



Fire Behaviour and Toxins (page 1)

Fire behaviour

The chlorine content of Foamalite PVC means that it is difficult to ignite and will self-extinguish when the flame is removed. The material will conform to Class 1y of BS 476: Part 7: 1987 for surface spread of flame. PVC raw material is flame resistant. Rigid PVC is flammable with difficulty.

Health and Safety

Rigid PVC is physiologically safe and has no Health and Safety implications.

PVC contains no products likely to give rise to health and safety concerns. In fabrication areas where the product is sawn or otherwise machined there is a possibility of dust generation. Such dust does not present a specific health hazard but good housekeeping with regard to dust collection and control should always be exercised.

Identification

Rigid PVC burns with a greenish-edged flame with some sputtering and a smell of hydrochloric acid (HCl). It is generally self-extinguishing.

Environmental Information

PVC has been attacked by various groups on the basis of environmental performance. Information on the recycling of PVC and PVC and the Environment is available here.

PVC and Dioxin

It is claimed that, when burnt, PVC contributes to the formation of highly toxic dioxin. Dioxins are a group of 75 chemically related materials of widely varying toxicity. Very few people know that dioxins are also widely found in nature.

Dioxins will always be produced in fires where organic substances containing chlorine are involved, i.e. in cigarette smoke, burning wood or burning PVC. Present methods of analysis can now detect dioxins in a concentration of one to a billion. The dioxin traces detected in the waste air from refuse incineration plant present no hazard to man and the environment since the concentration levels fall well below the internationally recognised limit values.

When burnt in the open, the chlorine contained in PVC escapes at temperatures as low as 2000C in the form of hydrogen chloride and is therefore no longer present to form dioxin. However, in the 'cold' section of incineration plants e.g. in the vicinity of the electro filters, dioxin may be produced from unburned carbon if chlorine or chloride, metal salt traces, in particular copper chloride, and oxygen are present at the same time. If one of these components is absent, no dioxin will be produced or any dioxin produced will be destroyed. This is why flue-ash now undergoes after treatment in a new process at approx. 6000C where oxygen is excluded.

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The following points should be noted:

- dioxins may be produced from the burning of any chlorine containing organic substance.
- the presence of PVC has no effect on the quantity of dioxin formed.
- the formation of dioxins can be virtually completely avoided by implementing appropriate precautionary measures at plant level.

In the discussion of dioxin, a number of substances, each exhibiting different properties, are frequently a subject of confusion. A clear distinction should be drawn between the following substances:

- TCDD (2,3,7,8 - tetrachloro-dibenzo-para-dioxin)
- TCP (2,4,5 - trichlorophenol)
- 2,4,5-T (2,4,5 - trichlorophenoxyacetic acid)
- PCP (pentachlorophenol)
- PCB (polychlorinated biphenyls)
- PCDD (polychlorinated dibenzo dioxins)
- PCDF (polychlorinated dibenzo furans)
- TCSS (2,3,7,8-tetrachlorobenzo-para-odioxin)

These are all dioxins and dioxin is only the commonly used term for a group of 75 chemically related substances, which differ widely in their degree of toxicity. This often results in misunderstandings. For instance, there are 22 different types of TCSS alone. Only one of these, 2,3,7,8-TCDD, is the highly toxic 'Seveso dioxin' (referred to below as TCDD only). This mainly occurs in mixtures with other dioxins and, in chemical terms, can only be separated from them with difficulty. In the discussion surrounding dioxins, it is therefore important to specify exactly which dioxin is being discussed.

It has recently become clear that dioxins may also be produced in incomplete incineration processes involving organic substances and substances containing chlorine. This also includes, for example, natural substances such as wood.

Traces of TCDD have probably been present in man's environment since prehistoric times and have only been recently detected due to advances in the analysis methods available.

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