Technical Specifications

General	
Dimensions	L 550 mm x H 700 mm x W 300 mm
Weight	Approximately 40 kg
Power Requirements (Voltage and Power Consumption)	
Macro-TMA	230 V, 12 A, 50 Hz
Environment	
Operating Temperature	min. 10 °C (50 °F), max. 30 °C (95 °F) recommended: 15 °C – 25 °C (59 °F – 77 °F)
Relative Humidity	max. 80 % (non-condensing) up to 35 °C (95 °F)
Operation	
Measurement conditions	Sample temperature: max. 650 °C Heat Rate: max. 25 K/min Expansion height: max. 150 mm
Sample diameter	Approximately 45 mm
Analysis time	Approximately 45 minutes, depending on the final temperature
Cool-down time	Approximately 70 minutes, depending on the test temperature
Sample load	Max. 1000 g
Reporting	
Software	LabVIEW-based program with result text-file export
Test parameters	All measurement values are stored in the result text-file
Reports	Detailed report of test results, date and time
Safety	
Cooling	Instrument cooling with shop air in case of sensor failure
Various	Programmable Logic Controller (PLC) based

Functional Description

The instrument Macro-TMA is designed for the determination of the swelling behavior of intumescent materials when they are exposed to heat like in case of a fire.

During an analysis the specimen, which is placed in a one-side closed stainless-steel tube, is heated at a user-defined heating rate until the user-defined final temperature is reached. A variable pre-load can be applied to the probe after it has been placed in the tube. The swelling behavior of the specimen is recorded with the help of a linear potentiometer. The temperature of the probe is approximately measured with the help of a thermocouple that is in direct contact with the bottom of the tube. Both, temperature and thermal expansion of the probe are recorded and displayed in the software of the instrument.

Shop air is used to cool down the instrument after the test and to pneumatically clamp down the stainless-steel tube in the instrument chassis during the test.

For ease of cleaning and specimen removal the bottom of the tube can be removed from the tube.