

## Detection of Flame Retardants in Foam Packing

### Application Note

Environmental Industry

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### Abstract

#### Easy Detection of Flame Retardants by Pyrolysis GC/MS

In an effort to make some products safer flame-retardants, are added. Unfortunately, some of these are toxic to humans. Brominated flame retardants, for example, widely found in indoor and outdoor environments, are shown to have adverse health effects are banned in the US and EU. Other newly developed additives may yet have unknown health risks.

Blue packing foam was pyrolyzed at 750°C (Figure 1). Pyrolysis fragments polymers into diagnostic pieces, so we can determine what the foam is made from. A diisocyanate peak is an indication that the foam is polyurethane, and the ethers generated suggest that it is a polyether type of polyurethane.

The end of the pyrogram contains a cluster of large peaks, not typically seen in polyurethanes. These include Triphenyl phosphate (TPhP), isopropylated phenyl phosphates, and two brominated compounds, Tetrabromophthalate (TBPH) and Tetrabromobenzoate (TBB). In combination, TBPH, TBB, TPhP and Triaryl phosphate isopropylated (IPPP) are components of the flame retardant mixture, Firemaster 550. Peaks 2 and 3 are likely breakdown products of IPPP (Peak 5).

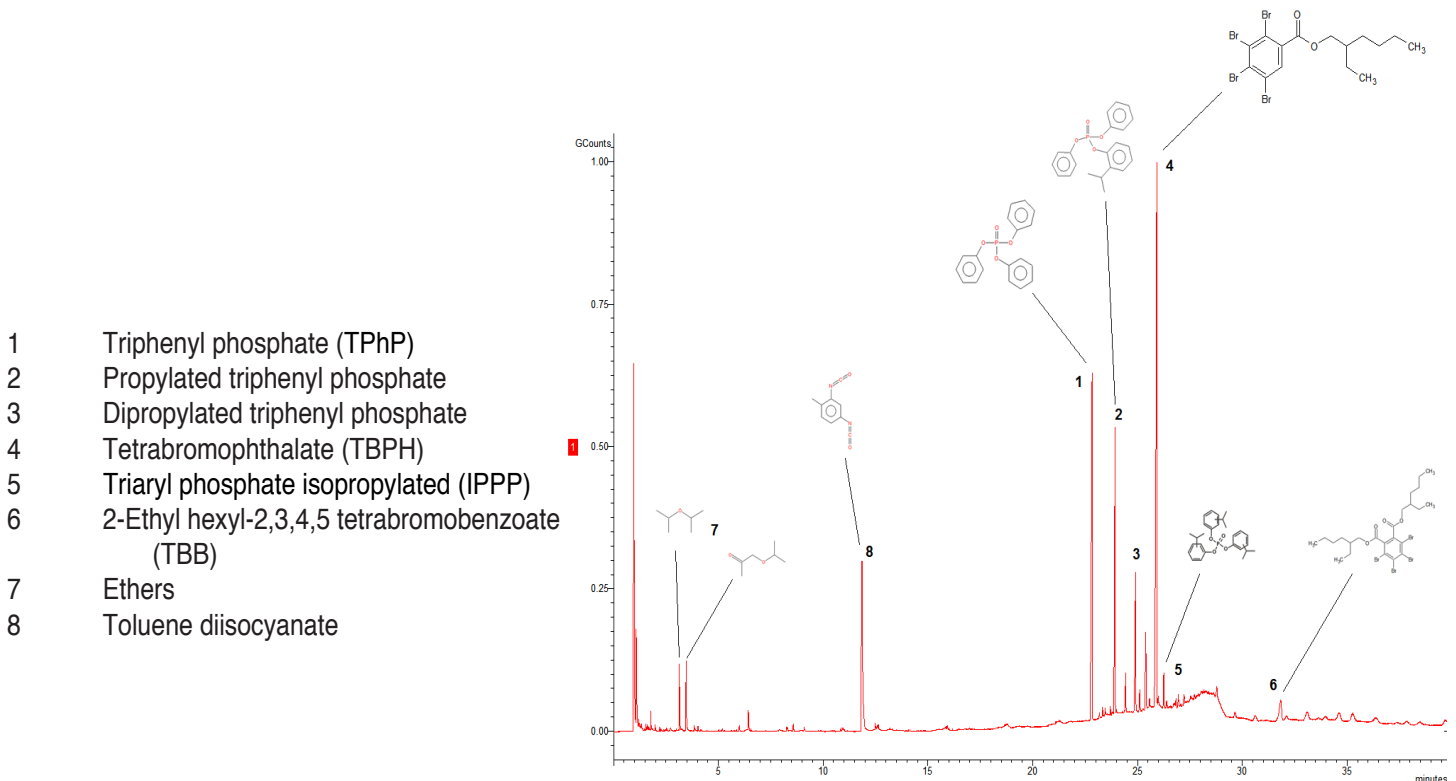


Figure 1: Blue Packing foam, 750°C.

**CDS Pyroprobe Conditions:**

Interface:

Rest: 50°C

Final: 325°C for 3 minutes

Pyrolysis:

750°C for 30 seconds

Iso Zones:

Valve oven: 350° C

Transfer line: 350° C

**GC Conditions:**

GC/MS

Column: 30m x .25µm 5% phenyl

Carrier: Helium, 1ml/min

Split: 50:1

Injector: 350°C

Oven: 40°C for 2 min

10°C/min to 300°C (hold 10 min)

Mass range: 25 to 600 amu