

# Health and Safety Aspects of Correx<sup>®</sup> Plastics Corrugated Board

## Introduction

The name 'Correx' applies to a range of extruded corrugated plastics sheet based on a propylene ethylene copolymer. The natural polymer is chemically inert and is generally recognised by legislative authorities as being non-toxic and safe to use in contact with foodstuffs. The polymer has been safely used in large quantities for over 25 years in all the normal thermoplastic conversion processes. The Correx sheet itself is more recent; it has been marketed by Corruplast since 1972. This note has been prepared to give information on the potential hazards in handling and processing Correx sheets in all their forms, including sheets containing pigments and UV stabilising additives.

## Effect of heat/burning

Propylene ethylene copolymer is sensitive to oxidation in the presence of heat and/or UV light, and thus all Correx sheets contain anti-oxidants and other stabilisers to improve their heat and light stability. These additives are melt blended with the polymer during granule manufacture and so do not constitute any extra health hazard under normal handling conditions.

### a) Effect of heat

Correx can be handled at normal processing temperatures. Small quantities of fumes are evolved at about 220°C due to a partial volatilisation of some stabilisers and/or of lower molecular weight hydrocarbons. These gradually increase until at about 300°C decomposition and oxidative pyrolysis proceeds at an appreciable rate. The softening temperature for Correx sheet is approximately 144°C and its crystalline melting point is approximately 160—175°C. If for any reason Correx sheet should become molten, and any of the molten polymer come into contact with and stick to the skin, medical attention must be sought immediately.

### b) Burning behaviour

Typical thermal properties for propylene ethylene copolymer are as follows:

Softening temperature (BS 2782: 102D, ISO R306)	144°C
Crystalline melting point	160—175°C
Flash ignition temperature	ca 350°C
Self-ignition temperature	ca 380°C
Calorific value	11000 cal. kg.
Specific heat	0.46 cal gm <sup>-1</sup> °C
Limiting oxygen index (ASTM D 2863)	0.174—0.180
Burn rate — Correx sheet (FMVSS 302)	5.3—8.2 cm/min

When Correx is heated in air above 300°C, decomposition and oxidative pyrolysis takes place. The heat of oxidation may produce a rapid rise in temperature which accelerates the pyrolysis. Under these conditions carbon monoxide, formaldehyde and acrolein are evolved. These evolved gases may ignite. Once ignition occurs sufficient heat will be generated to accelerate further the pyrolysis, thereby releasing further quantities of low molecular weight fractions. Burning will therefore continue, provided sufficient oxygen is present, even if the initial source of ignition is removed. Burning is accompanied by the release of flaming molten droplets of polymer which could ignite other flammable materials which are nearby. Carbonisation also occurs and some of the carbon is released as soot. The main combustion product in flaming conditions is generally carbon dioxide. However, in confined spaces rapid de-oxygenation of the air can occur, resulting in increasing amounts of carbon monoxide.

Appreciable quantities of acrolein and other toxic aldehydes can also evolve over a limited range of temperatures. This pyrolysis is very similar to that of wood and other cellulosic materials though there are differences in detail.

The comments made on the burning behaviour of Correx can only be of a general nature, since the conditions in a fire situation will depend upon many factors, such as location, the presence of other flammable materials and the availability of air, and can never be fully predicted. Should a fire involving Correx occur, however, any commonly available fire extinguisher may be used. It has been found that powder extinguishants are very effective in quenching flames although they do not have the cooling ability needed for a deep seated fire. Water sprays are especially effective in rapidly cooling and damping down a fire, but the use of jets of water in the early stages of a fire is not recommended since they could help to spread the flames.

## Toxicity

Translucent Correx is chemically inert and is generally recognised as being non-toxic.

UV stabilised Correx can also be handled under normal circumstances without any extra health hazard. However, it does not possess food contact approval. The UV stabilising system used is a relatively recent development which is considered to give greater UV stabilising effectiveness compared with other systems.

Pigmented (coloured) Correx contains pigments which are fully compounded into the polymer and encapsulated by it, hence they do not constitute any extra health hazard under normal handling conditions, and are considered suitable for food contact usage. The three exceptions to this are black coloured Correx, fire retardant grades of Correx and conductive grades of Correx which do not possess food contact approval.

## General

### a) Cutting and Granulating

The edges of cut Correx Sheet can be rather sharp. Also when Correx sheet is cut or granulated dust can be generated. Gloves, goggles and dust masks should be worn, particularly when granulating, and working areas should be well ventilated in the vicinity of processing machinery in order to ensure that any dust (or fumes) which may be generated does not exceed acceptable levels. In any case dust should not be allowed to accumulate and a high standard of housekeeping should be maintained.

### b) Smoking eating and drinking

Smoking, eating and drinking in working areas are not desirable practices and should not be allowed.

### c) Packaging and Materials Handling

Correx sheets are generally supplied on wooden pallets with a polyethylene overwrap. The pallets are non-returnable and, in order to keep packaging costs to a minimum, are manufactured from rough timber. Care should be taken to avoid splinters etc. when handling these pallets.

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