

Abstract

In the project entitled Combustion of Chemical Substances and the Impact on the Environment of the Fire Products, combustions of chemicals from microscale to large-scale have been performed in order to study the relation between results obtained from bench-scale to full-scale tests. The role of SP was to conduct the large-scale indoor combustion experiments.

This report describes the sampling and chemical analyses of smoke gas components for combustions performed in the SP Industry Calorimeter, where continuous measurements of oxygen, carbon dioxide and carbon monoxide are an integrated part of the Calorimeter system. On-line measurements of nitrogen oxides and total amounts of unburned hydrocarbons were performed. Hydrogen cyanide, hydrogen chloride and ammonia in the smoke were sampled and absorbed in impinger bottles and subsequently analysed using wet-chemical techniques. An adsorbent sampling system was designed to allow the identification and quantitation of individual organic compounds in the smoke. Gas chromatography was utilised with a mass spectrometric detector for the identifications and a FID for quantitations of total amount as well as individual components. A procedure for cleaning the smoke gas duct in between the combustion experiments was designed and found to be effective.

The materials studied were Nylon 66, polypropene, polystyrene (with and without fire retardant, respectively), PV and chlorobenzene. A total of 19 large-scale tests were carried out. The mass of sample burned ranged from 20 kg to 125 kg in an experiment.

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Denna rapport beskriver provtagning och kemiska analyser av rökgaskomponenter för förbränning utförd i SP Industri-kalorimeter, där mätningar av oxygen, koldioxid och kolmonoxid fortlöpande är en integrerad del av kalorimeter-systemet.

Gaskromatograf användes tillsammans med en mass-spektrometerdetektor för identifiering och en FID för kvantifiering av det totala antalet och de individuella komponenterna. En procedur för att rena rökgasledningen mellan förbrännings-experimenten tillverkades och befanns effektiv.