



Introduction of Flame Retardant Chemicals Association of Japan (FRC-J) and Japanese perspective of Environmentally Friendly (Green) Flame Retardants

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Good afternoon Ladies and Gentlemen,

Shigeru Matsumi is my name. I am an Executive Director of FRC-J in charge of International Liaison. I am from Chemtura Japan. It's my great pleasure to be here and on behalf of FRC-J, I would like to say "Thank you all AFSC executives for your invitation to this symposium".

The first part of my presentation describes the organization of Flame Retardant chemicals Association of Japan (FRC-J), a part of METI (Ministry of Economy Trade & Industry) supported industry organization of flame retardant.

The second part presents the Japanese perspective of environmentally friendly (Green) flame retardants, in the categories of brominated, phosphorous and antimony trioxide.

Flame Retardant Chemicals Association of Japan (FRC-J)

1. **Introduction**
 - FR Manufacturers, importers, distributors and users
 - Liaised with METI, JCIA, AFSC, EFRA and CSFR

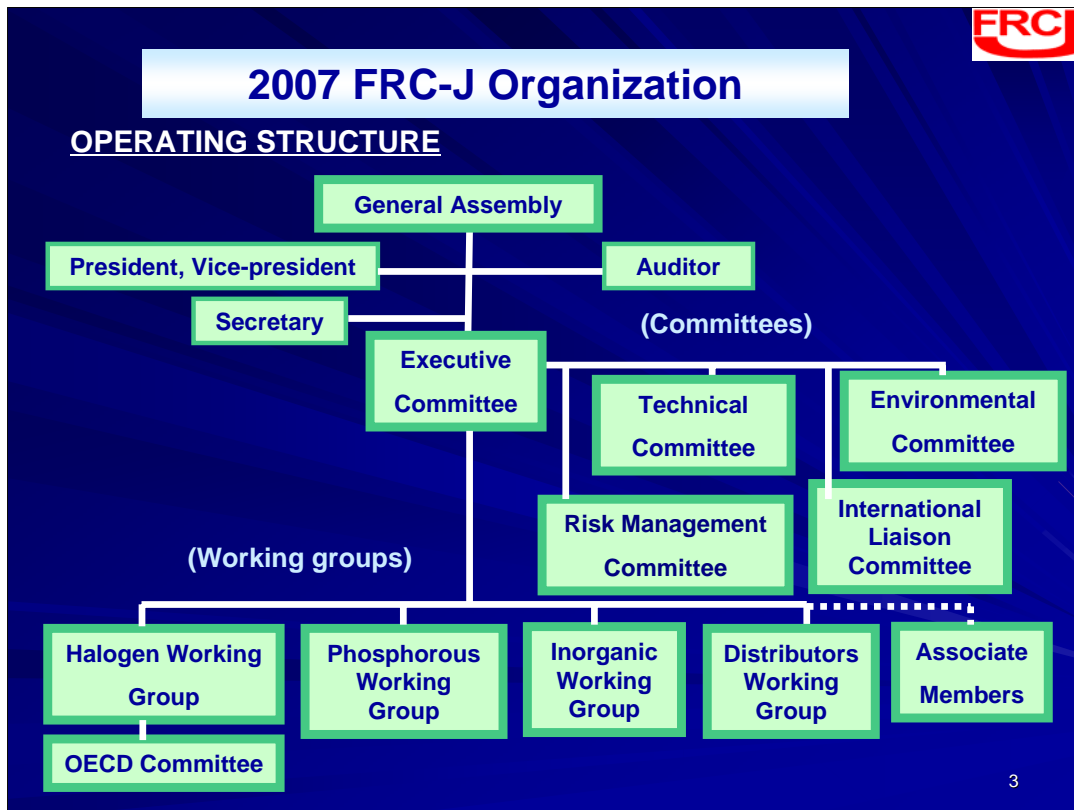
2. **History of FRC-J**
 - Japan Plastics Council in 1974
 - Japan Flame Retardants Council in 1979
 - Flame Retardant Chemicals Association of Japan in 1996

3. **Updated FRC-J**
 - Operating structure
 - Officers list in 2007

Let me introduce FRC-J. FRC-J is an independent organization made up of flame retardant manufacturers, importers, distributors and users. It is located in Tokyo and one of members of the Japan Chemical Industry Association (JCIA) and being liaised globally with the American Fire Safety Council (AFSC), European Flame Retardants Association (EFRA) and the Chinese Society of Flame Retardants (CSFR).

History of FRC-J

FRC-J was born out of the Japan Plastics Council in 1974 and changed its name to Japan Flame Retardants Council in 1979. It then became the Flame Retardant Chemicals Association of Japan in 1996 in order to meet the wider challenges of Japan's many industrial sectors.



This slide shows 2007 FRC-J operating structure of the organization lead by President Yamanaka, from Daihachi Chemical Industry, Vice President Otsuka, from Marubishi Oil Chemicals and Mr. Yasui, Secretary General.

There are General Assembly, Executive Committee, four types of functional committees, another four types of working groups and associate members.

OFFICERS LIST IN 2007

Title	Name	Company
PRESIDENT	Hiroshi YAMANAKA	DAIHACHI CHEM.IND.CO.,LTD.
VICE PRESIDENT	Minoru OTSUKA	MARUBISHI OIL CHEMICAL CO.,LTD.
AUDITOR	Nobuo SHIBAHARA	NAGASE & CO.,LTD.

[DIRECTOR]

CHAIRMAN, Technical Com.	Enichirou OCHIAI	SUZUHIRO CHEM.,CO.,LTD.
CHAIRMAN, Environmental Com. & OECD Com.	Hirofumi KAMIBAYASHIYAMA	TOSOH CORPORATION
Chairman, Risk Manag. Com.	Akhide KITAMURA	MANAC INCORPORATED.
EXECUTIVE DIRECTOR, International Liaison	Shigeru MATSUMI	CHEMTURA JAPAN LTD.
CHIEF, Halogen Group	Hideji ASADA	SAKAMOTO YAKUHN KOUGYOU CO.,LTD.
CHIEF, Phosphorous Group	Nobutaka MIYANO	DAIHACHI CHEM.IND.CO.,LTD.
CHIEF, Inorganic Group	Yoshiyuki MASUMORI	NIHON SEIKO CO.,LTD.
CHIEF, Dealer Group	Yasushi IWATA	SANYO TRADING CO.,LTD.

[SECRETARY]

SECRETARY	Toshiyuki YASUI	E-mail : info@frcj.jp URL : http://www.frcj.jp
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2007 officers list is here:

FRC-J Organization Structure

- **General Assembly**
- **Executive Committee**
- **Four types of Committees**
- **Four types of Working Groups**
- **Associate Members**

General Assembly

The general Assembly meets once a year in May, reviews the work of all FRC-J committees, ratifies their work, describes on FRC-J membership and approves their budget, activity plans and all financial decisions. It is composed of all members (Full and Associate).

Executive Committee

- **Steering/Prioritization of efforts and funds**
- **Finance**
- **Internal Liaison**
- **Liaison with AFSC, EFRA, CSFR**
- **Liaison with METI, JCIA, BSEF-J, Pfric-J
IAOIA, relevant organizations**
- **Recruitment of New Members**

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Executive Committee

The Executive Committee coordinates all FRC-J activities. Its principle duties are as follows:

- Steering and Prioritization of efforts and funds
- Finance
- Internal liaison
- Liaison with AFSC, EFRA and CSFR
- Liaison with METI, JCIA, BSEF, Pfric, IAOIA and relevant organizations
- Recruitment of new menebrs

Environmental Committee

- Japan national activities for FR chemical toxicity issues and regulations
- Preparation for European REACH introduction
- Activities of OECD
- UN, WHO, IPCS, EHC
- Other HSE issues

There are four functional committees in the organization and:

Environmental Committee

The Environmental Committee deals with the health, chemical safety and environmental concerns/issues in Japan. These include:

- Japan national activities for FR chemical toxicity issues and regulations
- Preparation for European REACH introduction
- Activities of Organization of Economic Cooperation and Development (OECD) in the flame retardant area
- The United Nations (UN), World Health Organization (WHO), International Program on Chemical Safety (IPCS) and environmental health criteria (EHC) series of reports in flame retardant area
- Other HSE Issues in Japan and worldwide like GHS and correspondence to NGO and relevant industry groups.

General committees

➤ **Technical Committee**

- JIS Standards
- Industry Fire Safety Issues
- Technical Seminars
- Plastics Wastes Treatment Association

➤ **Risk Management Committee**

- METI, BSEF-J and Pfric-J
- VECAP program

➤ **International Liaison Committee**

- AFSC, EFRA and CSFR

General functional committees

First, **Technical Committee** is in charge of JIS standards, industry fire safety issues, conducting technical seminars with BSEF-J, liaison with **Plastics Waste Treatment Association**, and other technical oriented associations. In particular, it is in charge of planning and execution of FR technical seminars once or twice a year.

Risk Management Committee

This committee has recently been formed to correspond with the HBCD issues and is making a close liaison with METI, BSEF-Japan and other stakeholders. It is also involved in promoting VECAP activities being initiated in EU. It is to be described in 2nd part of my presentation.

International Liaison Committee

It has been coordinating with AFSC, EFRA and CSFR to exchange relevant FR information and update for all members.

Working Groups

- Halogen Working Group
- Phosphorous Working Group
- Inorganic Working Group
- Distributors Working Group

Also, there are four working groups in the organization:

Halogen working group

Phosphorous working group

Inorganic working group

Distributors working group

FRC-J Objectives

- To conduct research work for updated FR legislative actions and collect relevant information both domestically and globally
- To work on FR safety issues and collect relevant information
- To promote the advocacy work for FR
- To liaise with Japanese governmental agencies and relevant associations for FR
- To liaise with testing institutions and laboratories
- To institute environmental, toxicological and other work programs, as appropriate

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Japanese perspective of environmentally friendly (Green) flame retardants

Background

- Environmental issues and DBDPO concern in Japanese E&E industry
- De-selection of halogenated FRs
- Awareness of Phosphorous FRs risks in METI
- Potential confusion of Japanese E&E industry
- Japanese car manufacturers' concern on selection of FR plastics

Next subject here is Japanese perspective of environmentally friendly (Green) flame retardants

I would like to present firstly about the background of this perspective. Environmental issues and concerns for Decabromodiphenyloxide surfaced in Europe over 20 years ago, and many of Japanese industries have been negatively influenced by global regulatory and non-regulatory actions taken by governmental and non-governmental organizations. In particular, the Japanese E&E (Electric and Electronic) OEMs are being forced to cope with the global unification of material standards for their equipment. As a result, de-selection of many halogenated flame retardants has taken place without any scientific data to back up the emotional decisions made by European groups, who have a strong preference for non-halogens. One group of non-halogen flame retardant alternatives is those developed with phosphorous compounds. Practically, phosphate esters have become large volume flame retardants for E&E and IT equipment housing materials.

Recently, the Japanese governmental agency, METI has been concerned about organic phosphorous compounds in respect with potential risks to human health, such as the "House Sick Syndrome" and "Chemical substance Irritation". It is easy to see why many Japanese E&E OEMs could easily get confused in their selection of flame retardants for E&E equipment. In addition, we now see phosphorous containing compounds confused with other phosphorous containing compounds, such as those used in insecticides. Besides, because of the increased usage of FR plastics for automotive parts, Japanese car manufacturers are also concerned about the environmental assessment of flame retardants.

Halogenated FR compounds

Deca-BDE

- Stopped using PBB, Penta-BDE and Octa-BDE in compliance with EU RoHS
- Have almost been away from using Deca-BDE due to a confusion about its impurity aspect of RoHS and moved to Non-Deca alternatives

TBBA

- Concerned about its additive applications but being replaced with other Br-FRs most likely

HBCD

- Classified into “Type I Monitored chemical substance” by law
- Japan HBCD VECAP program has just started this year

Halogenated FR compounds

Japanese E&E OEMs have stopped using PBB, Penta-BDE and Octa-BDE based upon EU RoHS directives, although there were no regulatory actions on those brominated FRs at that time. In respect to Deca-BDE, most Japanese E&E OEMs have been away from using currently commercialized Deca-BDE, as they believe there is confusion about interpreting the EU RoHS directives in terms of Deca's impurity aspect of 0.1%. It is said that the plastics containing Deca-BDE would contain about 3% Nona-BDE, and have more than 0.1% of impurity in E&E plastic materials. Therefore, Japanese E&E market understands that commercial Deca-BDE is unlikely exempted from RoHS directives as yet. Some of Deca-BDE manufacturers are likely to launch high purity Deca-BDE with assay of around 99.7% so that there should be no more questions on this issue. Yet, most Japanese E&E OEMs have already de-selected Deca-BDE, and have moved to both brominated and phosphorous non-Deca alternatives.

Tetrabromobisphenol-A (TBBA) is being widely used as a reactive flame retardant for brominated epoxy and brominated polycarbonate resins. There is no concern about TBBA used in these applications but Japanese E&E OEMs are somewhat concerned about TBBA's additive applications into resins. Yet, these concerns are not realistic at this point in time as it is being replaced primarily with other brominated compounds.

In Japan, HBCD was classified into “Type I Monitored Chemical Substance” in the Chemical substance Control Law of 2004 as a result of its safety assessment. FRC-J and BSEF-Japan have been working together with the user sectors consisting of textile and polystyrene foam industries and have just started “Japan HBCD VECAP program” to seek the risk management programs for the future.

Phosphorous FR compounds

1) Red phosphorous

- Concerned about phosphine gas generated from burning but it deforms into non-poisonous oxidized compounds
- Surfaced treated ones being used in W& industry

2) Phosphate esters

- Bisphosphates are widely used for E&E/IT equipment as non-halogen alternatives
- Japanese OEMs have been aware of environmental concern on through mass-media

Antimony Trioxide (ATO)

- Concerned about a suspicious carcinogenicity of its powder form but to be cleared as master-batched

Red phosphorous:

It is generally thought that red phosphorous would produce poisonous phosphine gas when burned. However, actually it easily deforms into non-poisonous oxidized compounds at room temperature. Some of surfaced-treated ones are being used for wire and cable applications practically in Japan.

Phosphate esters:

In Japan, Bisphosphates are significantly being used for housing materials of E&E and IT equipment these days, replacing brominated compounds as non-halogen alternatives. Recently Japanese OEMs have been made aware of the environmental questions and potential concerns (emission into the air, VOC and neurotoxicity) of phosphorous compounds as such relevant information is being revealed in the public through mass-media without scientific data. As a result, some of E&E and IT OEMs are now asking FRC-J about its risk assessment for future potential uses.

Antimony Trioxide (ATO)

Antimony Trioxide has historically been used as a synergist for halogenated FR systems. Japanese PVC and brominated FR industries suggest using ATO to increase flame retardant performance. It is said that ATO, in powder form, would become free from that suspicious carcinogenicity concern if it is master-batched or compounded into polymer systems. However, Japanese E&E OEMs are still concerned about voluntary European initiatives, like Blue Angel and TCO, which do not allow for its use, although there are very few satisfactory alternatives.

Conclusion

- FRC-J works for FR advocacy to make relevant information available in public
- FRC-J liaises with all parties concerned for safety and environmental issues of FR chemical substances
- FRC-J supports REACH introduction and copes with globalization of E&E/IT and Auto OEMs
- FRC-J promotes “New Concept of Green FRs”

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Conclusion:

FRC-J has been working intensely for the advocacy of flame retardant use in society, and has contributed to the social understanding of FR chemical substance, in order to make products safer, save lives, and to protect our environment.

Fortunately or unfortunately, an environmental safety for flame retardant chemicals has been heavily verified globally so far and it brings about the most scientifically evaluated data available among various environmentally concerned chemicals. It is sure that such big data base helps REACH introduction, not only in EU but also in Japan as it is said that Japanese government would impose the similar types of chemical substance control law within three or five years.

Japanese E&E/IT and Automotive OEMs must become more sensitive on their REACH enforcement globally. As the demand for flame retardants continues to increase for various polymer systems along with rapidly increasing fire safety, all stake holders must communicate proactively and openly about the risks and environmental concerns around Flame retardants. FRC-J has been promoting the advocacy of “Environmentally Friendly (Greener) Flame Retardants” for relevant industries through the following new concept:

“New Concept of Green FRs”

- **Scientifically proved (Persistence, Bioaccumulation and Toxicity)**
- **Regulatory compliance (Chemical Substance Law, REACH and etc.)**
- **Environmentally Friendly Image (example: High MW, Low volatility, Recycle ability, Historical data pile, Sound disposal, Energy conserved and etc.)**

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