

## Explosion protection remote test site Štramberk

The explosion protection testing laboratory is a unique complex of three explosion galleries in Štramberk with a length of up to 300 meters, where explosions with real parameters corresponding to mine conditions as well as other technologies with flammable substances can be simulated.

### Testing the effectiveness of explosion-proof enclosures in accordance with EN 14591-2

The test of water and explosion-proof dust enclosures preventing the transmission of explosions in mines complies with the requirements of the Czech Mining Bureau, Decree No. 10/1994 Coll., as amended, as well as with the requirements of the EN 14591-2 standard, where for a defined explosion pressure there must be no burst of explosive flame at a specified distance.

### Pressure resistance test

Testing the pressure resistance of gates, doors, fire doors, windows and covered passages of buildings, stressed by explosion pressure up to 450 kPa, extremely from 0.5 to 1.0 MPa.

## Other activities of our testing laboratory

Assessing the resistance of buildings and protection systems to pressure and thermal exposure to dust-air or gaseous mixtures, including experimental verification - evaluation of explosion dynamics

Verifying the causes and consequences of an explosion of coal dust or methane-air mixtures

Monitoring explosion dynamics – the development and decline of the explosion processes in space of 1D and 2D propagation

Active involvement in R&D projects, experimental and development activities in areas dealing with explosions and fires in enclosed spaces

Rental of explosion galleries in Štramberk

## Seminars and educational activities

Our work in the field includes the organization of regular seminars that focus on the danger of explosion of flammable gases, flammable liquid vapors and combustible dust, and on eliminating the risk of explosion in industrial plants.

As part of these seminars, we conduct demonstrations of the burning and explosion of combustible dust. We are ready to offer you our professional experience and will be glad to show you what combustible dust can do.



Engineering, analysis and assessments in operational and process safety. Comprehensive services and solutions in explosion prevention and protecting industrial operations. Our team of risk analysis experts is ready to consult and address your needs and requirements in the explosion protection document, external influence identification protocols, and in undertaking a risk analysis of electrical and non-electrical equipment.



VVUU is the Notified Body 1019 engaged in assessing the conformity of personal protective equipment against falls from height and slips, protective systems for use in explosive atmospheres (ATEX), explosives for civil use, and selected types of machinery for use underground.

The certification body VVUU is also accredited to certify protective and rescue equipment for working at heights, conveyor belts and flexible medium volume bags for non-hazardous materials.

VVUU has been assessing and defining fire and explosion risks for more than 70 years. VVUU, a.s. is a market leader, a company with modern and complex laboratory, testing and development facilities.

Ensuring industry safety is the clearly defined direction of the company's core activity. VVUU offers its services to all companies at risk of industrial accidents, explosions or fires.



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Explosion protection testing laboratory





# Explosion protection testing laboratory

VVUU is a European leader in the testing of explosion protection systems. Thanks to its extensive testing facilities, the company provides its customers with comprehensive explosion prevention services. **Testing laboratory VVUU, a.s. No. 1025 is the Accredited Body according to ČSN EN ISO/IEC 17025:2018.**



## We offer



Explosion tests

Verification of operational and mechanical safety of protective systems and equipment

Educational activities in explosion protection technologies and systems

Development and application activities in explosion protection

### Wide range of high-pressure test vessels

The testing laboratory is equipped with 15 test vessels with volumes from 400 dm<sup>3</sup> to 60 m<sup>3</sup>. They meet the design requirements according to the applicable technical regulations and they have high pressure resistance up to 16 bar.

### Maximum explosion parameters in real volumes

The maximum explosion parameters can be set in the vessels in an enclosed space in order to test containment systems under realistic and the most risky conditions of explosion.

### Accredited determination of explosion parameters in 1 m<sup>3</sup> volume

The advantage is the possibility to determine the maximum explosion parameters of dust mixtures in a standardized 1 m<sup>3</sup> vessel, the accuracy and quality of which has been confirmed by CaRo interlaboratory comparison tests. This allows the use of customer-supplied combustible powders that best suit the needs for the application of tested protection systems.

### State-of-the-art recording and measuring technology

The testing laboratory has state-of-the-art technology for the recording and subsequent

**Our experts are able to assess the risks present in explosion prevention, to design and determine the necessary explosion and flammability parameters and to test appropriate protective measures at the Testing and training center Ostrava (TTC).**

## Our Services

evaluation of the explosion tests performed. Almost all computational designs need to be practically verified by large-scale simulation tests.

The use of two independent test lines makes it possible to test different protection systems in parallel in a given test cycle.

### Large-scale tests

Large-scale tests also play an indispensable role in the development of new protective systems and equipment, where without these tests the product cannot be certified for use in hazardous areas.

The output of these types of tests is an accredited report.

### Test, evaluation, accredited protocol, ATEX certificate

The testing laboratory offers the possibility of performing large-scale explosion tests, including their subsequent professional evaluation. Our experts provide individual approach and support in solving the issues of testing protection systems according to accredited test procedures.

Upon customer request, the explosion protection test facility will submit the accredited test report to the Notified Body for conformity assessment.  
<https://certification.vvuu.cz/en>

**VVUU is the Notified Body 1019 according to the legislation 2014/34/EU for the certification of protective systems for use in explosion hazardous environments.**

## Accredited examinations at TTC Ostrava

<b>EN 14373</b>	explosion suppression systems (automatic high rate discharge suppressor or HRD systems)
<b>EN 14797</b>	explosion venting devices (bursting panel device, explosion doors or flaps, relief valves)
<b>EN 16009</b>	flameless explosion venting devices (mesh, ceramic, ribbon devices for flameless venting)
<b>EN 14460</b>	explosion resistant equipment (filters, cyclones, redler conveyors, elevators, dryers and other explosion-proof equipment)
<b>EN 16447</b>	explosion isolation flap valves
<b>EN 15089</b>	explosion isolation systems (rotary valve, float valves, quick-closing gate valves, fire extinguishing barriers)
<b>EN 14034-1</b>	determination of the maximum explosion pressure $p_{max}$ in a 1 m <sup>3</sup> vessel
<b>EN 14034-2</b>	determination of the maximum rate of explosion pressure rise $(dp/dt)_{max}$ in a 1m <sup>3</sup> vessel

### Testing explosion suppression systems in accordance with EN 14373

This test determines the effectiveness of the explosion suppression system in different volumes of closed test vessels. The result of the testing is the value of the maximum reduced explosion pressure for different unit volumes depending on the value of the explosion constant  $K_{st}$ .

### Testing explosion resistant equipment in accordance with EN 14460

The accredited test assesses the ability of a structure to withstand internal blast pressure without compromising its integrity and preventing dangerous blast effects from reaching the surroundings.

### The determination of the maximum explosion pressure $p_{max}$ and the maximum rate of explosion pressure rise $(dp/dt)_{max}$ in a 1 m<sup>3</sup> vessel in accordance with EN 14034-1 and EN 14034-2.

The values of these parameters are necessary for testing of explosion protection systems, for the qualified calculation and design of explosion protection elements.

### Testing explosion venting devices in accordance with EN 14797

The venting device is subjected to type testing to achieve maximum vent efficiency, functionality and mechanical strength.

### Testing explosion isolation flap valves in accordance with EN 16447

The accredited test assesses the effectiveness and mechanical integrity of the explosion isolation flap valves.

### Testing flameless explosion venting devices in accordance with EN 16009

The flameless explosion venting device is subjected to type testing to achieve maximum efficiency, prevention of flame transmission, mechanical integrity and the external effects of the flameless explosion vent device.

### Testing the efficiency of explosion isolation systems in accordance with EN 15089

The accredited test assesses the resistance of the equipment under test to explosion, flame transmission and functional tests of the various types of explosion isolation equipment (active and passive isolation valves, fire barriers and rotary feeders).