NETZSCH
Proven Excellence.



Fire Testing Systems

Instrumentation and Methods for Investigating the Fire Behavior of Products and Materials

Analyzing & Testing



Product	Heat release	Smoke develop-ment	Flame spread	Flaming droplets	Non-combus-tibility	Ignitability	Burning time/ speed	Time to ignition	Mass loss
KBT 916	x	x	x	x					
SBI 915	x	x	x	x			x		
TBB 913		x	x						
TNB 912					x				
KBK 917						x			
TCC 918	x	x						x	x
TDP 909 T4			x	x		x			
TDP 909 T3			x	x		x			
UL 94 *Supreme*/ UL 94 *Classic*				x			x		
LOI 901									
HBK 919							x		
TRD 908 (A/L/LED)		x							

Fire Testing Systems

For Investigating Nearly Any Kind of Material

Preventive fire protection serves to safeguard life and limb, the environment and public safety. It involves regulations designed to prevent the development and spread of fire so that fire hazards do not occur in the first place. Therefore, devices and systems for testing the fire behavior of products have been increasing in importance in recent times.

For reasons of safety and in accordance with legal regulations, it is essential that products and materials are as flame-retardant as possible. At the same time, it is equally important that a product generates as little smoke and heat as possible in the event that it does ignite. This can help save lives. The main issues which should be taken into consideration in product development are:

- Compliance to local, state, national and international product standards
- Producing low-flammability products
- Preventing product from igniting quickly and burning rapidly
- Knowing how flammable products behave
- Generating the least amount of smoke possible

Heat of combus-tion	Combus-tion gas	Oxygen index	Euro Classi-fication/ Euro fire testing lab	Industry	Standards	Page
				Cables	EN 50399, IEC 60332-3-10	6
			x	Building Materials	EN 13823	7
			x	Floorings	EN ISO 9239-1	8
			x	Building Materials	DIN EN ISO 1182	9
			x	Building Materials	DIN EN ISO 11925-2, DIN 4102-1	10
x	x		x	Building Materials, Automotive, Polymers	ISO 5660-1, ASTM E1354	11
			x	Roofings	DIN CEN/TS 1187 – Test 4	12
			x	Roofings	DIN CEN/TS 1187 – Test 3	13
			x	Electronics, Polymers	UL 94, DIN EN 60695-11, ISO 9773, etc.	14
		x		Polymers	ISO 4589-2, ASTM D2863	15
				Automotive	MVSS 302, GB 8410, IS 15061, CMVSS 302, U.T.A.C. 18-502, FAR 25.853	16
			Mostly integrated	Smoke Density	DIN 50055	17

Fire Testing Prevents Firefighting

IN ACCORDANCE WITH EURO CLASSIFICATION DIN EN 13501 (A1 to F)

Detailed product information and brochures can be found at:

https://netzs.ch/fire-testing

Preventive Fire Protection

In order to prevent fires or keep them from spreading, it is essential to choose materials and components appropriately. The basis for such decisions are fire tests in accordance with national, regional and international standards used to classify the flammability and burn rate of materials for the construction, textile, automobile and electrical industries.

Building Materials of Nearly Any Kind

Especially relevant for the construction industry are the resistance to fire of building components as well as the reaction to fire of building materials, with the resulting parameters of flammability, flame spread, flaming droplets, combustibility, heat release, calorific value, smoke production.

The reaction to fire of nearly any material used for construction, such as facades, building and insulation materials, plastics and floor coverings, can be tested with our fire testing devices.



Mobility

Tests in the field of mobility focus on the flammability and flame spread rate of materials that are used for the interior of vehicles. Such materials include those used to produce the interior lining and trim, seats and floor coverings of aviation vehicles, railed vehicles, road vehicles and ships.

Electrical Industry/Cable

Reactions to fire – especially issues such as flame spread and flaming droplets for electronic and electrical parts, smoke density, insulation integrity and the formation of corrosive gases upon flame impact for electrical, control and data cables – form the basis for fire tests in the field of electrical industry and cable products.

Textile Products

Textile products such as upholstery fabrics, curtains and drapes, decorative materials, floor coverings and protective clothing are primarily tested and classified for flammability, reaction to fire, and dripping behavior. Designed in accordance with the European classification system for these, NETZSCH fire testing systems are based on the standards DIN EN 13501-1 (reaction to fire) and DIN EN 13501-2 (fire resistance).

FLAMMABILITY

FLAME SPREAD RATE

SMOKE GAS DENSITY

FLAMING DROPLETS

COMBUSTIBILITY

HEAT RELEASE

MASS LOSS

KBT 916 – Fire Testing Systems for Cables

Fire Testing System for Measuring the Heat Release, Smoke Production and Smoke Density During Flame Spread Tests on Vertically Mounted Bunched Cables and Insulated Wires in Accordance with EN 50399 and IEC 60332-3-10

Cables and lines are essential for our day-to-day use of electricity and energy. To achieve maximum safety and the best possible fire protection, it is important to have precise knowledge about their fire behavior. The KBT 916 fire testing device determines the heat release and smoke production and helps classify cables into the correct fire class according to the Construction Products Regulation.

For testing, the cable is mounted into a fixture in the test chamber and exposed to a flame for a burning time of 20 minutes. During this time, flame spread and burning droplets are observed. The flue gases emitted during combustion are transferred into an exhaust air duct and into the measuring section for examination.

The KBT 916 features innovative control and data acquisition. The Windows-based KBT software allows for intuitive user guidance and is easy to operate via the integrated high-resolution touch panel. There is no longer any need for common operating elements such as switches or buttons. Evaluation, logging of the test and storage of the measurement is handled entirely via the control unit.

Information Obtained by KBT

- Heat Release Rate (HRR)
- Total Heat Release (THR)
- Flame Spread (FS)
- Flame Propagation Rate
- Fire Growth Rate Index (FIGRA)
- Smoke Production Rate (SPR)
- Total Smoke Production (TSP)
- Smoke Density
- Droplet Count
- Gas Analysis of O_2, CO_2 (CO as option)



SBI 915 – Single Burning Item

Fire Testing System for Determining the Reaction of Building Products to Fire When Exposed to Thermal Attack by a Single Burning Item in Accordance with EN 13823

To assess the fire behavior of building products, the SBI 915 simulates the start of a fire. The results of the SBI test are used to classify the building product (Euroclass). By means of the SBI 915, building products can be measured according to CPR (Construction Products Regulation), with the exception of a few product groups like floorings and cables.

The test unit consists of a test chamber, the test device (specimen trolley, assembly frame, burner, exhaust hood and collector) and the measuring section. A specimen, consisting of two vertical wings forming a right-angled corner, is exposed to the flames of a burner (the main burner) installed at a corner of the base.

Based on the oxygen consumption methods, the oxygen and carbon dioxide content in the flue gas are measured. In addition, flame spread, flammability, and the amount of heat, smoke and gases are determined, as well as whether the product melts, drips or chars.

Information Obtained by SBI

- Lateral Flame Spread (LFS)
- Flammability
- Energy Released (THR Values)
- Fire Growth Rate Index (FIGRA)
- Smoke Production (TSP Values)
- Smoke Growth Rate (SMOGRA)
- Flaming Droplets/Particles
- Gas Analysis of O_2, CO_2 (CO as option)

SBI for classification into fire classes A2, B, C and D!



TBB 913 – Flooring Radiant Panel Tester

Test System for the Reaction of Floorings to Fire in Accordance with EN ISO 9239-1 (Propane Burner) and EN 13501-1, Based on ASTM E648 (Methane Burner)

The fire test in accordance with EN 13501-1 has been mandatory for the approval of flooring products in European countries for several years now. The American standard is very similar to the European standard, but is based on a methane burner. All types of flooring products, e.g., carpets, wood, cork and plastic coverings, can be tested.

The TBB 913 is used to simulate the probable degree of stress that is exerted on a floor in a corridor using a radiator. Flames and/or hot gases are assumed to be present in the early phase of fire development in an adjacent room or section. The intuitive TBB software allows the recording of all relevant measured values. Measurement processes can be tracked and results displayed, saved, exported and logged in various formats.



Information Obtained by TBB

- Flame propagation distance over time
- Smoke gas density as a function of time
- Critical heat radiation

For classification into the European fire classes for floorings $A1_{fl}$ - F_{fl}

TNB 912 – Non-Combustibility Test Device

Fire Testing Device for Non-Combustibility Tests on Building Products with Electrical Tube Furnace in Accordance with EN ISO 1182, ASTM E2652 and IMO FTP Code Part 1

The TNB test identifies which building products contribute very little, if at all, to the progression of a fire. Based on these results, the appropriate building product for a structure can be selected. Testing of non-combustibility serves for classification into the European fire classes A1 and A2.

The "TNB measuring and control unit" – with its integrated Single Board Computer with Windows operating systems. TNB software and high-resolution color touch display – is used for setting parameters and controlling the test furnace in stand-alone mode. Automated digital control and monitoring for exact linear heating of the furnace ensures a long service life of the heating element.

Numerous interfaces enable connectivity to peripheral devices for the fast and convenient export and transfer of data. Connection to an external PC or notebook allows for extensive data analysis and printing of test reports as per the relevant standards.



Information Obtained by TNB

- Non-combustibility of homogeneous products and substantial components of non-homogeneous products
- Mass loss
- Inflammation
- Temperature rise



KBK 917 – Small Burner Box

Fire Testing System for Determining the Ignitability of Building Products Subjected to Direct Impingement of Flame – Part 2: Single-Flame Source Test in Accordance with DIN EN ISO 11925-2 for Classification into Euroclasses B, C, D and E

The DIN EN ISO 11925-2 standard specifies a test method for determining the flammability of products in a vertical arrangement, applying a small flame directly and without additional heat irradiation. By means of additional accessories, the KBK can also be used for tests in accordance with DIN 4102-1.

During a test in the small burner box, the building material is exposed to a simulated match flame. Under this stress, flame spread and flammability must be limited within a defined time; if this condition ist met, then the test is considered to have been passed.

The small burner box is ideal for testing insulation boards and materials, foils, fabrics, construction panels and plastic panels. Its high-quality manufacturing ensures minimal cleaning and maintenance efforts and a long service life.

Information Obtained by KBK

- Inflammability
- Height of the flame front and time at which the flame front exceeds 150 mm above the ignition point
- Burning droplets



TCC 918 – Cone Calorimeter

Fire Testing System for Determining the Heat Release Rate, Dynamic Smoke Production and Mass-Loss Rate of Materials and Products According to the Oxygen Consumption Principle in Accordance with ISO 5660-1 and ASTM E1354

The Cone Calorimeter is considered the most significant instrument in fire testing. It analyzes the heat release rate and the dynamic smoke production of a product, and is based on the principle that the amount of heat released by the burning sample is directly related to the amount of oxygen consumed during forced combustion.

The amount of heat produced by a material is directly related to the severity of of a fire, expressed, for example, by its rate of spread. To test the flammability of a material, it is exposed to an external radiant heat coure during testing in the Cone Calorimeter.

The TCC monitors the development of fire from a very early stage. The ability to predict fire behavior on a real scale allows for the safe evacuation of buildings, airplanes, cars and boats in case of emergency.

The TCC 918 works in accordance with all established standards, including ISO 5660-1, ASTM E1354, ASTM E1474; ASTM E1740, ASTM F1550, etc.

TCC 918 Tests – Data Source for Predicting Real-Time Fire Behavior

- Ignition Time (TOI)
- Time of combustion or extinction (TOF)
- Mass-loss rate
- Measurement of gas concentration for calculation of the amount of heat released
- Heat release rate (HRR)
- Combustion products (CO and CO_2 quantities)
- Transmission and smoke gas density
- Total smoke release (TSR)
- Prediction of the real-scale fire behavior
- Identification of toxic gases, released during combustion by coupling with the Bruker Omega 5 FT-IR system (optional)



BUILDING MATERIALS, AUTOMOTIVE, POLYMERS

TDP 909 T4 – Fire Testing Device for Roofs

For Determining the Performance of Roofs When Exposed to External Fire – Test 4 in Two Stages Incorporating Incendiary Devices, Wind and Supplementary Radiant Heat in Accordance with DIN CEN/TS 1187

Information Obtained by TDP 909 T4

- Flame spread on the roof surface
- Burnt length
- Burning/falling droplets
- Penetration of burning/glowing parts through the roof stucture
- Glowing behavior of the roofing
- Formation of holes in the roofing
- Radius of fire spread on flat roofs



For the building industry, fire behavior including flammability and flame spread is of major importance. With the TDP 909 T4 testing device, the behavior of roofs when exposed to external fire loads can be determined.

The DIN CEN/TS 1187 standard specifies four test methods for determining the fire behavior of roofs when exposed to external fire. The TDP 909 T4 allows for a test in accordance with test method 4.

This two-step method assesses the fire behavior of roofs using incendiary devices, wind and supplementary radiant heat. The fire is simulated via a burner lance and the radiant heat via a heater panel, consisting of four heater elements. The TDP 909 T4 test evaluates the fire spread on the roof surface. In addition, it is determined whether and how fire penetrates the roof and the extent to which falling and burning materials are generated on the surface and/or underside of the roof.

TDP 909 T3 – Fire Testing Device for Roofs

For Determining the Performance of Roofs When Exposed to External Fire – Test 3, Incorporating Incendiary Devices, Wind and Supplementary Radiant Heat in Accordance with DIN CEN/TS 1187

Information Obtained by TDP 909 T3

- Flame spread on the roof surface and inside the roof
- Burning distance as a function of time
- Burning/falling droplets
- Penetration of the roof structure by flames
- Smoldering and glowing behavior of the roofing

The TDP 909 T3 enables a test in accordance with test method 3 of the standard DIN CEN/TS 1187.

The burning behavior of roofs is evaluated by incendiary devices, wind and supplementary radiant heat. During the T3 test, a fire is simulated with a roof construction. Along with the fire spread on the surface of the roof and within the roof structure, penetration of the roof by the fire and the extent of burning droplets and burning parts are also investigated.



UL 94 *Classic/Supreme* – Fire Testing System

Test Device for Flammability of Plastics for Parts in Devices and Appliances in Accordance with UL 94, 5th and 6th Edition, EN 60695 Part 11-10, EN 60695 Part 11-20, EN 60695 Part 11- 3, EN 60695 Part 11-4, ISO 9772, ISO 9773 and many more EN, ASTM and ISO standards

The UL 94 test enhances the safety of using plastic materials and electronic components.

The electrically driven spindle system for positioning the burner for horizontal and vertical tests facilitates handling of the UL 94 *Supreme*. The touch screen that is integrated into the test system additionally offers optimum intuitive user guidance.

The UL 94 *Classic* is the manually operated alternative to the UL 94 *Supreme*. This fire testing device operates with the same technical precision and standard compliance as the *Supreme* model. It offers reliable performance at a more affordable price.

All tests are carried out in accordance with the UL 94 standard and the corresponding international ASTM and ISO standards.

Information Obtained by UL 94

- Linear burning rate
- Afterburning and afterglow time
- Falling burning droplets
- Flame front
- Total afterburning time with flame
- Afterburning time with flame plus afterglow time



UL 94 *Classic*



UL 94 *Supreme*

	Classic	*Supreme*
Operation	Fully manual	Semi-automatic with electric spindle system
Control	Mechanical control via front panel	Touch display with software interface
Calibration	Manual calibration	Processor-controlled
Chamber interior	Black walls for improved visibility	Black insulated walls for improved visibility
Axis movement	Manual X/Y/Z axes	Electric Y/Z axes I manual X
Timing/Flow control	Manual or external	Processor-controlled
Best suited for	Training, QC, and routine testing	R&D and high-throughput labs

LOI 901 – Oxygen Index Analyzer

Testing System for Determining the Burning Behavior of Plastics by Oxygen Index at Ambient Temperature in Accordance with ISO 4589-2 and ASTM D2863

With the help of LOI fire testing device (LOI = Lowest Oxygen Index), the burning behavior of polymers is determined by the oxygen index.

Compact and lightweight, the device features a high-resolution touch display for intuitive user guidance. The fully automatic calibration and testing functions make it easy to operate the LOI.

All relevant data such as temperature, flow rate and time are displayed during the test. Except for the test gases (O_2/N_2) and the burning gas, all necessary accessories for performing standard tests are included in the scope of delivery.



Information Obtained by LOI

- Limited oxygen index, minimum oxygen concentration at which combustion of the test specimen becomes possible
- Flammability of plastics
- Burning time
- Burning distance

HBK 919 – Horizontal Burner Box

Testing Device for Determining the Reaction to Fire of Materials Used for Vehicle Interiors When Exposed to a Single Flame Source in Accordance with ISO 3795, DIN 75200, FMVSS 302, GB 8410, IS 15061, CMVSS 302, U.T.A.C. 18-502, FAR 25.853 (horizontal, aircraft interiors, ECE R 118, Annex 6)

Even more safety for the use of materials for interior fittings in the automotive and aircraft industries!

Well thought-out details along with the use of high-quality materials guarantee the HBK system an extended product life while reducing wear and tear, lessening the need for cleaning and maintenance, increasing safety and greatly simplifing day-to-day work at the lab.

In addition, the HBK complies with the different vehicle manufacturers' factory standards (see table).

Brand	Factory Standard
BMW	GS 97038
Daimler	DBL 5307.10-13
Ford	FLTM-BN 24-2
General Motors	GM 6090 M
Mazda	MES DF 050D
Mitsubishi	ES-X60410
Porsche	PTL 8501
Renault	D45 1333
Volvo	VCS 5031,19
VW	VW TL 1010
Hyundai/KIA	MS 300-80



Information Obtained by HBK

- Horizontal burning rate
- Burning distance



Sample holder with support wires in accordance with ISO 3795

AUTOMOTIVE

TRD 908 (A/L/LED) – Smoke Density Test Devices with Light Measurement System

Test Devices for Determining the Smoke Production of Materials During Thermal Decomposition in Accordance with DIN 50055, ISO 3182 and ISO/TS 19850

The TRD white-light test device determines transmission and calculates the smoke and fog density at known volume flow. There are three versions of the TRD, which differ only in their light sources: The TRD 908 A uses halogen light; the TRD 908 L uses a helium-neon laser; and the TRD 908 LED uses LED technology.

The TRD LED light measurement system complies with the ISO/TS 19850:2022 standard. It offers a longer lifespan, lower energy consumption and more stable light output, reducing recalibration needs.

The TRD 908 – thanks to its integrated Single Board Computer with Windows operating system, TRD software and high-resolution color touch display – can be used in stand-alone mode for setting parameters and determining optical transmission. Various interfaces and analog outputs enable connectivity to peripheral devices for fast and easy export of data.

Optional accessories allow for use of the light measurement system on various types of exhaust duct systems and greatly simplify calibration, operation and cleaning of the components.

It can be operated as a standalone unit or be integrated into systems such as the NETZSCH SBI 915 and TBB 913.

Information Obtained by the TRD 908

- Relative light transmission
- Smoke or fog density (at known volume flow)

Use in stand-alone mode for setting parameters and determining optical transmission!



TRD

Additional Fire Testing Systems

TSP 905 – Smoldering Testing Device

This testing system with one burner in accordance with DIN EN 16733 serves for determining a building product's propensity to undergo continuous smoldering. The standard is valid for all building components which are classified in accordance with EN 13501-1.

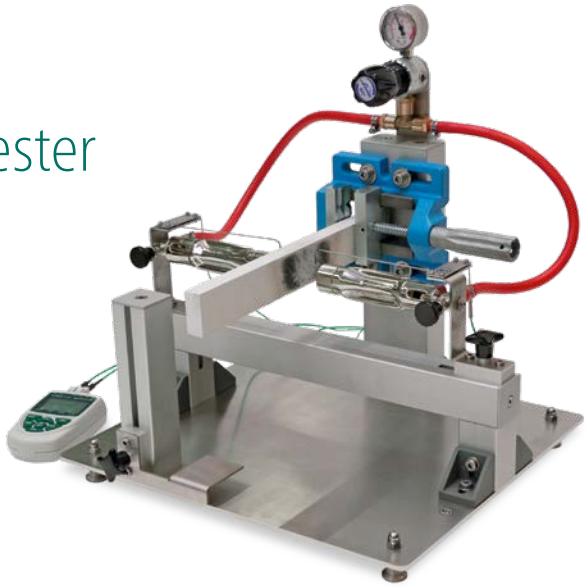




TSK 906 – Single Cable Test Device

This testing system with a 1 kW burner in accordance with EN 60332-1-2 is used to determine the vertical flame spread on a conductor core, an insulated conductor, or a cable. In addition, the system allows the evaluation of flaming or glowing droplets/ particles under defined fire conditions. The standard applies to electrical wires and cables, including optical fibre cables, tested in accordance with EN 60332-1.

FRG 903 – Structural Cohesion Tester for Gypsum Products



The FRG tester is a fire-resistant system with two burners in accordance with DIN EN 520. The standard specifies the performance characteristics of gypsum boards for use in buildings. Among other things, it defines specifications for the fire behavior, water vapor permeability, bending tensile strength, impact resistance and thermal resistance of the material.

SBK 902 – Burner Box for Toys



Security and health safety are decisive factors for determining the quality of toys. The SBK test equipment determines the fire behavior of beards, mustaches and wigs made of hair, hair-like material or materials with similiar characteristics in accordance with DIN EN 71-2. It tests the flammability of toys when exposed to direct flames.

Additionally, NETZSCH offers custom-built fire testing systems and accessories designed to precisely meet your requirements. Our systems range from modified sample holders, test chambers to entirely new developments for special materials, dimensions or environments.

Moreover, we can customize the instrument software for test procedures and reports according to your requirements.

The owner-managed NETZSCH Group is a leading global technology company specializing in mechanical, plant and instrument engineering.

Under the management of Erich NETZSCH B.V. & Co. Holding KG, the company consists of the three business units Analyzing & Testing, Grinding & Dispersing and Pumps & Systems, which are geared towards specific industries and products. With over 4,600 employees in more than 200 global production, sales and service companies, the NETZSCH Group has been offering its customers proximity and competent service for over 150 years.

When it comes to Thermal Analysis, Calorimetry (adiabatic & reaction), the determination of Thermophysical Properties, Rheology and Fire Testing, NETZSCH has it covered. Our 60 years of applications experience, broad state-of-the-art product line and comprehensive service offerings ensure that our solutions will not only meet your every requirement but also exceed your every expectation.

Proven Excellence.

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