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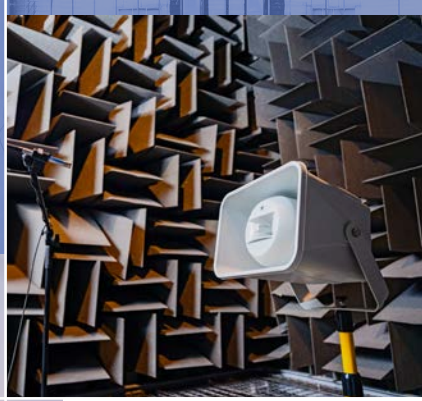
Instytut Techniki Budowlanej

Testing and expertise



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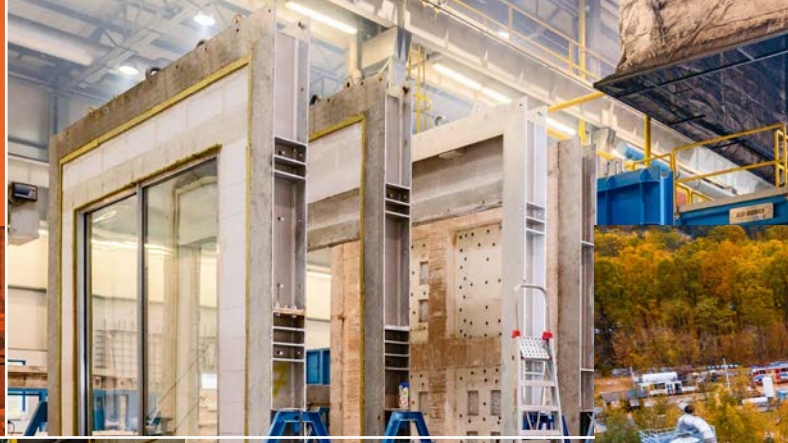
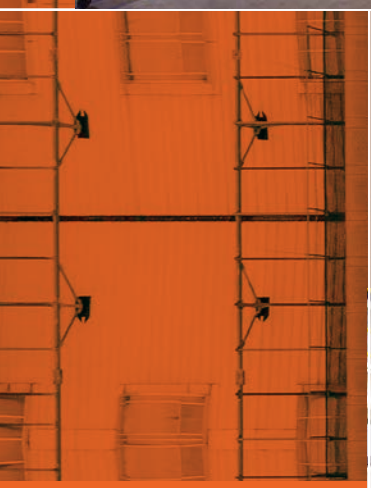
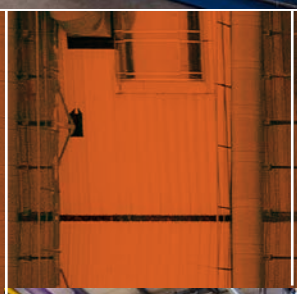
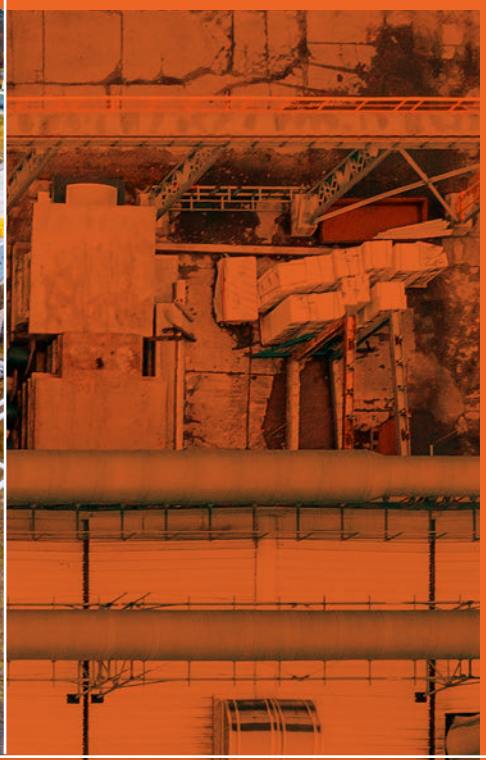




Fire Research Department

- fire safety of construction works
- fire safety of components
- reaction to fire of materials and products
- fire spread indoors and outdoors
- electrical engineering issues with voltage up to 24 kV
- development of design assumptions and assistance in designing buildings, tunnels, underground stations, stadiums and other civil engineering works
- inspections of systems and acceptance of works related to the fire safety of building structures

Tests and expert works

FIRE SAFETY

- assessment and classification of reaction to fire
- assessment and classification of fire spread
- evaluation and classification of fire resistance of building structures
- evaluation of fire safety system efficiency in buildings and civil engineering works
- evaluation of durability of fire protection systems in structures
- expert opinions and assessments of fire protection of existing and new buildings and building structures
- evaluation of existing or required solutions related to fire protection
- evaluation of smoke control systems
- numerical calculations of smoke and heat propagation
- numerical calculations of fire temperature distribution in time
- evaluation of fire protection performance of smoke control ducts

FIRE DETECTION SYSTEMS

- evaluation of design solutions
- tests and assessment of alarm systems
- tests and assessment of fire detection systems
- assessment of interactions with related ventilation and air-conditioning systems

Fire Testing Laboratory

- construction products and components of buildings such as walls, ceilings and roofs, beams, posts, stairs, balconies, suspended ceilings and ceiling cladding, shielding walls, doors and windows, ventilation ducts, fire dampers, sealing of system passages, sealing of linear joints (also with displacement), glass panes and system ducts, raised floors, conveying systems and their closures, smoke control ducts, smoke curtains, smoke dampers, smoke control fans
- fire protection systems of building structure components
- fire protection of wood and wood-based materials
- reactive products, elastic finishing products and fabrics, armchairs and seats
- electrical cables, ensuring continuous supply of power and signals
- electrical cables, cable strips and installation tubes for cables within fire reaction and toxicity of decomposition and combustion products
- lift stop doors, cabinets for flammable liquids, cabinets for compressed gas vessels, drywalls
- fire detection and communication devices based on EN 54 requirements (e.g. heat detectors with R and S index, autonomous detectors, aspirating fire detectors)
- carbon oxide detectors
- components for smoke and heat control systems according to EN 12101 standard series
- components for fixed firefighting systems according to EN 12094 standard series
- components of electrical systems, electrical equipment of buildings and cable routes
- sound warning system units and loudspeakers
- fire alarm broadcasting systems

Fire Research Department

tel.: (+48 22) 853 34 27
e-mail: fire@itb.pl
02-656 Warszawa, ul. Ksawerów 21

26-670 Pionki, ul. Przemysłowa 2

We identify the following:

- reaction to fire classes of construction products (including a complete set of tests for European classification)
- classes of external fire performance of roofs according to three European methods
- fire spread of building elements
- fire-resistance classes of structural and non-structural elements of buildings at loads according to a standard, hydrocarbon and tunnel curve and other temperature increase scenarios
- fire-resistance classes of elements of building systems and smoke curtains, smoke dampers and smoke control fans
- classification of fire doors
- efficiency of fire protection systems in building structural elements
- combustibility of construction products and components, including elastic products, textile fabrics and furniture
- toxicity of combustion products and smoke-generating properties of materials
- expansion ratio and expansive pressure of fire protective products
- high temperature core cohesion test
- continuous supply of power and signal by electrical systems, fire reaction of electrical products and density of smoke released by burning wires or cables, and acidity of combustion gases of electrical cable materials
- fire-resistance classes of road traffic noise-reducing devices due to scrub fire
- resistance and durability against environmental, climate and mechanical loads (vibrations, collision, single impact, corrosion)
- resistance to electromagnetic compatibility interference (voltage dips, decreases and fluctuations, static electricity discharge, electrical fast transient/burst immunity, voltage surges, impact of electromagnetic fields of radio and other frequencies)
- activation threshold of fire detectors of all kinds
- usability of fire detectors
- full functionality of fire automation and detection equipment
- properties of electrical equipment of buildings and electrical systems, including:
  - electrical resistance and insulation resistance
  - electric circuit continuity
  - IP degree of protection

The new test facilities (furnaces) for fire-resistance testing enable the handling of vertical items up to 10 m wide and 7 m high, and horizontal items with a span of up to 11.35 m. Moreover, tests of fire propagation through external walls under fire impact from outside are carried out all year round.

Within notification, we specify fire classifications for CE marking in relation to fire reaction, resistance of roofs to external fire, fire propagation and fire resistance.

Thermal Physics, Acoustics and Environment Department

- building thermal physics – heat and moisture exchange in buildings and building components; rationalization of energy use in buildings and their heating, ventilation and air-conditioning systems
- acoustics – basics of building acoustics and methods of acoustic measurements and calculations, including:
  - indoor acoustics
  - acoustic assessment of the noise sources in buildings, assessment of the acoustic quality of buildings (acoustic comfort of residential buildings)
  - assessment and development of acoustic performances of new material and structural solutions for construction works and elements
- environment – impact of construction products on indoor air quality, assessment of products and buildings which meet the criteria of sustainable development, life cycle assessment
- heating, ventilation and air-conditioning systems aimed at ensuring their durability, safety, operating efficiency and comfort of use; sewage water, precipitation water, rationalisation of energy use in buildings and its technical systems

Tests and expert works

THERMAL PHYSICS

- static and dynamic thermal calculations for windows, doors, partitions and facades
- assessment of heat and moisture characteristics of insulation products
- heat and moisture characteristics of partitions, rooms and buildings
- guarded hot box tests
- evaluation of the technical conditions of heating, ventilation and air-conditioning systems
- evaluation of system design solutions in construction works
- origins of mould formation on surfaces
- evaluation of energy efficiency of buildings
- methods of evaluating the optimum life-cycle cost
- temperature distributions on the surface of objects including thermovision

ACOUSTICS

- sound insulation of building partitions
- acoustic characteristics of building elements and construction products
- acoustic absorption characteristics of building components and equipment
- dynamic stiffness, absorption coefficient, insulation
- acoustics in buildings

HEALTH AND ENVIRONMENTAL PROTECTION

- emission of dangerous substances from construction products
- assessment of air pollution in buildings
- assessment of air pollution with dust and asbestos fibres
- air purity classes
- inspection of asbestos-containing products in building structures
- odour detection

SUSTAINABLE CONSTRUCTION

- environmental product declarations (EPD) according to PN EN 15804 and ISO 14025
- verification of single-parameter environmental declarations for products and technologies according to PN-EN ISO 14021
- evaluation of construction products' carbon footprint according to ISO 14067
- LCA and LCC calculations for products and buildings
- indoor air quality tests (VOC, formaldehyde) for BREEAM and WELL purposes
- testing the acoustic comfort of buildings, including tests for BREEAM purposes (or acoustic acceptance of buildings)
- classes of emissions from construction products (VOC and dust)
- environmental assessment of new technologies

VENTILATION

- testing of ventilation ducts' technical characteristics
- expertise of ventilation and air-conditioning in buildings
- rationalisation of energy use in buildings
- design and implementation issues

Laboratory of Thermal Physics, Acoustics and Environment

THERMAL PHYSICS

- thermal insulation materials
- windows, doors, roof windows, skylights, manholes, gates, glass units
- sandwich panels
- walls and wall components, masonry mortars
- metal and glass shielding walls
- supply air terminal devices
- pre-insulated pipe systems
- products for thermal insulation in civil engineering and products of thermal insulation of building equipment and industrial systems, including products made of EPS, XPS, PUR/PIR, MW, FEF, CG, CS, PEFPF and biobased

We identify the following:

- thermal conductivity of materials and products
- thermal resistance and heat-transfer coefficient (by means of heat-flow computer simulation or in a test rig)
- characteristics related to water vapour transport, water vapour absorption at long-lasting diffusion by thermal insulation products, e.g. flat roofs and terraces with a reversed arrangement of thermal insulation and water protection layers and foundation walls
- humidity, moisture absorption and desorption, absorbability
- resistance to freezing and thawing
- dimensions, dimensional stability under fixed or laboratory temperature and humidity conditions
- behaviour of thermal insulation products at compression, bending, spot loading, and tensile strength perpendicular to the face
- density, including bulk density
- net volume and percentage share of hollowing in masonry items
- water tightness and air permeability of products and flow characteristics of air inlets

ACOUSTICS

Acoustic parameters under laboratory and field conditions:

- construction items, including: wall and ceiling partitions, roofs, doors, windows, ventilation items, glass packages, floating floors, lightweight floor systems, carpets, access floors, suspended ceilings and noise barriers
- sound-absorbing materials and systems, interior design objects and equipment

Acoustic conditions:

- in residential buildings, multi-family and public buildings, including: technical rooms, systems and elements of technical equipment in buildings
- in rooms with qualified acoustics

We identify the following:

- properties of insulating materials
- sound insulation from airborne and impact sounds of building components and partitions
- sound absorption coefficient of sound-absorbing materials and systems
- acoustic parameters of noise barriers
- dynamic stiffness of elastic materials used in floating floors
- flow resistance of porous materials
- reverberation time and other parameters which characterise reverberation conditions in rooms with qualified acoustics, noise level in rooms
- efficiency of acoustic protection

Thermal Physics, Acoustics and Environment Department

tel.: (+48 22) 56 64 276
(+48 32) 73 02 925
e-mail: fizyka@itb.pl
tel.: (+48 22) 56 64 276
e-mail: energia@itb.pl
tel.: (+48 22) 56 64 311
e-mail: akustyka@itb.pl
02-656 Warszawa, ul. Ksawerów 21

tel.: (+48 22) 56 64 311
e-mail: chemia@itb.pl
00-611 Warszawa, ul. Filtrowa 1

tel.: (+48 32) 73 02 925
e-mail: akustyka@itb.pl
40-153 Katowice, al. W. Korfantego 191

CHEMISTRY AND ENVIRONMENT

- evaluation of emissions and content of substances in materials and construction products
- indoor air pollution

We identify the following:

- VOC emissions
- formaldehyde
- chlorobenzenes
- vinyl chloride
- acrylonitrile
- pentachlorophenol
- volatile components of bitumen and its chlorine-based derivatives
- isocyanates
- unsaturated monomers and solvents
- phthalic acid esters
- asbestos content and type
- asbestos fibres contaminant levels
- air purity classes
- characteristics of domestic sewage treatment plants

ENERGY AND ENVIRONMENTAL EFFICIENCY

- ventilation ducts characteristics
- ventilation systems characteristics
- hygrothermal analysis in buildings and buildings components trans
- analysis of optimum cost and life-cycle cost
- LCA and LCC for products and buildings (EPD)








Building Elements Engineering Department

- load capacity and stability of product
- safety in use criteria of product
- hygiene, health and environment (including the indoor comfort)
- tightness and strength of product
- property security - assessment of construction products in accordance with burglar resistance

Tests and expert works

WINDOWS, DOORS, GATES, SHUTTERS AND BLINDS

- tightness and strength assessment of product in the scope of class determination
- assessment and classification of mechanical durability and functionality
- assessment and classification of mechanical strength
- assessment and classification in terms of burglar resistance
- assessment of doors for escape routes
- climate tests
- tests at the place indicated by the client (including site tests)
- static numerical calculation
- confirmation of usability
- assessment of the installation correctness and assembly

CURTAIN WALL, INTERIOR NON-LOAD BEARING WALLS, FACADES AND PHOTOVOLTAICS

- tightness and strength assessment of product in the scope of class determination
- assessment and classification in terms of durability and safety in use
- tests and numerical assessment in the scope of horizontal loads
- assessment in the scope of the thermal and humidity action
- assessment and classification in terms of burglar resistance
- tests at the place indicated by the client (including site tests)
- static numerical calculation
- confirmation of usability
- assessment of the installation correctness and assembly
- repair recommendations and monitoring
- acceptance of works

ROOFLIGHTS AND CONTINOUS SKYLIGHTS

- tightness and strength assessment of product in the scope of class determination
- assessment and classification in the scope of safety in use
- assessment and classification in terms of burglar resistance
- confirmation of usability
- assessment of the installation correctness and assembly

BALUSTRADES AND RAILINGS

- assessment and determination of usefulness in engineering application
- assessment of safety in use and durability
- tests and numerical assessment in the scope of horizontal and vertical loads
- assessment of the technical condition for embedded product (including site tests)
- repair recommendations
- acceptance of works

SANDWICH PANELS

- tightness and strength assessment of product
- assessment of suitability in the function of time (creepage)
- assessment of safety in use
- assessment of durability in the scope of the thermal and humidity action
- assessment of the technical condition for existing facilities
- assessment of the installation correctness and assembly
- repair recommendations and monitoring

ROAD TRAFFIC SIGNS, TRAFFIC BOLLARDS AND NOISE BARRIERS DEVICES

- tests and numerical assessment in the scope of wind loads and dynamic forces from snow clearance
- assessment and classification in the scope of safety in use (Impact test)
- evaluation and classification in the scope of spectrophotometry
- static numerical calculation
- assessment of the installation correctness and assembly

SANITARY SYSTEMS (bathtubs, washbasins, trays, sinks and pipes)

- assessment of the mechanical strength
- assessment of strength and chemical durability
- assessment in the scope of temperature changing action
- drainage assessment
- assessment of the installation correctness and assembly

HARDWARE, OPENING AND CLOSING MECHANISMS (including door drives and power operated doors)

- tightness and strength assessment of product in the scope of class determination
- assessment and classification of mechanical durability and functionality
- assessment and classification of mechanical strength
- assessment of safe evacuation
- assessment and classification in terms of burglar resistance
- tests of efficiency in the scope of temperature changing action
- confirmation of usability
- assessment of the installation correctness and assembly

LADDERS AND STAIRS

- assessment of mechanical strength
- assessment of durability
- assessment of construction characteristics
- assessment of the installation correctness and assembly

Additionally, we offer:

- local vision
- site tests
- static numerical calculation with FEM
- test verification of innovative products solution (e.g. anti-hurricane products, building tightness, temporary protection of railroad works and methodology indicated in standards other than EN)

Building Elements Laboratory
(stationary and in situ tests)

- curtain walls, ventilated facades, roof coverings
- balcony windows and doors, balcony, loggias and terrace glazing system
- windows, doors, curtain walls, shutters and other building partition with burglar resistance
- roof windows and hatches, roof skylights, glass coverings and continuous skylights
- internal and external doors
- gates, shutters, blinds, balustrades and railings
- suspended ceilings
- sandwich panels, composite boards
- facade cladding systems
- glass point-fixing systems
- aluminium window profiles
- building hardware, including:
  - anti-panic locks and emergency locks for exits
  - embedded and surface-mounted locks with catches (including multi-point locks)
  - door and window hinges and latches
  - door hardware (handles, knobs, grips) and window handles
  - hardware for tilt-and-turn, turn-and-tilt, tilt or turn windows and balcony doors (including burglar resistance) and other window hardware
  - door closing devices with adjustable closing speed
  - inserts and other cylinder locks, padlocks
- windows and doors made out of different materials, including:
  - internal and external doors (including burglar resistance) and door frames
  - slide and revolving doors with drive devices and door drives (including safety)
  - balcony windows and doors (including burglar resistance)
  - roof skylights, roof windows and hatches
  - garage doors for commercial and industrial purposes, activated manually and electromechanically
  - shutters, awnings, internal and external blinds
- balustrades and railings
- components for lightweight constructions, including:
  - substructures for ventilated facades
  - substructures for photovoltaic panels
  - self-supporting sheets for roof covering
- fixtures, fittings and finishing item kits, including:
  - trays, bathtubs, washbasins, sinks, shower cabins, hydraulic ball valves, hydraulic distributors
  - handles for gutters, downpipe, sewer pipes and others
  - attic stairs, steps for manholes
  - expansion joints
  - plastic equipment components
  - fencing components
  - mail boxes

Building Elements Engineering Department

tel.: (+48 22) 56 64 260
e-mail: przegrody@itb.pl
02-656 Warszawa, ul. Ksawerów 21

tel.: (+48 61) 853 76 29
e-mail: przegrodypoznan@itb.pl
61-819 Poznań, ul. S. Taczaka 12

Assessed characteristics i.e.:

- product identification and dimensions
- physical and chemical characteristics
- mechanical performances, such as:
  - strength and deformability under compressive, bending, tensile and torsional forces
  - modulus of elasticity
  - destruction form
  - hardness
  - impact resistance
- resistance, including resistance to:
  - artificial atmospheric aging
  - tearing and tearing off from the ground, abrasion
  - impact resistance and resistance to static and dynamic loads, concentrated loads
  - puncture and breaking
  - wind load
  - shocks
  - water penetration
  - corrosion
  - frost resistance
- specific characteristics, including:
  - safety in use
  - air permeability
  - water tightness
  - door resistance to repeated opening and closing, for non-standard tampering and other
  - resistance to dynamic loads related to snow clearance

Construction Materials Engineering Department

- usability of construction products and material aspects of durability of construction works
- protection against corrosion of construction works and their components, including concrete, reinforced concrete, metal and wooden structures
- waterproofing
- materials and processes related to finishing methods in civil engineering

Tests and expert works

WATER PROTECTION

- protection of construction works and their components
- technical and functional performances of water protection membranes
- typical design and application errors in terms of protection from water and dampness
- solutions to waterproofing problems

CORROSION, PROTECTION, REPAIRS

- protection of structures against corrosion
- physical and mechanical properties of products for protection against corrosion
- use of products in corrosive environments

SPORTS SURFACES

- evaluation of technical conditions
- sports surface installation
- evaluation of compliance with technical documentation

THERMAL INSULATION SYSTEMS (IMPLEMENTATION, INSTALLATION)

- evaluation of technical conditions
- reasons for failure
- repair methods

Construction Materials Laboratory

FINISHING MATERIALS AND PRODUCTS

- plasters (external and internal), plastering mixes and mortars
- paint and varnish coatings and products
- adhesives (cement-based, dispersive, based on reactive resins, solvent-based, hybrid and polyurethane-based), bonding mixes and mortars
- systems of thermal insulation of walls and related products
- ceramic tiles
- gypsum panels and drywalls
- stretch ceilings
- cladding materials made of plastic, on mineral binders
- floors and floorings
- floor screeds and levelling mixes
- floor coverings
- wood and wood-based materials
- plastic products and rubbers (window profiles, window sills, gutter systems etc.)
- components for sealants for joints between window and wall (polyurethane foams and tapes)
- composite materials, e.g. plastics and wood chips, recycled

SPORTS AND LEISURE SURFACES AND FLOORS

WATERPROOFING PRODUCTS

- reinforced elastic asphalt-based products (tar paper, bitumen shingle)
- elastic products made of plastic and rubber (foils, textiles, tapes, laminates, gaskets)
- asphalt-based waterproofing coatings and mixtures
- waterproofing coatings and products based on plastics and cement
- waterproofing stopping and injection products
- ceramic and cement roof tiles
- sealants
- geosynthetic barriers and geotextiles
- roof accessories

PROTECTIVE MATERIALS AND COATINGS

- impregnating and painting products
- fire resistant coatings and mortars
- liquid resin compositions
- resin and mineral-based injection agents
- polymer, polymer-cement, bitumen and mineral protective coatings
- metallic and oxygen anode coatings on metal products
- products and systems for protection and repair of concrete and reinforced concrete structures
- admixtures and additives to concrete and mortar

BIOLOGICAL CORROSION PROTECTION PRODUCTS

- wood and wood-based material protection products
- mould and algae control and prevention agents

CONCENTRATION OF MOULD SPORES IN THE AIR

The identified characteristics include:

- identification features, dimensions, and physical and chemical characteristics
- mechanical performances, such as:
  - tensile strength (within a temperature range of −30°C to +250°C)
  - compressive and bending strength
  - cleavage and shear strength
  - tear strength
  - adhesion to substrate
- functional performances and specific features for particular applications, including:
  - water tightness, absorbability
  - permeability to water vapour and carbon dioxide
  - thermal resistance, dimensional stability, shrinkage, flexibility
  - impact strength and resistance to static and dynamic load
  - fatigue strength

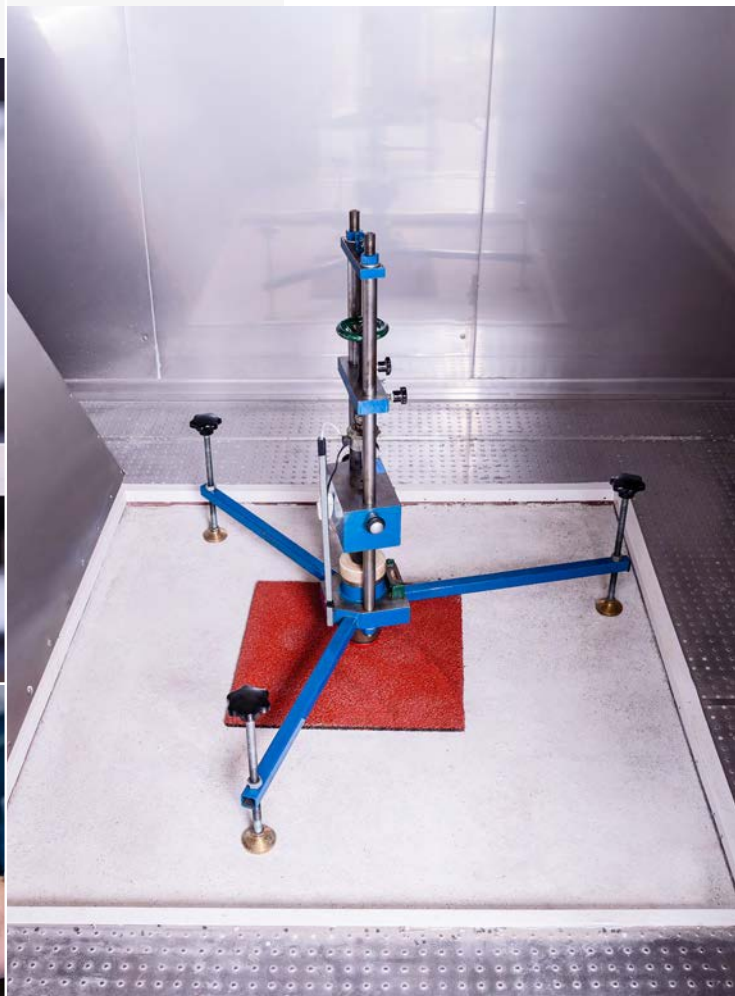
- creeping
- resistance to hail and wind load
- impedance parameters of coatings
- injective sealing capacity
- effect of admixtures on protective characteristics of mortars and concrete against reinforcement
- susceptibility of reinforcement steel in concrete to corrosion
- susceptibility of concrete and mortars to carbonation
- content of chloride and sulphate ions in construction products
- anti-slip properties and slipping resistance
- abrasion strength (including impact abrasion)
- resistance to shoe spikes
- ball friction, rolling and bouncing, resistance of sports surfaces in rotational movement
- wastewater treatment efficiency of onsite wastewater treatment stations
- effectiveness of mould and algae control, and prevention agents
- effectiveness of wood and wood-based materials protection agents
- effectiveness of wood protection from blue stain mould

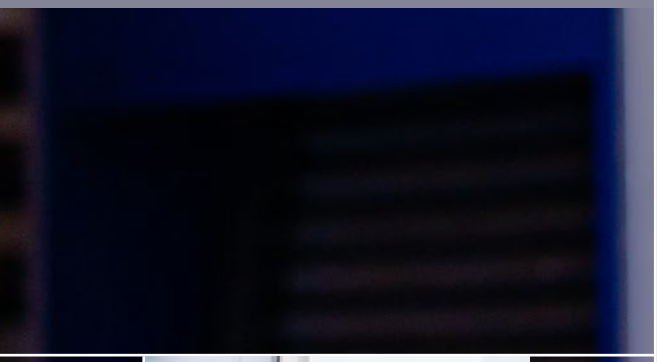
- durability of products and systems, including:
  - frost resistance
  - resistance to atmospheric factors, including UV (X, Y, Z1 and Z2 environment, xenon and fluorescent lamps), water and variable temperatures
  - resistance to aggressive environments (XA1, XA2 and XA3)
  - resistance to asphalt, oil, synthetic eluate, water, alkalis and other liquid chemicals
  - resistance to salt mist and SO_2-containing atmosphere
  - corrosion resistance and durability of coating on metal products
  - resistance to mould and algae

Construction Materials Engineering Department

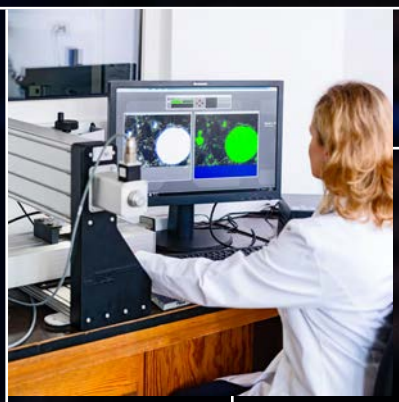
tel.: (+48 22) 57 96 492
e-mail: materialy@itb.pl
00-611 Warszawa, ul. Filtrowa 1

tel.: (+48 22) 56 64 409
02-656 Warszawa, ul. Ksawerów 21






CONTROLS




INSTRON

Building Structures, Geotechnics and Concrete Department

- testing, evaluation of the technical conditions and providing expert opinions on building structures, including:
  - the protection of existing and new construction works from the impact of mining activities
  - geotechnical investigation for construction works
  - substrate interaction with foundations and engineering structures
- static and dynamic numerical calculation related to the structures, geotechnics and foundations
- testing and assessment of performances of construction products and components

Tests
and expert works

STRUCTURES OF BUILDINGS AND CIVIL ENGINEERING STRUCTURES

- verification of structural design
- advanced stability and resistance calculations
- structure diagnostics and in-situ tests (including non-destructive tests)
- monitoring of the structures and result analysis
- identification of the causes of construction failures or disasters
- evaluation of technical conditions, safety and durability of a structure
- recommendations on repairs and structural reinforcement

BUILDING STRUCTURES FOUNDED IN MINING AREAS

- evaluation of technical conditions of buildings and expert opinions on construction works subject to mining activities impact
- analysis of building structures' protection from mining operation impact
- calculations for building structures' mechanics and structure interaction with mining substrate
- tests on the resistance and usability parameters of buildings with respect to mining activities
- assessment of development of mining and post-mining construction works
- supervision concerning the development of areas subject to mining operation impact
- monitoring of building structures in relation to mining
- correctness of technical solutions assumed in building structures subject to mining impact
- assessment of the effects of rock bursts on urbanized surface

GEOTECHNICS AND FOUNDATIONS

- comprehensive geotechnical investigation
- assessment of geotechnical foundation conditions
- assessment of the impact of designed structures on the environment
- foundation design for building structures and the protection of slopes
- design and execution of special geotechnical work
- supervision at construction sites

CONCRETE

- causes of defects in concrete products and building structures
- quality control of concrete and its constituents
- conformity of products and building structures with technical specifications and standards
- assessment of the usability of concrete as a construction material

Building Structures, Geotechnics and Concrete Laboratory

CONSTRUCTION PRODUCTS AND ITEMS

- ceramic/silicate/concrete/AAC masonry units
- precast concrete products (paving bricks, concrete slabs, lintels, floor slabs and wall panels, manhole covers etc.)
- beam and block floor systems
- masonry structures made with traditional, thin and polyurethane mortars
- masonry structures made of prototypical items
- building mortar
- brackets and suspension members for masonry structures
- supporting items of suspended ceilings
- reinforcement bars and meshes
- balcony connectors
- expansion pins
- composite bars and mats
- precast stairs and attic ladders
- plain and ribbed reinforcing steel
- wires and lays for prestressed structures
- metal sheets for wall and roof covering
- hatches and gullies
- drain ducts and trays
- installation tubes for cables
- electricity and lighting poles
- prototypical and large-size products (e.g. prestressed reinforced concrete posts, steel three-dimensional trusses)
- precast wood items
- steel structures and sections
- spot-fixing items for glass
- bearing capacity of wastewater treatment plants
- wall and ceiling sandwich panels

FASTENERS AND FIXINGS

- metal expansion and bonded fasteners, channel bars
- metal fasteners for wooden structures
- bonded reinforcement bars
- plastic expansion fasteners
- bolts, screws, and nails
- anchors, brackets
- construction nails
- fixings and connectors for suspended ceilings

CONCRETE AND ITS CONSTITUENTS

- properties of lightweight, normal-weight and heavy-weight concrete
- concrete mix: density, consistency, air content, temperature
- concrete additives and admixtures
- cements
- steel and polymer fibres for concrete
- natural stone and aggregates
- hydrophobising agents
- rheology of cement grouts
- total porosity and porosity distribution
- microstructure observations using classic and electron microscopy

SOIL AND GEOSYNTHETICS

We identify the following:

- physical properties (granulometric composition, humidity, consistency limits, linear shrinkage, total specific area and sorption volume, specific density, volumetric density)
- maximum and minimum bulk density
- organic matter content
- optimum water content and maximum dry density (Proctor apparatus)
- consolidation and compressibility parameters
- swelling pressure and swelling index
- coefficient of permeability
- strength parameters (shear strength, coherence and internal friction angle in a direct shear apparatus, using the UU method of tri-axial compression without consolidation and drainage, and CU and CD methods, with saturation and consolidation, residual strength, determination of the shear modulus based on the measurement of the speed of acoustic waves and probe-mounted sensors)
- water permeability in a vertical direction to the product surface
- water flow capacity in the product plane
- index flux
- characteristic pore size
- long-term protective efficacy of geotextiles in contact with geosynthetic barriers

Building Structures, Geotechnics and Concrete Department

tel.: (+48 22) 57 96 165
e-mail: konstrukcje@itb.pl
tel.: (+48 22) 57 96 438
e-mail: beton@itb.pl
00-611 Warszawa, ul. Filtrowa 1

tel.: (+48 22) 56 64 291
e-mail: geotechnika@itb.pl
02-656 Warszawa, ul. Ksawerów 21

tel.: (+48 32) 73 02 925
e-mail: katowice@itb.pl
40-153 Katowice, al. W. Korfantego 191

INSTYTUT TECHNIKI BUDOWLANEJ
ul. Filtrowa 1 | 00-611 Warszawa | Polska
tel.: +48 22 825 04 71
e-mail: ci@itb.pl