The complete service offering of TITK and OMPG is listed in the following overview:

Development of compositions and processes

Material testing of...

- plastics / compounds
- plastic parts
- plastic films
- fibre compounds
- foam plastics
- textile area-measured materials / non-wovens
- fibres / yarns / filaments
- leather / leatherette
- polymer solutions
- electrical and electronic equipment with take-back obligation (RohS)

...in the fields of

- physical - mechanical tests / rheology
- chemical analysis (analysis of materials and hazardous substances)
- microscopy
- thermal characterisation
- colour determination
- determination of electrical properties
- optical tests
- particle analysis
- dynamic ESR-spectroscopy

Subsequent processing of materials

- production of non-wovens (needle, wet, spin)
- compound production (pressing, injection moulding, winding)
- film production
- laminate production
- dry, wet and melt spinning
- comminution

Visit us on **www.titk.de** for more details.

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East Thuringian Materials Testing Company

Materialprüfungen

cone calorimeter measurements

possibilities of measurement

co-operation

We would like to offer cone calorimeter measurements to you and/or co-operate with you in a research and development project.
You can profit likewise from the service offer of the East Thuringian Materials Testing Company for Textile and Plastics Ltd. (OMPG ltd.). You can also get accredited test services in this company according to your request. We assure a competent and fast treatment to you.

possibilities

⇒ **simulation of fires** with variable external heat entry

⇒ **estimation of the fire risk** by statements about
- time of ignition
- heat release rate (HRR)
- smoke release rate
- CO- und CO_2 -production
- mass lost

principle of measurement

The heat of combustion stands in direct relation to the oxygen consumption during burning.

$13{,}1 \times 10^3$ kJ correspond to 1 kg O_2.

test standards

ISO 5660
ASTM E 1354

specimen conditions

⇒ homogeneous plate with evenly flat surface
⇒ 100 x 100 x (5 bis 50) mm³

sample test specimen production

injection moulding of plates 100 x 100 x 5 mm³

equipment

Cone calorimeter consisting of:

cone heater, vertical and horizontal
sample holders, vertical and horizontal
weigh cell
spark ignition
suction system
heat flux measurer
oxygen analyzer
smoke densitometer
CO 2 - gas analyzer
CO - gas analyzer
and peripheral equipment

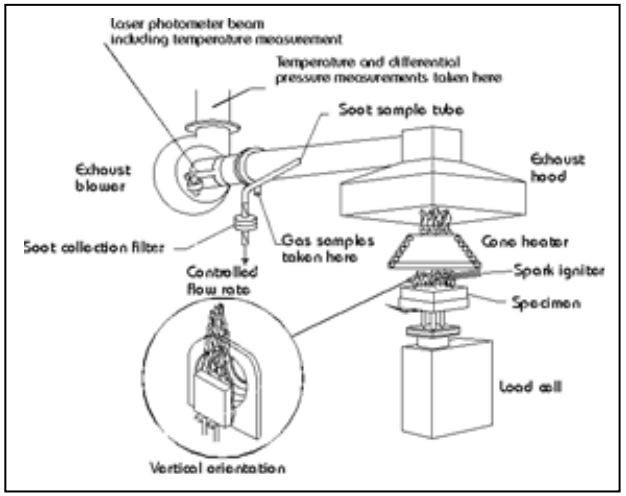


illustration: principle structure of a cone calorimeter

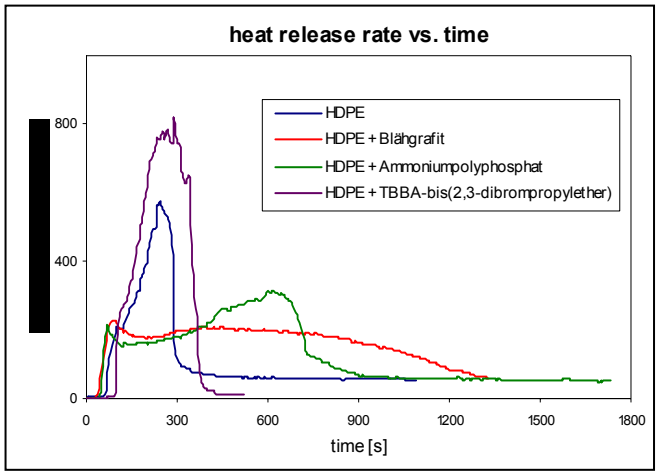
photo: cone calorimeter heater with specimen during measurement

presentation of results

example: Flame Retardation of HDPE

external heat entry = 50 kW/m²

specimen	T_{ig} [s]	Peak HRR [kW/m²]	THR [MJ/m²]	TSR [m²/m²]	CO [kg/kg]	CO_2 [kg/kg]	burning time [s]
HDPE	57	576	125	762	0,48	68	1039
HDPE + expandable graphite	30	228	203	1408	0,25	10	1213
HDPE + ammonium polyphosphate	38	315	207	2623	0,48	19	1614
HDPE + TBBA-bis(2,3-dibrompropylether)	84	822	152	3594	0,64	66	365



legend

Tig - time of ignition
HRR - heat release rate
THR - total heat released
TSR - total smoke released