

CONE CALORIMETER

ISO 5660-1



SCOPE

The Cone Calorimeter is designed to assess the heat release rate and the dynamic smoke production rate of specimens in the horizontal or vertical orientation. Generally all solid materials can be determined on small specimens.

PRINCIPLE

The specimens are exposed to a determined radiation rate and an ignition system. The specimen is heated and the developing combustion gases are ignited. The time it takes to ignite the specimen is captured.

The heat release rate is determined by measuring the oxygen consumption by the oxygen concentration and the flow rate of the combustion product stream.

The dynamic smoke production rate is calculated from the measurement of the attenuation of a laser light beam by the combustion product stream.

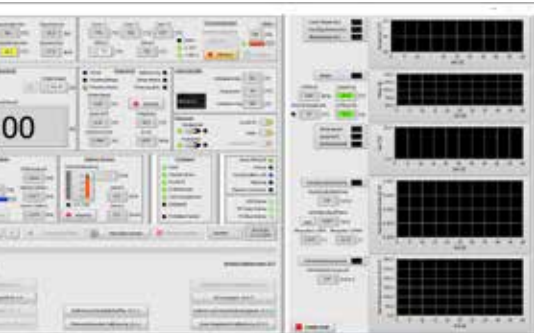
Since mass changes can give evidence on the reactivity of a specimen, the mass loss rate is determined by continuously weighing the specimen

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FEATURES

Wazau Cone Calorimeter can be used to conduct tests in horizontal as well as in vertical position of the heater. The necessary conversion of the device can be done without tools. For this purpose, the heater must only be moved by means of a linear guide and then be tilted.



The device provides almost completely automated test and calibration procedures. Only the set up of the device and the insertion of the specimens have to be done manually. The recording of the measurement data and the calculations according to the standard are carried out automatically, too. These results are output to a measurement file.

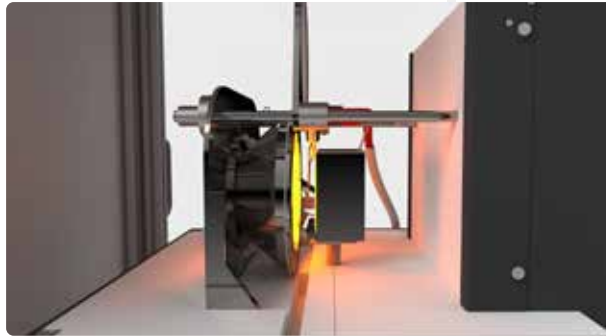
The radiation shield of the Cone Calorimeter is one piece and like the Ignition unit actuated by pneumatic. The one piece implementation of the radiation shield assures the heater is completely covered.

The calibration burner is provided with a flame detection which cuts the gas supply if the burner does not ignite or extinguish. The burner is ignited automatically.

The weighing module is a high quality brand product of distinct precision and long term stability.

The device is equipped with a housing of the test bench. In addition with a cable remote control operation can be conducted without direct contact to the specimens with closed device. The housing features a large angled door which provides comfortable access to the test bench.

The cooling of the heat-flux meter is realized by means of a radiator and a closed cooling circuit, thus no water supply and drain is needed.



SCOPE OF DELIVERY

Cone Calorimeter ISO 5660-1

- ◆ Differential pressure measurement with difference pressure transducer.
- ◆ 2 thermocouples Type-K, Ø 1,5 mm
- ◆ Gas ring probe and gas analyzer for O₂ 2 (paramagnetic) and Co/CO₂ (infrared). Gas analyzer inclusive calibration and test certificate.
- ◆ Smoke obscuration measuring system
- ◆ Weighing module
- ◆ Ambient climate sensors (temperature, air pressure, humidity)
- ◆ Integrated control cabinet inclusive PC.
- ◆ Monitor, keyboard, mouse inclusive bracket.
- ◆ 3 specimen holders and retainer frames
- ◆ 3 Specimen holders vertical
- ◆ Radiation shield
- ◆ 4 gauges
- ◆ 1 pair of protective gloves
- ◆ Replacement igniter

Software

- ◆ Operating system Microsoft Windows 10
- ◆ Cone Calorimeter ISO 5660-1, LabView based

Calibration equipment

- ◆ 2 heat-flux sensors, Schmidt-Boelter type, 0-100 W/m²
- ◆ Radiator with closed cooling circuit for heat flux meter
- ◆ Calibration burner
- ◆ Weights 1 x 500 g, 2 x 200 g, 2 x 100 g, 2 x 50 g
- ◆ Neutral density filter with holder, optical density 0.3 and 0.8, calibrated.

Manuals

HERMOMETRY

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DIMENSIONS

Width x depth x height: approx. 2000 x 800 x 3000 (without Monitor and keyboard)*

Installation space width x depth x height: min. 3000 x 2600 x 3000 mm*

Weight: approx. 400 kg*

SUPPLIES

Electrical voltage 400 VAC 50/60 Hz, power consumption 6 kVA

Methane gas CH₄, purity ≥ 2.5 , input pressure 1 bar

Compressed air, input pressure 4 - 8 bar, free of oil

Nitrogen N₂, purity 5.0

Calibration gas, 5 - 10 % CO₂ percentage and 0,5 - 1 % CO percentage.

SPECIMEN DIMENSIONS

98 - 100 mm x 98-100 mm x max. 50 mm

HEATER

Electrical heater, power consumption max. 5 kW

DIFFERENTIAL PRESSURE MEASUREMENT

Sharp edge orifice $\varnothing 57 \pm 3$ mm, stainless steel, differential pressure transducer, measuring range 0 - 2,5 mbar

GAS ANALYZER



O₂: Paramagnetic type

CO & CO₂: Infrared type

Cold trap, condensate and sample gas pump, flow meters / controllers, filter

Operating temperature +10 – +40 °C

WEIGHING MODULE

Mettler Toledo WMS6002C-L/10, electronic

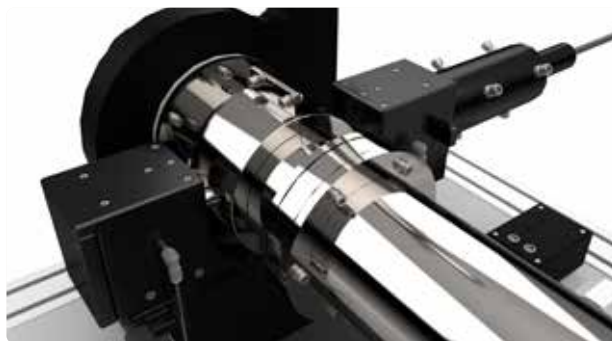
Max. Weight: 6200 g

Resolution: 0,01 g

Linearity: 0,03 g

SMOKE OBSCURATION MEASURING

Helium Neon laser, class 2, 2 receiver diodes, neutral density filters (optical density 0,3 and 0,8), air purging



HEAT FLUX METER

Schmidt-Boelter type, measuring range 0 - 100 W/m², closed cooling circuit with radiator

FLOW CONTROLLERS AND VALVES/GASES

Methane gas calibration burner: electronically controlled flow controller, 2/2 way diaphragm valve, electrical

Compressed air: solenoid valve, flow control via compressed air maintenance unit

Nitrogen: solenoid valve, flow control via cylinder valve

Calibration gas: solenoid valve, flow control via cylinder valve

SENSORS

3 thermocouples type K, heater

1 thermocouple type K, smoke system

1 thermocouple type K, exhaust duct

1 thermocouple type K, calibration burner

Differential pressure measurement with difference pressure transducer

Gas ring probe, according to ISO 5660-1, stainless steel.

Gas analyzer O₂ (paramagnetic type), CO and CO₂ (infrared type) with gas processing (desiccation and filtration)

Optical smoke obscuration measuring system according to ISO 5660-1

2 heat flux meters Schmidt-Boelter type, measuring range 0 - 100 W/m²

Ambient conditions:

Air pressure

Ambient temperature

Air humidity

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EXHAUST GAS SYSTEM



Stainless steel, inner diameter 110 mm,
wall thickness 2 mm
Centrifugal exhaust fan, power consumption
approx. 90 W, heat-resistant up to 300 °C at 2800
rpm and 200 °C at 1400 rpm
Electronically continuously adjustable
Connector DN 200

PC

Integrated to control cabinet, inclusive monitor,
mouse and keyboard.
Operating system Windows 10
Software: MCC DAQ & CONE CALORIMETER ISO 5660-1

SAFETY

Emergency stop
Test bench housing
Flame protection of the calibration burner
via thermocouple.



TO BE PROVIDED BY THE CUSTOMER:

Exhaust duct DN 200
Leveled (deviation max ± 5 mm), fireproof ground

SPATIAL REQUIREMENTS

Temperature test room 15 - 30 °C
Air humidity 20 - 80 %
No other processes withdrawing oxygen from the
test room.

* Our products are under continuous development. For this reason actual values may differ.

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