



General Green Flame™ Document 1/2002 (revised January 2005, July 2006)

1. Background

Environmental requirements have been included in product procurement policies for some time. Fire performance requirements have, however, typically not been included in such policies. In some cases the environmental focus, however, has potentially had an effect on the fire performance or vice versa attention to the fire performance has potentially had an effect on the environmental impact of the product. The Green Flame™ (GF) system has been put forward in an attempt to address both environmental and fire safety issues simultaneously, i.e., to ensure maximum environmental and fire performance. It has been developed to promote environmentally sound fire safety.

Fire code enforcement and environmental officials from the United States, with assistance from Swedish safety authorities, have formed a partnership that is proposing a program to encourage manufacturers to develop, use and sell products capable of simultaneously meeting high standards for human health, fire safety and environmental quality.

The partnership includes the following agencies and organizations

- The National Association of State Fire Marshals (NASFM) which represents the most senior fire code enforcement officials in each of the 50 states and District of Columbia, in the US. In the US, almost all fire code enforcement is conducted at the state and local levels. NASFM is receiving scientific guidance from the US Environmental Protection Agency (US EPA) and other experts.
- The Swedish Rescue Services Agency (SRV)¹.

The partnership grew from a shared interest in reconciling the risk from fires and the potential environmental and health impacts of fire retardant chemicals. The fire retardant chemicals in question are found in many products throughout society — in aircraft, autos, trains and boats, home electrical appliances, computers, televisions and a range of home furnishings. Scientists have raised concerns about the environmental and health effects of these chemicals, and formal risk assessments of five brominated fire retardant chemicals are now under way by European authorities. Other fire retardant chemicals are also being scrutinized by government agencies in Sweden and the US.

¹ SRV is receiving scientific guidance from its advisors: The Swedish Chemicals Inspectorate (KemI) and the Swedish Environmental Protection Agency and other experts.



The challenge accepted by the partnership is to move away from flame retardant chemicals posing unacceptable harm to the environment while maintaining a high level of fire protection through safe alternative chemicals and/or techniques. The program shall establish and promote voluntary market incentives to encourage industry to develop fire safety technologies which do not compromise human health and environmental quality.

In this context the challenges are based mainly on the following:

- Significant environmental and health concerns have been raised and continue to be examined regarding a range of chemical additives used to make materials flame retardant. These additives are in very broad use in products and materials found in the home, school, workplace and in modes of transportation. Efforts to find alternatives that are environmentally sound and safe must be encouraged. At present, certain brominated flame-retardants are in focus.
- With the rapid introduction of new technologies, increasingly high levels of human health, fire safety and environmental quality are simultaneously possible. All three are critical. Public policy should not encourage more rigorous standards in any of these areas at the expense of others.
- The passage of laws and regulations in this case does not occur rapidly enough to reflect technological change. Market forces more easily keep pace with technology. Government should create effective incentives to encourage responsible market activity. Such innovations as eco-labels have proven to be one of the most effective incentives in Europe and will be considered as a model for this effort.

All markets of concern to this program are global and must be addressed as such.

The participating organizations observe that environmental, safety and health regulations exist to define minimum acceptable impacts for a wide range of products. However, too few incentives exist for organizations seeking the highest possible standards for the products they make and sell. Indeed, in some cases disincentives discourage innovation and prevent the use of existing technologies. This program can and will provide such incentives.

2. Scope

The scope of the program is to create a system that simultaneously promotes, fire safety, health and the environment.

Proposals will be accepted for products that can demonstrate improved fire behaviour over those to be replaced. In the short term, applicants may use existing test methods and standards (provided the secretariat in accordance with relevant expertise agrees with the methods and standards proposed). Over time, the program hopes to encourage innovation in testing and standards, as well as in the technologies to be evaluated.

At present suppression technologies are outside of the scope of this program.

3. Goals

To create clear incentives for manufacturers to design, produce and sell products capable of simultaneously meeting high standards for fire safety, health and environmental quality.



Our main objectives are to reduce the:

- contribution to the systematic increase in concentrations of potentially harmful substances from the earth's crust (e.g. by avoiding the use of heavy or rare metals or virgin fossils)
- contribution to the systematic increase in concentrations of substances produced by society (e.g. by avoiding the use of persistent man-made chemicals, or precursors)
- contribution to the impoverishment of nature as a result of over-harvesting or other forms of ecosystem manipulation (e.g. by encouraging the use of FSC- or IFOAM-certified renewable resources)²
- risk of fires to people and property (e.g. by the introduction of meaningful state-of-the-art fire performance requirements)

The program should encourage the implementation of best practice and enhance consumer and industry fire safety and environmental awareness through benchmarking of "Green Flame™" systems against current standard practice.

4. Financing

Green Flame™ shall be self financing through the auspices of the industrial clients who apply for approval.

5. Organisation

A not-for-profit corporation³ has been established in the United States (see Figure 1), and is governed by a Board of Directors consisting of representatives of government agencies responsible for environmental, fire safety and health policy. The Board will set all policies and will ensure that the Secretariat and all experts involved in the evaluation follow such policies. By-laws will set rules for the on-going conduct and responsibility of the Board.

This corporation will oversee a number of separate projects as indicated in the organisational chart below, one of which is the Green Flame™ project. The Green Flame™ project will, in turn, be supported by a Green Flame™ Advisory Board.

The Green Flame Advisory Board will appoint and shall be supported by: a Secretariat whose responsibilities shall include the processing of all proposals (see below), the charging of necessary fees, issuing of reports and overall coordination of the program.

The Secretariat will be supported in the actual evaluation by the Combustion Chemistry Council of the International Consortium for Fire Safety, Health and the Environment.

² FCS = Forest Stewardship Council; IFOAM = International Federation of Organic Agriculture Movements

³ The International Consortium for Fire Safety, Health and the Environment

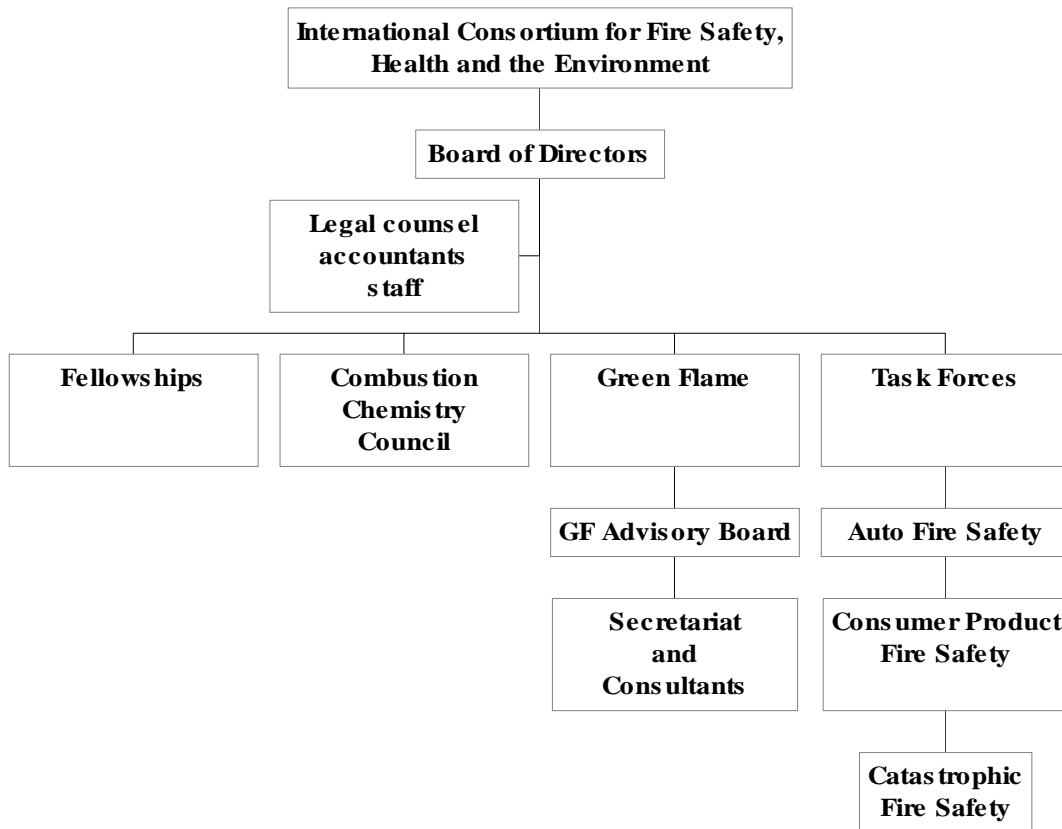


Figure 1: Organisational chart for the International Consortium for Fire Safety, Health and the Environment.

6. Green Flame™ recognition

The secretariat shall process applications from industry, facilitate environmental and fire safety evaluation of the product or technology, and write a recommendation to the Green Flame™ Advisory Board for approval or other action regarding the application.

Green Flame recognition will be granted for the specific product that has been assessed and will be time limited. Should the applicant wish to extend approval beyond the initial time period the applicant will be required to provide suitable documentation to the secretariat that the production methodology and product or technology has not changed significantly in the interim period since previous approval. Any new knowledge that has become available in the interim period shall be considered.

The secretariat reserves the right to recommend to the Green Flame™ Advisory Board that new fire or environmental evaluations should be conducted if GF recognition has potentially been effected by changes in production practice, or if new information that effects the fire or environmental evaluation has come to light.

In summary the steps from submission to approval include:

- a. The Secretariat will establish and make generally available for proposals:
 - A set of voluntary or mandatory standards to establish relevant benchmarks for evaluation of the proposed product. These standards will be provided by the applicant and posted on the GF website for a period of public review before being accepted as benchmarks.



- A schedule of application and processing fees to cover all costs of the program.
 - Rules describing responsibilities, major steps, time required.
 - Consultants to conduct assessments of data pertaining to fire safety, environmental and health impacts.
 - Names of suitable consultants to conduct an evaluation of the proposed product will be selected by the Secretariat, together with the Combustion Chemistry Council, for approval by the Green Flame™ Advisory Board.
- b. Proposals will be accepted and screened by the Secretariat to ensure that they are relevant and complete.
- c. Data pertaining to environmental and health impacts will be forwarded to a consultant or consultants.
- d. If a new combustion test method or standard is proposed, the Secretariat will retain a testing laboratory from an approved list to replicate the results shown in the proposal.
- e. The Secretariat will issue a report of the expert evaluation either directly to the GF Advisory Board or (if necessary) to the Combustion Chemistry Council, which may seek additional data via the Secretariat from the organization making the proposal.
- f. The GF Advisory Board will assure that the actions of the Secretariat comply with established policy and procedure for GF recognition.
- g. The GF Advisory Board reserves the right to reject any proposal that does not meet the intent of the program.
- h. The GF Advisory Board makes the final decision concerning GF Recognition.

7. Submission

Organizations proposing technologies will be required to submit

- Environmental, health and fire safety data related to the technology that they seek to replace. These data shall be used to set a baseline for what currently exists.
- A summary of the proposed new technology.
- Data on the impact on environment and human health of the new technology. Emphasis should be on bio-accumulation, toxicity and persistence in the environment and man.
- A fire test method and standard. These either may be well-accepted methods and standards or new approaches.
- The highest, existing fire safety, health and environmental requirements for its product. The requirements can be governmental enforced, prevailing standards or adopted by an independent group. This data would become the baseline. The company should then also state their own requirements that are above this baseline.

8. Guidelines

a. Fire safety

Organisations proposing technologies or products shall submit, in addition to relevant fire test methods and standards, the following:

- Fire performance data that establishes that the new technology represents a fire safety improvement over present standard practice.



- Other information as requested by experts involved in the evaluation or by the secretariat.

b. Environmental and health safety

Organisations proposing technologies or products shall submit:

- Environmental and health safety data related to the technology that they seek to replace. These data shall be used to benchmark the present state-of-the-art.
- a summary of the proposed new technology
- data on the risk of exposure and possible effects on the environment and human health of the new technology. Emphasis should be on bio-accumulation, toxicity and persistence both in the environment and in humans.

This data will be evaluated by independent experts in the field of eco- and human toxicology and health and environmental chemistry, or other relevant fields, as recommended by the Combustion Chemistry Council. The experts shall report to the secretariat relating whether the proposed technology is better than present standard technology, including an assessment of the possible health and environmental impact of the proposed technology. The report shall make a recommendation as to whether the proposal qualifies for Green Flame™ approval based on a requirement of a high level of health and environmental safety relative to present state-of-the-art. If no present technology is available for benchmarking (i.e. the proposed technology is entirely innovative) a general assessment of the health and environmental safety of the proposed technology relative to standard health and eco-criteria should be made.

9. Green Flame™ product declaration

The ultimate aim of the system is to work together with existing Eco-labels and it is proposed that in the future a traditional eco-label could refer to Green Label requirements for the acquisition of the eco-label thereby removing the need to mark products as “Green Flame™ Approved” as this would be implied in the relevant eco-label. Until such time as this has been achieved, however, companies will be granted limited license to use reference to Green Flame™ as a visible mark on the product.

Applicants that pass through the Green Flame™ approval system shall be eligible to refer to the Green Flame™ system in their marketing and to identify products as “Green Flame™ Approved”.

10. Communication of Approval

Approved products shall be listed on the Green Flame™ web site.

A non-confidential product or technology performance information package will be distributed to public procurement agencies and environmental, safety and health regulators for inclusion in their guidelines. Similarly, this package will be made available to applicants for private distribution.