FIRE TESTS WITH SMOKE GAS ANALYSIS

In fire testing facilities and on our Test Site for Technical Safety (BAM TTS), application-oriented fire scenarios of various size (from building product to room fires) can be realised.
The smoke-gas composition is determined by a mobile FTIR spectrometer. Components such as CO, CO_2, CH_4, NO_x, HCl, HBr, HF, HCN, acrolein and SO_2 can be identified quantitatively. Scientific evaluation of toxicity is based on the FED (Fractional Effective Dose) model.

Our expertise:
Application-oriented fire scenarios and determination of characteristic values:

- Smoke gas composition (FTIR, paramagnetic and electrochemical methods)
- Particle emission (electrical low-pressure impactor)
- Smoke gas temperatures (thermocouples) and mass loss (combustion scale)
- Evaluation of smoke gas toxicity by the FED model

CONTACT

7.5 Technical Properties of Polymeric Materials
Unter den Eichen 87
12205 Berlin, Germany

Dr.rer.nat. Simone Krüger
☎ + 49 30 8104-3324
+ 49 30 8104-1747
simone.krueger@bam.de

Tina Raspe
☎ + 49 30 8104-4156
+ 49 30 8104-1747
tina.raspe@bam.de

Bundesanstalt für Materialforschung
und -prüfung (BAM)
Unter den Eichen 87
12205 Berlin, Germany

www.bam.de
info@bam.de

BAM
Bundesanstalt für Materialforschung und -prüfung

Sicherheit in Technik und Chemie

SMOKE GAS ANALYSIS

Division 7.5

20180429

SMOKE DENSITY CHAMBER: SMOKE EMISSION

Due to its toxicity, light absorption and scattering properties, smoke is one of the major fire hazards, and affects the escape times of persons who are exposed to it .
The specific optical density of smoke gases of flat material samples is determined by measuring the light transmission in the smoke density chamber.
In a closed test chamber (914 mm x 914 mm x 610 mm) the specimen (75 mm x 75 mm x 25 mm max.) is exposed to either horizontal thermal radiation up to 50 kW/m² (EN ISO 5659-2) or vertical thermal radiation of 25 kW/m² (ASTM E 662). An additional pilot flame is partly applied. The test duration is at least 10 min.

Our expertise:
Standard testing according to EN ISO 5659-2, ASTM E 662, DIN EN 45545-2, as well as preliminary assessment

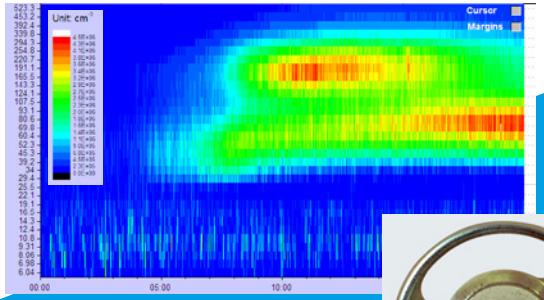
SMOKE DENSITY CHAMBER: FTIR GAS ANALYSIS

Essential characteristic values on smoke gases can be obtained by using the smoke density chamber.
To evaluate toxicity, qualitative and quantitative determinations of the smoke gas composition are obtained by applying FTIR spectroscopy (Fourier Transform Infrared Spectroscopy). For this an FTIR spectrometer is coupled directly with the chamber. The smoke gas toxicity of matererials used in the rail vehicle sector are evaluated by the Coventional Index of Toxicity (CIT) value (EN 45545-2). Therefore after 4 and 8 minutes test time Gas samples are analysed quantitatively by FTIR spectroscopy with respect to the acute inhalation-toxic smoke gas components like CO, CO_2, NO_x, HCl, HCN, HBr, HF and SO_2.

Our expertise:
Standard testing according to DIN EN 45545-2, as well as preliminary assessment, continuous gas analysis

Accreditation: We have the authority to perform the test on the basis of DIN EN ISO/IEC 17025 according to ASTM E 662, EN ISO 5659-2 and DIN EN 45545-2

SMOKE DENSITY CHAMBER: PARTICLE ANALYSIS

In the case of fire, released particles harm the respiratory tract and therefore influence the escape times of persons. To determine the particle emission, a particle analyser (ELPI electrical low pressure impactor) is coupled with the smoke density chamber.
The particle concentration range (per unit volume) and particle size distribution are determined by size-selective and time-dependent measurement in the range from 6 nm to 10 µm.
Furthermore we are able to collect the emitted particles by size (16 nm-10 µm) using a cascade impactor. This provides the opportunity to characterise the chemical composition using analytical methods, e.g REM, RFA, GC-MS.

Our expertise:
Determination of particle emissions according to VDI 3867-6, as well as investigation of the quantity, size distribution and, when applicable, the chemical composition of emitted particles