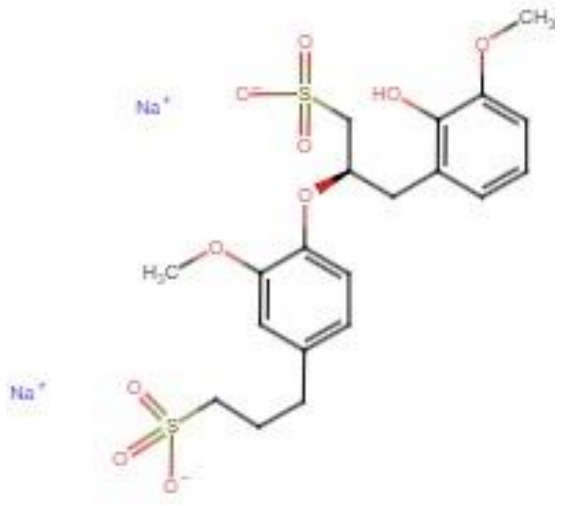
[2] https://www.epa.gov/sites/default/files/2021-01/documents/2018_ff_fact_sheet_dec_2020_fnl_508.pdf

[3] Includes animal feed, bio-based materials/biochemical processing, codigestion/anaerobic digestion, donation, land application, and sewer/wastewater treatment

Table 1. Chemical identity of lignosulfonic acid, sodium salt

Chemical Name	Lignosulfonic acid, sodium salt
Common or Trade Name	Polyfon T
CAS Registry Number	8061-51-6 (monomer) and 9009-75-0 (polymer)
Empirical Formula	$C_{20}H_{24}Na_2O_{10}S_2$
Structural Formula	N/A
Molecular Weight	2900
Form	Solid powder
Appearance	Brown
Odor	Vanilla
Solubility in Water	Soluble

Lignosulfonic acid, sodium salt is a kraft lignin polymer. PubChem lists the molecular weight for the CAS no. 9009-75-0 as between 1000-20,000[4] and the manufacturer of Polyfon T lists the average molecular weight as 2900. The structure of the monomer is shown below.



6. Environmental Assessment – Introduction of the Substance into the Environment

The following Environmental Assessment (EA) demonstrates that CHEP's use and disposal of lignosulfonic acid, sodium salt, as a component of the fungicide PQ-8 for use in hydrocooling, presents no significant environmental impact.

A. As a Result of Manufacture

Under 21 Code of Federal Regulations (CFR) §25.40(a), an EA should focus on relevant environmental issues relating to the use and disposal from use, rather than the production, of FDA-regulated articles. CHEP does not manufacture the wood, PQ-8, or the

[4] Lignosulfonic acid, sodium salt | C20H24Na2O10S2 - PubChem (nih.gov)

lignosulfonic acid, sodium salt utilized to treat wooden pallets for use in hydrocooling. Wood used to construct pallets to be treated with the FCS is generated by a third-party company outside the United States. CHEP purchases the wood from this third party seller, and assembles pallets at CHEP facilities in the United States. There is no reason to expect a significant release to the environment during assembly.

Manufacture of the FCS occurs only in plants that comply with all applicable federal, state, and local environmental regulations. Information available to the Notifier does not suggest that there are any extraordinary circumstances in this case indicating any significant adverse environmental impact as a result of the manufacture of treated pallets. Further, there are no extraordinary circumstances indicative of any significant adverse environmental impacts resulting from the manufacture of treated pallets. Consequently, information on the manufacturing site and compliance with relevant emissions requirements is not provided.

B. As a Result of Use/Disposal

Noting the specific use patterns for the FCS described above (i.e., dispersing agent in PQ-8 on treated wood where treated wood is used to construct wooden pallets used in produce hydrocooling operations, preventing produce decay during precooling of produce stored on treated pallets), the primary pathway by which the FCS is anticipated to be introduced to the environment is through the treatment and disposal of hydrocooling process wastewater generated over the lifetime of a treated pallet [approximately 10 years; see Item 7(c) below].

Hydrocooling water is recycled through multiple hydrocooling cycles after which it is discharged to a municipal sewer. The water will then be transported to a POTW where it will mix with other water sources and undergo water treatment. We note that direct discharge to surface waters under NPDES permitting is not anticipated. Due to the energy required to run hydrocooling equipment and the need to be in close proximity to a cold storage facility in order to maintain cold-chain integrity, hydrocooling does not occur, to our knowledge, near agricultural fields immediately after harvest.

Following use of the FCS at a hydrocooling or food processing facility, waste processing water generated and containing the diluted FCS material may be introduced to the environment via treatment and disposal of hydrocooling wastewater through the sewage system into waterways.

At the end of their service life, FCS-treated pallets may be disposed of in municipal solid waste (MSW) systems throughout the United States (either in a landfill or incinerated), or converted into mulch.

1) Maximum market volume for proposed use

The total amount of FCS utilized at a given food processing facility will depend on the volume of fruit and vegetable products processed via hydrocooling on pallets pre-treated with the FCS at that site. To adjust for variation in volume of

fruit and vegetable products that may be processed at a given site, the expected introduction concentration (EIC) in surface water was calculated based on an intentionally conservative, worst-case assumption that all of the process water potentially containing diluted FCS is discharged to surface waters after water treatment on-site or at a POTW.

While hydrocooling machinery is mobile, hydrocooling typically is done in facilities with sufficient power supply to handle a large throughput. Therefore, in our experience, it is not done at individual farms where the water may be used for irrigation.

Various conservative assumptions that would overestimate concentrations were made including:

- Assumption of worst-case conditions for hydrocooling, including a 12-hour cycle with 432 pallets, low water usage and no recycling, and low commodity volume (see below for details).
- Assumption that 100% of the chemical that migrated into the cooling water then migrates into the food commodity.
- Assumption that 100% of commodities that may employ hydrocooling with pallets were hydrocooled. In fact, for some portion of all commodities no cooling will be done and for some commodities other precooling methods are also used.
- Assumption that 100% of commodities that may employ hydrocooling with pallets use CHEP pallets.
- For repeat use pallets, assumption that there is a full dosage of PQ-8 available despite assuming that all of the chemical migrated in the first use.
- Assumption that the full top area of the pallet is available to contact water and potentially migrate chemical into the water despite the top area of the pallet being covered by the commodity container.

The maximum estimated residue level of lignosulfonic acid, sodium salt in hydrocooling water is shown in Table 2 below. See pages 80-84 for migration calculations.

Table 2. Maximum concentration of constituent

Constituent	Concentration (ppm)
lignosulfonic acid, sodium salt	3.1

2) Percent of market volume that will enter the environment

Utilizing a worst-case assumption, an estimated 100% of the FCS is considered to be disposed of with waste processing waters after hydrocooling. Under this assumption, 100% of the FCS used at a given facility enters an on- or off-site

wastewater treatment system and may be released into aquatic and/or terrestrial environments.

3) The mode of chemical introduction into the environment

The FCS will be directly applied to wood pallets prior to hydrocooling of fruits and vegetables packed on treated pallets. Assuming a worst-case scenario, all of the FCS that may migrate from pallets to hydrocooling process water will be discharged to surface waters after water treatment on-site or at a POTW.

4) Expected concentration of chemicals introduced into the environment

i. Estimated --- Concentration in the Aquatic Environment

As stated in Item 5 above, the FCS in this notification is lignosulfonic acid, sodium salt. Lignosulfates including lignosulfonic acid, sodium salt are soluble to very highly water soluble depending on the cation[5]. Dissociation of the cation in water is also dependent upon pH, and once in the water, the dissociated cation and anion are likely to remain in dissolution. The manufacturer lists the water solubility was 300-500 g/L (Appendix A). The breakdown of lignosulfonates increases their susceptibility to further degradation by microbial populations (USDA, 2013), and the persistence of lignosulfonates in aquatic environments is lower in the presence of abundant microbial activity compared to environments with low microbial activity. Potential concerns of increased biological oxygen demand and aquatic environment acidification upon lignin sulfonate decomposition is low based on the Expected Introduction Concentration (EIC) of 31 ppb (Table 3).

Lignosulfonic acid, sodium salt is not anticipated to be introduced to the environment to any significant extent as a result of its use in PQ-8, or disposal of hydrocooling water. Quantitative evaluations of the expected introduction or environmental concentrations and ecotoxicity for lignosulfonic acid, sodium salt are not necessary.

As outlined above, assumptions representing a worst-case scenario in which 100% of PQ-8 containing the FCS (lignosulfonic acid, sodium salt) would migrate to hydrocooling water and be discharged into surface water were utilized to calculate the EIC.

There is limited public documentation available on hydrocooling processes. Therefore, CHEP gathered information from its customers on how the pallets are used. Approximately 12-36 pallets are used in a hydrocooling batch, meaning the pallets holding the food commodities are placed on a conveyer which delivers

[5] Federal Register, Volume 70, No. 31, 7912.

them into and through the hydrocooling car. A high-end rate of 36 pallets/hour was assumed.

In hydrocooling, cold water is drained onto the pallets in a process that is completed in about 35-40 minutes. The quantity of food on a pallet ranges from 460 to 2000 lbs. Information provided by CHEP indicates that the amount of water used varies according to unit size: a "1/2 Car Tube" holds approx. 500 gallons, and a "Full Car" can vary between approx. 1000 and 1500 gallons.

It is reasonable, however, to assume that the "1/2 Car Tube" variety will process a directly proportionally lower number of pallets than a full car, so the water-to-pallet surface ratio would be approximately the same. Therefore, for worst-case calculations, the following assumptions were made: 1000 gallons of water during a 12-hour hydrocooling cycle with 36 pallets/hour where each pallet has 460 lbs of food commodity.

The majority of the POTWs have a daily flow of greater than 0.1 million gallons (100,000 gallons)[6]. Therefore, the hydrocooling flow represents 1%[7] of the typical daily flow through of a POTW. Conservatively assuming no removal from treatment, the estimated upper-bound aquatic introduction concentration (EIC) for lignosulfonic acid, sodium salt is 31 ppb[8]. A summary of EIC values is shown in Table 3.

Table 3. Estimated aquatic introduction concentration for lignosulfonic acid, sodium salt

Constituent	EIC (ppm)	EIC (ppb)
lignosulfonic acid, sodium salt	0.031	31

Chemical species present in the FCS are present in the aqueous phase. Because the FCS is anticipated for use as an indirect food additive through the pre-manufacture process (by application to wood pallets prior to hydrocooling of fruits and vegetables packed on treated pallets), chemical components surviving wastewater treatment may consequently be introduced to the aquatic environment (i.e., surface waters) via the disposal of process water processing plant wastewater. Surface water is anticipated to be the primary route of FCS environmental introduction. The assessment conservatively assumes no removal of lignosulfonic acid, sodium salt from water treatment systems.

ii. Estimated --- Concentration in the Terrestrial Environment

[6] See Table I-2 in 2008 Clean Water Needs Survey. https://www.epa.gov/cwns/clean-watersheds-needs-survey-cwns-report-congress-2008

[7] hydrocooling flow = 1000 gallons/day x 100 / 100,000 gallons POTW flow/day = 1%

[8] EIC (ppm) =1/100 x 3.1ppm = 0.031 ppm. This is equivalent to 31 ppb

FDA states that substances with an adsorption coefficient (K_{oc}) ≥ 1000 L/kg might adsorb significantly to sewage sludge[9]. The log K_{ow} is -3.45 which suggests a low $K_{oc.}$ Therefore, exposure in the terrestrial environment was not assessed and is not of concern.

i. Estimated --- Concentration in the Atmospheric Environment

Lignosulfonic acid, sodium salt is not volatile. Therefore, it is not expected to be present in the atmosphere in any meaningful quantities.

7. Fate of Substances Released into the Environment

As outlined above, negligible amounts of the FCS may be released into the environment as the result of use and hydrocooling water disposal. Lignosulfonic acid, sodium salt is soluble in water once in the water, the dissociated cation and anion are likely to remain in dissolution. Degradation of lignosulfonates increases their susceptibility to further degradation by microbial populations (USDA, 2013), and the persistence of lignosulfonates in aquatic environments is lower with abundant microbial activity compared to environments with low microbial activity.

As discussed in Item 6, we do not expect any significant release to the environment as a result of the use or migration of the FCS to hydrocooling process water. However, in full disclosure, a detailed discussion of the potential fate of the FCS that may be released into the environment is included below.

Basic physicochemical and environmental fate properties of the FCS are included in Table 4 and were obtained from the safety data sheet for lignosulfonic acid, sodium salt (trade name Polyfon T) (Appendix A). Lignosulfonic acid, sodium salt is highly soluble, non-volatile, has a low $logP_{ow}$, and is readily biodegradable.

Table 4. Physicochemical and environmental fate properties of lignosulfonic acid, sodium salt

Property	Lignosulfonic acid, sodium salt
Water solubility	300 to 500 g/l
Vapor pressure	not volatile
Partition coefficient	$logP_{ow}$ = -3.45
Readily biodegradable	Yes

a. Water

[9] See Guidance for Industry: Preparing a Claim of Categorial Exclusion of an Environmental Assessment for Submission to CFSAN – Appendix A. https://www.fda.gov/regulatory-information/search-fda-guidance-documents/guidance-industry-preparing-claim-categorical-exclusion-or-environmental-assessment-submission-cfsan-6.

Lignosulfonic acid, sodium salt is water soluble and readily biodegradable. The estimated environmental concentration (EEC) is estimated by assuming a 10-fold dilution of the POTW effluent (see Table 7).

Expected Environmental Concentration (EEC) in Surface Water: Applying a 10-fold dilution factor to the aquatic EIC for lignosulfonic acid, sodium salt (EIC = 31 ppb), the EEC for lignosulfonic acid, sodium salt from the proposed use on wooden pallets in hydrocooling of fruits and vegetables is estimated to be **3.1 ppb in surface waters** directly receiving the treated effluent (see Table 5).

Table 5. Estimated environmental concentrations for lignosulfonic acid, sodium salt

Constituent	EIC (ppb)	EEC (ppb)
lignosulfonic acid, sodium salt	31	3.1

b. Land

Based on the physicochemical properties, there is no meaningful exposure to terrestrial organisms as a result of its use in the treatment of wooden pallets to be used in fruit and vegetable hydrocooling.

c. Air

A report from CHEP USA's parent company, Brambles, provides a life-cycle analysis for treated and untreated CHEP pallets (assessment for whole pallet fleet; **this report is provided as a confidential attachment to this EA, Attachment L.1**). A Life Cycle Assessment (LCA) is an accounting of the energy, waste, and emissions associated with the creation of a new product, through use and reuse/disposal. LCA quantifies resource use, energy consumption, and environmental emissions to the air, water, and land for a given product system based upon the study boundaries established. The unique feature of this type of analysis is its focus on the entire life cycle of a product, from raw material acquisition to final disposition, rather than on a single manufacturing step or environmental emission. The "life-cycle" impacts evaluated as part of the CHEP assessment included:

- Extraction and processing of raw materials;
- Platform processing and manufacturing;
- Transportation of the platform to the customer;
- Use of the platform by the customer (including transportation cycles);
- Recovery, reuse, recycling or disposal of each platform at the end of its useful life.

It should be noted that the scope of LCA is significantly different and wider than typical corporate emissions tracking and reporting.

Also, it is important to consider that hydrocooling should not meaningfully increase emissions because it does not result in meaningful increased pallet usage. Fruit or vegetables that were palletized for hydrocooling would normally have been shipped on pallets regardless of whether the commodities were hydrocooled. It is possible that hydrocooling could have a very small impact on pallet useful life, but that would be difficult to estimate. On the other hand, the use of the fungicide should help increase pallet lifetime and thus reduce new pallet construction.

As a part of the LCA, Brambles estimated the total potential emissions resulting from the construction, processing and use of CHEP pallets over the full pallet life cycle. Specifically, estimated emissions of all six EPA criteria air pollutants (ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter and lead) and greenhouse gases (GHGs; methane, carbon dioxide and nitrous oxide) were calculated per 100,000 anticipated pallet trips.

Because ozone is not emitted directly but is formed via chemical interactions between volatile organics and nitrogen oxides (NO_x) in the presence of sunlight, emissions of volatile organics and non-methane hydrocarbons were calculated as a proxy for ozone. Again, both pallets treated with PQ-8 containing the FCS, and untreated pallets were included for the purposes of this assessment. The large majority of pallets in the CHEP fleet are untreated. Thus, estimates of potential emissions from the production and use of CHEP pallets presented in this report largely overestimate emissions anticipated from the fraction of pallets treated with PQ-8 containing the FCS.

Results of CHEP's LCA indicate that emissions associated with CHEP pallets are a very small contributor to total U.S. air pollutant and GHG emissions even after making conservative assumptions.

Further, GHG emissions resulting from incineration of articles containing the FCS in MSW combustion facilities are regulated by the U.S. Environmental Protection Agency (U.S. EPA) under 40 C.F.R. § 98, which "establishes mandatory GHG reporting requirements for owners and operators of certain facilities that directly emit GHG." Part 2 of this regulation (40 C.F.R. § 98.2) describes the facilities that must report GHG emissions under EPA's GHG reporting program (GHGRP), and sets an annual 25,000 metric ton carbon dioxide equivalent (CO2-e) emission threshold for required reporting. The above total carbon dioxide equivalent emissions are below 25,000 metric tons on an annual basis.

Additionally, we have concluded that the FCS will not significantly alter the emissions from properly operating municipal solid waste combustors, and incineration of the FCS will not cause municipal waste combustors to threaten a

violation of applicable emissions laws and regulations (40 C.F.R. Part 60 and/or relevant state and local laws).

As noted above, these values were obtained using conservative estimates, but clearly indicate a negligible contribution to total air pollutant and GHG annual U.S. emissions. As only a fraction of the CHEP pallet fleet is anticipated to be treated, emissions from treated pallets would represent a fraction of the above emissions estimates.

Considering all above information, we respectfully submit that there is no expectation of significant environmental introductions of substances relating to the FCS from the proposed use of lignosulfonic acid, sodium salt in PQ-8 used to treat wooden pallets manufactured from non-domestic wood materials and internally distributed. As noted above, hydrocooling does not meaningfully increase pallet usage because the pallet would have been used to ship the commodity even if it was not palletized for hydrocooling.

8. Environmental Effects of Released Substances

The available information on the aquatic ecotoxicity levels for lignosulfonic acid, sodium salt show that toxicity to ecological species is a low concern. Short-term toxicity values that have been identified include a 48-hour LC_{50} of 7,300 ppm in *Oncorhynchus mykiss* (Roald, 1977) and a 96-hour LC_{50} of 615 ppm in *Pimephales promelas* (Appendix A). The aquatic effect levels for lignosulfonic acid, sodium salt are orders of magnitude higher than the EEC of 3.1 ppb. In general, lignosulfonic acid, sodium salt is considered to be of low toxicological concern to aquatic organisms.

9. Use of Resources and Energy

CHEP currently uses a related fungicide (PQ-80) on pallets used in hydrocooling. It is not known if other FCSs are used on the pallets of other manufacturers used in hydrocooling. Different types of wood pallets (without PQ-8 treatment) are already used in hydrocooling, including wood and plastic pallets. If this FCN is approved, we do not expect any change in the demand for the use of wood pallets in hydrocooling or any change in the overall demand for wood pallets.

As is the case with other food contact materials, the production, use and disposal of the FCS will involve the use of energy and natural resources such as petroleum products, coal, etc. However, the use of this FCS is not anticipated to result in a net increase in the use of energy or resources within the United States, as the FCS is intended for use in wooden pallets which will be used in place of similar articles already in use.

The use and subsequent disposal of wood pallets treated with the FCS is not expected to result in a net increase in the energy and resources required to transport and/or dispose of wastes, as the amount of FCS disposed of annually in the United States is estimated to comprise a negligible component of total POTW streams [see Item 6(B)(4)].

We believe that granting the FCN will not result in any appreciable change in the demand for wood resources or energy use. Granting the FCN will simply allow wood pallets designed for other purposes to also be used in hydrocooling and remove the possible impact of separating pallets with the FCN from other pallets when providing pallets for hydrocooling.

10. Mitigation Measures

No significant adverse environmental effects have been identified in this environmental assessment. Therefore, mitigation measures are not necessary.

11. Alternatives to the Proposed Action

Because the current action has minimal to no significant environmental effects, it is unnecessary to propose alternatives to the proposed action. The alternative of not approving the action proposed herein would simply be the continued use of pallets on the market without pretreatment with PQ-8 fungicide. As such, the action would have no significant environmental impact. The proposed use of the FCS is not anticipated to enter terrestrial or aquatic environments to any significant extent, and no significant environmental impact is anticipated from its use.

12. List of Preparers

Richard Reiss, Sc.D.
Exponent, Inc.
Principal Scientist
1800 Diagonal Road, Suite 500
Alexandria, VA 22314
Telephone: 571-227-7228
Fax: 571-227-7299
Email: rreiss@exponent.com

Dr. Reiss is an environmental health scientist with expertise in risk assessment, exposure assessment, environmental chemistry and fate, mathematical modeling and applied statistics. He has extensive experience conducting risk assessments, data analyses, probabilistic exposure modeling, and environmental exposure modeling for environmental agents such as pesticides, industrial chemicals, and consumer product chemicals.

13. Certification

I, Richard Reiss, certify that the information presented is true, accurate, and complete to the best of my knowledge.

April 8, 2022
Date

[redacted]

_____
Richard Reiss, Authorized Representative for CHEP

14. References Cited

Brambles. (2007). Life-cycle analysis for CHEP pallets. Prepared by Franklin Associates. CONFIDENTIAL.

ECHA. 2022a. Registration dossier for sodium sulphate (CAS no. 7757-82-6). Available at https://echa.europa.eu/registration-dossier/-/registered-dossier/15539/6/2/1.

ECHA. 2022b. Registration dossier for sodium sulfite (CAS no. 7757-83-7). Available at https://echa.europa.eu/de/registration-dossier/-/registered-dossier/15131.

Roald, S.O. (1977). Acute toxicity of lignosulfonates on rainbow trout, *Salmo gairdneri*. Bulletin of 908 Environmental Contamination and Toxicology. 17 (6): 702-706.

U.S. Environmental Protection Agency (EPA). (2005). Federal Register, Volume 70, No. 31, 7912. Available at: https://www.govinfo.gov/content/pkg/FR-2005-02-16/pdf/05-2986.pdf. Accessed January 28, 2022.

U.S. Environmental Protection Agency (EPA). (1996). EPA 1996 Clean Water Needs Survey: Small Community Wastewater Needs. Available at: https://nepis.epa.gov/Exe/ZyPDF.cgi/200044DI.PDF?Dockey=200044DI.PDF. Accessed January 28, 2022.

U.S. EPA. (1994). Land Application of Sewage Sludge: A Guide for Land Appliers on the Requirements of the Federal Standards for the Use or Disposal of Sewage Sludge, 40 CFR Part 503. U.S. Environmental Protection Agency, Office of Enforcement and Compliance Assurance, EPA/831-B-93-002b, December, 1994. Available at: https://www.epa.gov/sites/production/files/2018-11/documents/land-application-sewage-sludge.pdf. Accessed January 28, 2022.

United States Department of Agriculture (USDA) (2013); Lignin Sulfonate Aquaculture – Aquatic Animals Petition; Available at: https://www.ams.usda.gov/sites/default/files/media/Lignin%20Sulfonate%20TR%202011.pdf.

Appendix A – Material Safety Data Sheet

Section 1. Identification

GHS product identifier	:	POLYFON T
Other means of identification	:	Not available.
Material uses	:	Chemical. Agricultural industry Dye. Dispersing agent. Dispersing agent.
Supplier's details	:	**Ingevity Corporation** 5255 Virginia Avenue North Charleston South Carolina USA 29406-3615 www.ingevity.com email: sds@ingevity.com Tel: +1 843 740 2300, +1 800 458 4034 (0800 - 1700 EST)
In case of emergency	:	+1 800 424 9300 (USA) CHEMTREC

RESPONSIBLE CARE®
OUR COMMITMENT TO SUSTAINABILITY

Section 2. Hazards identification

OSHA/HCS status	:	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Classification of the substance or mixture	:	COMBUSTIBLE DUSTS EYE IRRITATION - Category 2A

GHS label elements

Hazard pictograms :

Signal word	:	Warning
Hazard statements	:	May form combustible dust concentrations in air. Causes serious eye irritation.

Precautionary statements

Prevention	:	Wear eye or face protection: Recommended: safety glasses with side-shields; Possible: splash goggles. Wash hands thoroughly after handling.
Response	:	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical attention.
Storage	:	Not applicable.
Disposal	:	Not applicable.
Supplemental label elements	:	Keep container tightly closed. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Prevent dust accumulation.
Hazards not otherwise classified	:	None known.

Section 3. Composition/information on ingredients

Substance/mixture : Substance

Ingredient name	%	CAS number
Lignosulfonic acid, sodium salt	100	8061-51-6

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health and hence require reporting in this section.

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

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention if adverse health effects persist or are severe. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : Causes serious eye irritation.

Inhalation : Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the nose, throat and lungs.

Skin contact : No known significant effects or critical hazards.

Ingestion : No known significant effects or critical hazards.

Over-exposure signs/symptoms

Eye contact : Adverse symptoms may include the following:
pain or irritation
watering
redness

Section 4. First aid measures

Inhalation	: Adverse symptoms may include the following: respiratory tract irritation coughing
Skin contact	: No specific data.
Ingestion	: No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician	: Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
Specific treatments	: No specific treatment.
Protection of first-aiders	: No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media	: Use dry chemical powder.
Unsuitable extinguishing media	: Avoid high pressure media which could cause the formation of a potentially explosible dust-air mixture.
Specific hazards arising from the chemical	: May form explosible dust-air mixture if dispersed.
Hazardous thermal decomposition products	: Decomposition products may include the following materials: carbon dioxide carbon monoxide sulfur oxides metal oxide/oxides
Special protective actions for fire-fighters	: Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.
Special protective equipment for fire-fighters	: Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
Remark	: Fine powder forms flammable and explosive mixtures in air.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel	: No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing dust. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
For emergency responders	: If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Section 6. Accidental release measures

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Avoid dust generation. Using a vacuum with HEPA filter will reduce dust dispersal. Place spilled material in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor.

Large spill : Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Avoid dust generation. Do not dry sweep. Vacuum dust with equipment fitted with a HEPA filter and place in a closed, labeled waste container. Avoid creating dusty conditions and prevent wind dispersal. Dispose of via a licensed waste disposal contractor. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing dust. Avoid the creation of dust when handling and avoid all possible sources of ignition (spark or flame). Prevent dust accumulation. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Electrical equipment and lighting should be protected to appropriate standards to prevent dust coming into contact with hot surfaces, sparks or other ignition sources. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Lignosulfonic acid, sodium salt	**ACGIH TLV (United States).** TWA: 10 mg/m³, (Inhalable) 8 hours. **OSHA PEL (United States).** TWA: 15 mg/m³, (Total dust) 8 hours.

Appropriate engineering controls : Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles. If operating conditions cause high dust concentrations to be produced, use dust goggles.
Recommended: safety glasses with side-shields
Possible: splash goggles

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated. > 8 hours (breakthrough time): disposable vinyl, natural rubber (latex)

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Recommended: Lab coat, apron or coveralls

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use. Recommended: If dust is generated and ventilation is inadequate, use respirator that will protect against dust/mist.
Possible: disposable particulate mask

Section 9. Physical and chemical properties

Appearance

Physical state	:	Solid. [Powder.]
Color	:	Brown. [Light]
Odor	:	Vanilla [Slight]
Odor threshold	:	Not available.
pH	:	10.5 [Conc. (% w/w): 15%]
Melting point	:	150 to 260°C (302 to 500°F) Decomposes.
Boiling point	:	Not applicable.
Flash point	:	Not applicable.
Burning time	:	Not available.
Burning rate	:	Not available.
Evaporation rate	:	Not applicable.
Flammability (solid, gas)	:	Fine dust clouds may form explosive mixtures with air.
Lower and upper explosive (flammable) limits	:	Lower explosion limit = 50g/m^3 Explosibility: K_{St} = 175 bar m/s
Vapor pressure	:	Not applicable.
Vapor density	:	Not available.
Relative density	:	0.5 [Water = 1]
Solubility	:	Soluble in the following materials: cold water and hot water.
Solubility in water	:	300 to 500 g/l
Partition coefficient: n-octanol/water	:	-3.45
Auto-ignition temperature	:	>400°C (>752°F)
Decomposition temperature	:	150 to 260°C (302 to 500°F)
SADT	:	Not available.
Viscosity	:	Not applicable.

Section 10. Stability and reactivity

Reactivity	:	No specific test data related to reactivity available for this product or its ingredients.
Chemical stability	:	The product is stable.
Possibility of hazardous reactions	:	Under normal conditions of storage and use, hazardous reactions will not occur.
Conditions to avoid	:	Avoid the creation of dust when handling and avoid all possible sources of ignition (spark or flame). Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Prevent dust accumulation.
Incompatible materials	:	Reactive or incompatible with the following materials: oxidizing materials
Hazardous decomposition products	:	Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Lignosulfonic acid, sodium salt	LD50 Oral	Rat - Male, Female	>10 g/kg	-

Irritation/Corrosion

Not available.

Conclusion/Summary

Skin : Non-irritating to the skin.

Eyes : Causes eye irritation. (similar material)

Sensitization

Product/ingredient name	Route of exposure	Species	Result
Lignosulfonic acid, sodium salt	skin	Guinea pig	Not sensitizing

Conclusion/Summary

Skin : Not sensitizing

Mutagenicity

Product/ingredient name	Test	Experiment	Result
Lignosulfonic acid, sodium salt	OECD 471 Bacterial Reverse Mutation Test	Experiment: In vitro Subject: Bacteria	Negative

Carcinogenicity

Not available.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure : Routes of entry anticipated: Oral, Dermal, Inhalation.

Potential acute health effects

Eye contact : Causes serious eye irritation.

Inhalation : Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the nose, throat and lungs.

Skin contact : No known significant effects or critical hazards.

Section 11. Toxicological information

Ingestion : No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : Adverse symptoms may include the following:
pain or irritation
watering
redness

Inhalation : Adverse symptoms may include the following:
respiratory tract irritation
coughing

Skin contact : No specific data.

Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Product/ingredient name	Result	Species	Dose	Exposure
Lignosulfonic acid, sodium salt	Sub-acute LDLo Oral	Rat	30 g/kg	7 days per week
	Sub-chronic LCLo Inhalation Dusts and mists	Rat	25700 µg/m³	4 hours

General : Repeated or prolonged inhalation of dust may lead to chronic respiratory irritation.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
Lignosulfonic acid, sodium salt	Acute LC50 615 mg/l Fresh water	Fish - Pimephales promelas	96 hours

Conclusion/Summary : Practically non-toxic to aquatic organisms.

Persistence and degradability

Product/ingredient name	Test	Result	Dose	Inoculum
Lignosulfonic acid, sodium salt	OECD 301E Ready Biodegradability - Modified OECD Screening Test	<5 % - Not readily - 28 days	-	-

Conclusion/Summary : Lignin and lignin derivatives are slowly degraded in nature by white rot fungi to soil humus.

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
Lignosulfonic acid, sodium salt	-	-	Not readily

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
Lignosulfonic acid, sodium salt	-3.45	-	low

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

	DOT Classification	IMDG	IATA
UN number	Not regulated.	Not regulated.	Not regulated.
UN proper shipping name	-	-	-
Transport hazard class(es)	-	-	-
Packing group	-	-	-
Environmental hazards	No.	No.	No.
Additional information	-	-	-

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL and the IBC Code : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption**: This material is listed or exempted.
United States inventory (TSCA 8b): This material is listed or exempted.

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Section 15. Regulatory information

Classification : COMBUSTIBLE DUSTS
EYE IRRITATION - Category 2A

Composition/information on ingredients

Name	%	Classification
Lignosulfonic acid, sodium salt	100	COMBUSTIBLE DUSTS EYE IRRITATION - Category 2A

State regulations

Massachusetts : This material is not listed.
New York : This material is not listed.
New Jersey : This material is not listed.
Pennsylvania : This material is not listed.

California Prop. 65

This product does not require a Safe Harbor warning under California Prop. 65.

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

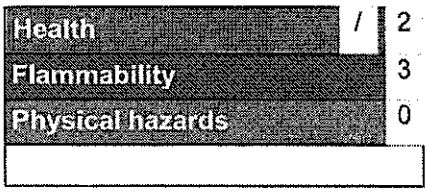
International lists

National inventory

Australia : This material is listed or exempted.
Canada : This material is listed or exempted.
China : This material is listed or exempted.
Japan : **Japan inventory (ENCS)**: This material is listed or exempted.
Japan inventory (ISHL): Not determined.
New Zealand : This material is listed or exempted.
Philippines : This material is listed or exempted.
Republic of Korea : This material is listed or exempted.
Taiwan : This material is listed or exempted.
United States : This material is listed or exempted.

Section 16. Other information

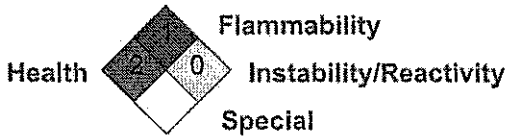
Hazardous Material Information System (U.S.A.)



Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings and the associated label are not required on SDSs or products leaving a facility under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered trademark and service mark of the American Coatings Association, Inc.

The customer is responsible for determining the PPE code for this material. For more information on HMIS® Personal Protective Equipment (PPE) codes, consult the HMIS® Implementation Manual.

National Fire Protection Association (U.S.A.)



Reprinted with permission from NFPA 704-2001, Identification of the Hazards of Materials for Emergency Response Copyright ©1997, National Fire Protection Association, Quincy, MA 02269. This reprinted material is not the complete and official position of the National Fire Protection Association, on the referenced subject which is represented only by the standard in its entirety.

Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

History

Date of printing	:	2019-09-27 .
Date of issue/Date of revision	:	2019-09-27
Date of previous issue	:	No previous validation.
Version	:	1
Key to abbreviations	:	ATE = Acute Toxicity Estimate BCF = Bioconcentration Factor GHS = Globally Harmonized System of Classification and Labelling of Chemicals IATA = International Air Transport Association IBC = Intermediate Bulk Container IMDG = International Maritime Dangerous Goods LogPow = logarithm of the octanol/water partition coefficient MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution) UN = United Nations
References	:	Not available.

Indicates information that has changed from previously issued version.

Notice to reader

Section 16. Other information

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.