Forward

The Environment and Plastics Industry Council (EPIC) of the Canadian Plastics Industry Association was created to provide support to the plastics industry and its associates in dealing with the matter of plastics in the waste stream. Throughout its history, EPIC has promoted environmentally and economically sustainable methods to deal with plastic solid waste. One of these methods is the mechanical recycling of plastics. To carry out recycling it is necessary that plastics be collected, sorted, transported and reprocessed into valuable commodities of commerce. At each step in this process plastic materials are accumulated and stored. The accumulation and storage of plastics must be carried out using procedures which reduce the risk of the materials becoming involved in a fire.

This booklet is designed to alert companies handling or storing plastics of the requirements of the Canadian Fire Code that may impact on their operations. Its purpose is to demonstrate that fire codes do deal with plastics in a manner that often is very specific.

In most parts of Canada the fire codes, whether they be the National, Provincial or indeed municipal, are referenced in specific legislation and are enforced by the “authority having jurisdiction.”

This booklet is not intended to be a substitute for a fire code nor does it offer an interpretation of a fire code. It is not a document having any standing in law and EPIC assumes no responsibility for its timeliness or accuracy.

Every owner of a company is required to conform to all of the legislation applicable to his operations. This includes local legislation pertaining to fire and its prevention. Information on local requirements is available from the local fire service and Fire Marshal. These officials can provide information on where a copy of the fire code applicable to the region may be obtained.

This booklet references the National Fire Code of Canada, which is available in either hard copy or CD-ROM format from:

National Research Council of Canada
Institute for Research in Construction
1500 Montreal Road
Ottawa, Ontario, K1A 9Z9

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In recent years recycling facilities, storage yards and material recovery facilities (MRF’s) have received negative publicity because of fires. On a number of occasions the occurrence may be linked to contravention of the local fire code and involve:

- Improper practices
- Lax security inviting arson

A number of these fires have resulted in serious consequences:

- Injury to employees, fire fighters
- Loss of property, investment
- Evacuation of local residents
- Damage to the environment.

Public fallout from a fire can continue for years:

- Class action suits are now common in Canada after an event
- Personal injury can result in chronic conditions, very difficult to cure
- Plants can be caused to shut down or relocate.

Damage to the environment may take years to recover and the processes required to remedy the damage might be extremely costly to those held responsible.

**MOST SITUATIONS COULD HAVE BEEN AVOIDED.**

The NATIONAL FIRE CODE is Canada’s model code. Provincial and municipal codes are patterned after it. The fire code comprises a set of technical requirements designed to provide an acceptable level of fire protection and fire prevention within a community.

Fire codes are adopted and enforced by the “Authority having jurisdiction” which in most instances is a province but in some cases a municipality.
• Failure to comply with the code may result in legal action. 

*Insurance Underwriters* also “enforce” compliance through their insurance policies and premiums.

**Fire Safety Planning**

• **Fire code Section 2.8** deals with *Emergency Planning*.

• A **FIRE SAFETY PLAN** is required to be prepared, approved and implemented in a variety of occupancies.
  - *outdoor tire storage yards*
  - *buildings containing a high hazard industrial occupancy, having an occupant load exceeding 25 people* (i.e. waste paper processing)

• **FIRE SAFETY PLANS** should be prepared for **ALL** plants.

Using work conducted by the Office of the Fire Marshal of Ontario we have prepared a *Fire Safety Planning Guide*, which describes in ten steps how to prepare a *Fire Safety Plan* for your operation.

Those who have prepared plans have found them very useful in detecting potential hazards. They have also developed better relations with their fire service, the insurance companies and their local communities.

• The Guide is available free of charge from EPIC.

**Security**

• At recycling and waste handling facilities, many fires have been started after hours by vandals or intruders.
  
  – *Proper security is a necessary part of fire protection.*

• Adequate external lighting shall be maintained to discourage unauthorized access.

• Secure doors and windows are necessary for all buildings. Procedures must be in place to assure that doors and windows are locked outside of regular working hours.

• **Fire Code sent. 3.3.2.6.** An outdoor storage area shall be surrounded by a fence 1.8m high to discourage climbing and unauthorized entry.
  
  – Gates shall be maintained on all access roads onto the site to discourage and prevent unauthorized access.

**Storage**

• Storage requirements for both **INDOOR & OUTDOOR** storage of combustible products and dangerous goods are outlined in *Parts 3 and 4 of the National Fire Code*.

  – Material recovery facilities (MRF’s) and recyclers dealing with plastics are handling combustible products.

• The sections of the fire codes dealing with storage include the short and long term storage of a long list of products, whether raw or waste materials, goods in process or finished goods.

The fire codes specify such requirements as access aisles, clearances, pile size, signage, sprinkler protection, ignition sources and fencing. The requirements are based on the relative hazard or classification of a commodity. The relative hazard or classification of a commodity is a function of both the material and its configuration. For example, a solid block of wood is relatively difficult to ignite and slow to burn. If however the block is split into kindling thus increasing the surface area to volume ratio it burns much more readily.

• Of primary interest to MRF’s and plastic recyclers are:
Class 1 to IV commodities
Group A, B and C plastics
Tires
Combustible fibres (paper)

(i) CLASS I, II, III & IV COMMODITIES

• **Class I:** essentially noncombustible products in ordinary corrugated cartons or paper wrappings, with or without combustible pallets.
• **Class II:** class I products in slatted wooden crates, wooden boxes, multiple thickness paperboard cartons, or equivalent combustible packaging material, with or without combustible pallets.
• **Class III:** wood, paper, natural fibre cloth, or Group C plastics, with or without combustible pallets. Products may contain a limited amount of Group A or B plastics.
• **Class IV:** class I, II, III products in corrugated cartons, containing an appreciable amount of Group A plastics or with Group A plastics packaging, with or without combustible pallets. Group B plastics and free-flowing Group A plastics are also included in this class.

The designation affects the quantity that may be stored and the configuration of the stored material.

(ii) GROUP A, B & C PLASTICS

The rate of heat release (Btu/min or kW/min) for plastic materials can be three to five times greater than that of a similar arrangement of ordinary combustibles. The purpose for classifying plastics is to provide information on the relative heat of combustion (Btu/lb or kJ/kg) and burning rate (lb/min or kg/min) of the plastic. Group A plastics have the highest heat of combustion and burning rate, while Group C plastics have heats of combustion and burning rates which approach those of ordinary combustibles.

• Group A plastics **include, but are not limited to:**
  - ABS, acrylic, butyl rubber, fibreglass, reinforced polyester, natural rubber (if expanded), nitrile rubber, polycarbonate, polyester elastomer, polyethylene, polypropylene, polystyrene, polyurethane, highly plasticized PVC and SBR.

• Group B plastics **include, but are not limited to:**
  - cellulosics, fluoroplastics, natural rubber (not expanded), nylon and silicone rubber.

• Group C plastics **include, but are not limited to:**
  - fluoroplastics, melamine, phenolic resins, **rigid** PVC, and urea formaldehyde.

(a) GENERAL INDOOR STORAGE

Fire code section 3.2.3. applies to the indoor storage of Class I to IV commodities, Group A, B or C plastics and other materials.

It stipulates the maximum individual storage areas permitted with and without sprinklers. In addition it also describes the design and installation of sprinkler systems.

For example the size limits for individual storage areas for **Group A Plastics** in unsprinklered buildings is 250 m$^2$ to a height of 1.5m. For sprinklered buildings the allowance is increased to 500m$^2$ to a height of 6.1m. (Fire code table 3.2.3.2 lists the allowances for other commodities and plastics.)

(b) OUTDOOR STORAGE

The proper storage of materials outdoors is as important as indoor storage. Many arson related fires involve materials stored outdoors. The ramifications of these fires can be very severe. Often the quantity of material involved in the fire is greater than that involved in indoor fires, sprinklers are not available and the standard of outdoor “housekeeping” is poorer than that practiced indoors resulting in difficulty in fighting the fire. The building codes address outdoor storage in a rigourous fashion.

• **Fire code section 3.3 Outdoor Storage** applies to:
  - Class III and IV commodities, and Group A, B and C plastics.
  - Rubber tires.
  - Various forest products and other goods.
• It speaks to:
  – individual storage areas and clearances
  – fire department access
  – fencing, maintenance, ignition sources, portable extinguishers,
    site preparation, fuel dispensing, spill control, etc.

Table 3.3.3.2 in the National Fire Code lists the size and clearances for
individual outdoor storage areas permitted for commodities and classes of
plastics. For example Group A, B and C plastics may be stored in an indi-
vidual area having a maximum base of 1000m\(^2\) and a height no greater
than 3m. Individual storage areas must have a minimum clear space
around each of 6m.

• Fire code Sent. 3.3.2.9 asks for a fire safety plan.

HOT WORK

Hot work involving open flames or the production of heat or sparks,
including cutting, welding, soldering, brazing, grinding, adhesive bond-
ing, thermal spraying and the thawing of pipes is a major cause of uncon-
trolled fires in recycling and waste handling facilities.

• Fire code section 5.2 deals with welding and cutting.
  – 5.2.3.1 (1) Except as provided in sentence (2) hot work shall
    be carried out in areas free of combustible and flammable
    contents, with walls, ceilings and floors of noncombustible
    construction or lined with noncombustible materials.

As hard as this requirement might seem to be, adherence to it provides a
fire safe environment in which to carry out the operation.

• Other keys to safe operations are the proper storage of welding gases,
  the maintenance of hoses and the proper disposal of rod stubs etc.

SMOKING

Smoking is prohibited in the workplace in accordance with municipal by-
laws, provincial regulations and federal statutes.

The fire codes also are not silent on the matter.

• Fire code section 2.4.2 treats the subject. The essence of the code is that:
  – Smoking should not be permitted in areas where combustible
    materials are stored. (Inside and Outside storage areas).
  – Smoking shall only be permitted in those areas approved and
    designated for smoking.

HOUSEKEEPING

Proper housekeeping is of utmost importance in providing a safe work
area. Shops, yards, plants, office, job sites, and work areas shall be kept
neat and orderly at all times.

Poor Housekeeping is often the norm for many recycling and recovery
facilities.

• Poor housekeeping is a major component of employee injury and fire.

• Poor housekeeping is an obvious sign that the storage provisions of the
  Fire Code are not being met.

• Poor management is the only reason for poor housekeeping.
EMPLOYEE TRAINING

• All recycling and materials recovery facility Owners/Operators must ensure familiarity with the Fire Code and the relevant Provincial Occupational Health and Safety Act.

• It is essential that each operation have staff who are trained to respond to a fire emergency in a prompt, positive and intelligent manner.

• Fire prevention is a team effort, which includes everyone involved with the operation of the site.

• The “Fire Safety Planning Guide” published by EPIC which is a companion document to this guide deals extensively with employee training.

FIRE SAFETY PLANNING GUIDE

• As previously mentioned Fire code section 2.8.2 speaks to fire safety plans and what must be incorporated in the plan. Some types of occupancies are required by the code to have plans prepared in cooperation with their fire service.

We believe that every company dealing with plastics should have a Fire Safety Plan for each of its facilities.

To facilitate the preparation of a fire safety plan, the Canadian Plastics Industry Association (of which EPIC is a council) has prepared a Fire Safety Planning Guide for use by any facility. The booklet is obtainable free of charge from CPIA in hard copy or may be accessed on CPIA’s web site www.plastics.ca under Publications – Plastics and Your Health.

The booklet contains:

• Ten Steps to Developing a Fire Safety Plan.

1) Conduct a Fire Safety Audit
2) Appointment and Organization of Supervisory Staff
3) Develop Emergency Procedures.
4) Fire Drill Procedures and Training.
7) Control of Fire Hazards.
8) Fire Dept. Access For Fire Fighting and Related Fire Suppression Information.
9) Preparing Schematic Diagrams and Site Plans.
10) Posting Emergency Procedures and Emergency Phone Numbers.