



## GreenScreen Certified® Firefighting Foam

### Class A Foam Concentrates, Class B Foam Concentrates, Class A Wetting Agents, and Class A&B Wetting Agents

Per- and polyfluoroalkyl substances (PFAS) are a class of chemicals that are extraordinarily persistent and, because of their high mobility, have become widespread drinking water contaminants. The use of PFAS in Class B aqueous film-forming foams (AFFF) to smother fuel and oil fires at military bases, airports, refineries, and elsewhere is increasingly acknowledged to be a significant source of PFAS water contamination. Human exposure to these chemicals is associated with cancer, developmental toxicity, immunotoxicity, high cholesterol, and other health effects. Class A foams typically do not contain PFAS but may contain other toxic ingredients.

That is why Clean Production Action produced the GreenScreen Certified™ Firefighting Foam standard for Class A Foam Concentrates, Class B Foam Concentrates, Class A Wetting Agents, and Class A&B Wetting Agents. **The Standard requires full chemical ingredient identification and uses a combination of a restricted substances list (RSL), GreenScreen scores, and analytic testing for acute aquatic toxicity and total organic fluorine to certify firefighting foams that do not use PFAS and over 2,000 other chemicals of high concern.**

#### GreenScreen® for Safer Chemicals

GreenScreen Certified for Firefighting Foam builds on the foundation of Clean Production Action's GreenScreen program, which encompasses GreenScreen List Translator™ and GreenScreen® for Safer Chemicals.

**GreenScreen List Translator™** is a list-based, automated hazard screening method that uses a “list of lists” approach to quickly identify chemicals of high concern. It does this by scoring chemicals



based on information from over 40 hazard lists developed by authoritative scientific bodies convened by international, national, and state governmental agencies, and non-governmental organizations (NGOs). The lists include the Stockholm Convention on Persistent Organic Pollutants (POPs), European Union's Substances of Very High Concern (SVHCs), and California's Proposition 65 list of carcinogens and reproductive toxicants. Currently over 2,000 chemicals meet these criteria and are scored as GreenScreen List Translator-1 (LT-1) chemicals.

**GreenScreen® for Safer Chemicals** is a globally recognized chemical hazard assessment method that specifies progress to increasingly safer chemicals through four transparent benchmarks, from GreenScreen Benchmark-1 (avoid—chemical of high concern) to Benchmark-4 (prefer—safer chemical). GreenScreen chemical hazard assessments require a comprehensive toxicological review of 18 human health and environmental hazard endpoints, including carcinogenicity, reproductive and developmental toxicity, acute and chronic aquatic toxicity, endocrine activity, persistence, and bioaccumulation. GreenScreen uses a combination of hazard endpoints and hazard levels to define criteria for each Benchmark score.

#### GreenScreen Certified Firefighting Foam: Three Levels of Certified Products

GreenScreen Certified for Firefighting Foam certifies a product at one of three levels—Bronze, Silver, or Gold—with each level reflecting a progression towards safer chemicals based upon GreenScreen List Translator and GreenScreen chemical hazard assessment scores.

## Prerequisites for all Three Levels

Manufacturers are required to complete the following for all GreenScreen Certified Firefighting Foam products:

1. Disclose under confidentiality all intentionally added chemicals (greater than zero parts per million or ppm) and all impurities present at or above 100 ppm in the product as sold.
2. Test the product for acute aquatic toxicity in fish, aquatic invertebrates, and algae. Acute aquatic toxicity is the intrinsic property of a substance to harm an organism in a short-term exposure. Because foams are often discharged outdoors, harm to aquatic organisms is a concern.
3. Test the product for total organic fluorine in an independent laboratory specified by Clean Production Action.

The descriptions below and Table 1 summarize the requirements for each of the three certification levels.

### Bronze Level

Products certified at the Bronze level meet the prerequisites and the following criteria:

- Total organic fluorine less than 1 ppm by weight of the product.
- Must not contain thousands of chemicals of high concern as specified by:
  - the GreenScreen Certified Firefighting Foam Restricted Substances List (see below for the RSL), which prohibits the use of PFAS and other chemicals of high concern; and
  - GreenScreen List Translator™–no List Translator-1 (LT-1) chemicals.
- Product level acute aquatic toxicity must be greater than 10 milligrams/liter (mg/L) for fish, aquatic invertebrates, and algae. This would prohibit the use of products considered by the US Fish and Wildlife Service to be moderately toxic or higher.

### Silver Level

Products certified at the Silver level meet the prerequisites, Bronze level criteria, and the following criteria:

- Have a GreenScreen hazard assessment for each intentionally added chemical (greater than zero ppm) and impurity greater than 100 ppm.



- Contain no intentionally added chemicals and impurities with a GreenScreen score of Benchmark-1.
- Pass the United States Environmental Protection Agency's (US EPA) Safer Choice Master Criteria for Environmental Toxicity and Fate for each intentionally added chemical and impurity. The Environmental Toxicity and Fate criteria combine limits for aquatic toxicity, biodegradation (persistence), and bioaccumulation potential. The Silver criteria for aquatic toxicity are more stringent than the Bronze level to give added precaution for firefighting foam released into the aquatic environment.

### Gold Level

Products certified at the Gold level meet the prerequisites, the Bronze and Silver level criteria, and the following criteria:

- Contain no intentionally added chemicals and impurities with a GreenScreen score of Benchmark-2.
- Meet the even more stringent US EPA Safer Choice Criteria for Environmental Toxicity and Fate for Chemicals in Direct Release Products for each intentionally added chemical and impurity. These criteria were developed by the US EPA Safer Choice Program for products that are likely to enter waterways directly without first passing through a wastewater treatment plant, such as a boat cleaner that is directly released into a waterway. The direct release criteria are the most precautionary and reduce the potential for harm from the accidental release of foam concentrate directly into the aquatic environment.



### GreenScreen Certified Firefighting Foam Restricted Substances List (RSL)

The GreenScreen Certified Firefighting Foam Restricted Substances List (RSL) is the following list of chemicals and chemical classes that products cannot contain to meet any certification level:

- **The entire PFAS chemical class**, verified with analytical testing finding less than 1 ppm or 0.0001 weight percent total organic fluorine.
- **All organohalogens** (beyond organofluorines) with a threshold of zero ppm for intentionally added and 100 ppm for impurities. This class of chemicals has significant life cycle and toxicity concerns, including formation of dioxins when burned.
- **Siloxanes (D4, D5, and D6)**—cyclic volatile methyl siloxanes D4 (octamethylcyclotetrasiloxane, CAS 556-67-2), D5 (decamethylcyclopentasiloxane, CAS 541-02-6), and D6



(dodecamethylcyclohexasiloxane, CAS 540-97-6) with a threshold of zero ppm for intentionally added and 100 ppm for impurities. D4, D5, and D6 are categorized as Substances of Very High Concern (SVHCs) by the European Union. D4, D5, and D6 are very persistent and very bioaccumulative (vPvB); and D4 is also persistent, bioaccumulative, and toxic (PBT).

- **The Zero Discharge of Hazardous Chemicals (ZDHC) Manufacturing Restricted Substances List (MRSL)**, which has been adopted by ZDHC companies to reduce hazardous chemicals in the global manufacturing of textile, leather, apparel, and footwear. The [ZDHC MRSL](#) is relevant to this

Standard as it is focused on eliminating toxic chemicals from discharges into water.

- **Alkyl Phenols (APs) & Alkylphenol Ethoxylates (APEOs)** with a carbon chain length of six carbons (C6) or more because they are persistent, bioaccumulative, and toxic. The chemicals of concern with chain lengths lower than C6 are eliminated by GreenScreen List Translator, which is applicable to all three certification levels.

**For more detailed information download the Standard [here](#) and see Table 1 below.**

TABLE 1

**GreenScreen Certified Firefighting Foam Standard: Summary of Certification Requirements**

Section In the Standard	Requirements	Bronze	Silver	Gold
<b>6. Product Inventory</b>	Product Inventory includes: a. Additives Inventory: 100% of additives in the product are identified; and b. Chemical Inventory: All intentionally added chemical compounds (present >0 ppm) and impurities present at or above 0.01% by weight (100 ppm) in the additives are identified	✓	✓	✓
<b>7.1 Chemical Hazard Assessment</b>	Intentionally added chemical compounds (>0 ppm) and impurities at or above 0.01% by weight (100 ppm) in the product are screened with GreenScreen List Translator™	✓	✓	✓
	Intentionally added substances (>0 ppm) and impurities present at or above 0.01% by weight (100 ppm) in the product are assessed with GreenScreen		✓	✓
	None of the chemical compounds screened have a GreenScreen List Translator™ score of LT-1	✓	✓	✓
	None of the substances assessed have a GreenScreen score of Benchmark-1		✓	✓
	None of the substances assessed have a GreenScreen score of Benchmark-1, Benchmark-2, Benchmark-2 <sub>DG</sub> , or Benchmark-2 <sub>TP</sub>			✓
	Each substance meets US EPA Master Criteria for Environmental Toxicity and Fate		✓	✓
	Each substance meets US EPA Safer Choice Criteria for Environmental Toxicity and Fate for Chemicals in Direct Release Products			✓
<b>7.2.1 Restricted Substances List</b>	Product meets all Restricted Substances List (RSL) criteria and thresholds	✓	✓	✓
<b>7.2.2 Requirements for Microorganisms</b>	Product meets requirements for microorganisms (if present)	✓	✓	✓
<b>7.2.3 Analytical Testing—Total Organic Fluorine</b>	Product meets analytical testing requirements for total organic fluorine	✓	✓	✓
<b>7.2.4. Analytical Testing—Acute Aquatic Toxicity</b>	Product-level acute aquatic toxicity LC50 or EC50 > 10 mg/L for each of the following groups of organisms: fish, aquatic invertebrates, and algae	✓	✓	✓