

Poly(vinyl chlorides) (PVC) constitute a major class of synthetic plastics. Many surveys of the voluminous literature have been performed. This report reviews the literature published in English from 1969 through 1984 and endeavors to be more interpretive than comprehensive. PVC compounds, in general, are among the more fire resistant common organic polymers, natural or synthetic.

The major products of thermal decomposition include hydrogen chloride, benzene and unsaturated hydrocarbons. In the presence of oxygen, carbon monoxide, carbon dioxide and water are included among the common combustion products.

The main toxic products from PVC fires are hydrogen chloride (a sensory and pulmonary irritant) and carbon monoxide (an asphyxiant). The LC50 values calculated for a series of natural and synthetic materials thermally decomposed according to the NBS toxicity test method ranged from 0.045 to 57 mg/l in the flaming mode and from 0.045 to > 40 mg/l in the non-flaming mode. The LC50 results for a PVC resin decomposed under the same conditions were 17 mg/l in the flaming mode and 20 mg/l in the non-flaming mode.

These results indicate that PVC decomposition products are not extremely toxic when compared to those from other common building materials. When the combustion toxicity (based on their HCl content) of PVC materials is compared to pure HCl experiments, it appears that much of the post-exposure toxicity can be explained by the HCl that is generated.