

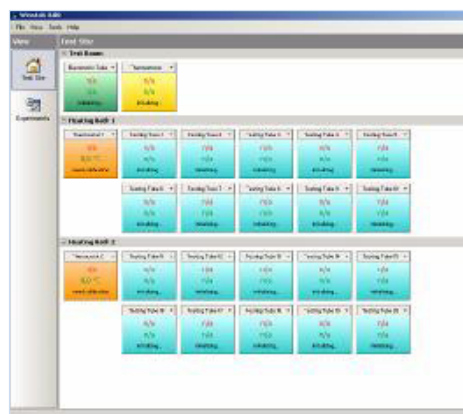
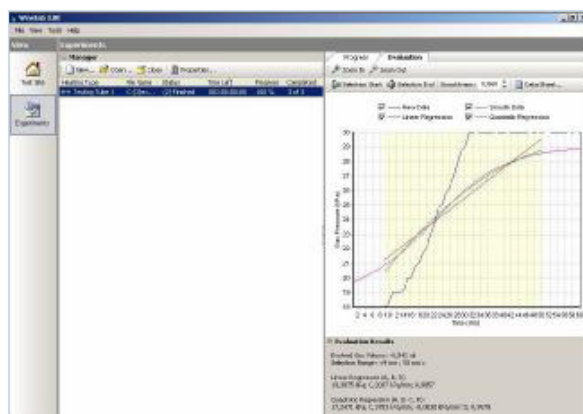
STABIL VI VACUUM STABILITY TESTER

Product Datasheet



Vacuum stability tester **STABIL VI** is used for measuring chemical stability of energetic materials (explosives, propellants, pyrotechnics, reactive chemicals, explosive waste). The apparatus measures volume of gas evolved from heating the samples in evacuated test tubes in a heating block maintained at a constant temperature (30 - 160 °C) for a specified period of time. **STABIL VI** is a fully instrumental tester equipped with sensitive electronic pressure transducers, communication with PC for direct control, continuous data acquisition, analysis and archiving. It is capable to test multiple samples (up to 20) from a single measuring unit.

In last 13 years of continuous innovations **STABIL VI** established itself as a standard equipment in many major explosives testing laboratories round the world where it fully replaced old apparatuses with mercury-containing manometer tubes, which use was highly dangerous (toxicity of spilled Hg from broken tubes), laborious and not providing continuous pressure-time record important for stability evaluation.





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APPLICATIONS

Vacuum stability test is frequently used for determination of chemical stability and compatibility of energetic materials and for quality tests of energetic ingredients. The test is able to discover with high sensitivity, precision and reproducibility chemical instability of energetic materials due to presence of destabilizing impurities, incompatibility with surrounding materials or ageing. Vacuum stability test finds its wide application in qualification, surveillance, manufacture, quality control and R&D of a whole range of energetic materials.

Vacuum Stability Tester **STABIL VI** is designed to comply with requirements of the following standards of testing:

- STANAG 4556: Explosives, Vacuum Stability Test
- STANAG 4147: Chemical Compatibility of Ammunition Components with Explosives (Non-Nuclear Applications)
- STANAG 4022/4, 4023, 4230, 4284 and 4566 Stability tests of energetic ingredients (RDX, PETN, HNS, HMX, CL-20)

The **STABIL VI** tester can also be used with minor modifications for other customer defined tests, such as long-term (weeks, months) stability tests at lower temperatures.

Included is a trial version of software Winstab (with limited duration of use). Obtaining an activation code for commissioning a full license without restrictions is subject to payment of the price completely.

INSTRUMENT DESCRIPTION

Vacuum stability tester **STABIL VI** is an apparatus for determination of chemical stability of energetic materials by vacuum stability test. The apparatus uses electronic pressure transducers for measuring the volume of gas evolved on heating multiple samples in evacuated glass test tubes in a heating block maintained at a constant specified temperature for a specified period of time.

The apparatus is composed of a main unit operating 1 - 2 heating blocks, each block with 10 test tubes with pressure transducers. The main unit contains 2 temperature controllers and 2 safety (limit) temperature controllers for 2 heating blocks, data acquisition unit for continuous recording of signals from up to 20 pressure transducers, stabilized power supply for the transducers and a data port for communication with a personal computer. The two-way communication data acquisition unit allows the operator to set heating programs directly from the computer and independently measure each of the 20 test tubes with samples. Typical temperature of measurement is in the range of 90 - 120 °C and testing period is typically 40 - 48 hours. Data acquisition unit also processes signals from a barometric pressure transducer and a temperature sensor continuously measuring ambient pressure and temperature during the test. These ambient data are used for calculation of a volume of evolved gases from each sample under the test.

Two heating blocks can be operated simultaneously at different temperatures. The temperature controller maintains the temperature of heating blocks to a specified isothermal temperature. It contains an independent alarm circuit switching off the heating if the temperature accidentally increases above a specified safety

temperature. The heating blocks are made of aluminum and each block contains 10 holes filled with silicon oil for better heat transfer to the test tubes. Each block contains 2 independent temperature sensors (for temperature and limit controllers). Temperature in the heating blocks is controlled and corrected using mercury thermometers or by a digital temperature calibrator.

Software Winstab 3.0 Eng for Windows 7 continuously records and evaluates evolution of gases from each of up to 20 test tubes heated simultaneously. The software calculates and plots volume of gases vs. time curves, contains calibration procedures for each test tube and transducer, records ambient and test temperatures and pressures, contains alarm functions detecting dangerously high decomposition rate of samples with risk of explosion during the test or deviation of a test temperature from the required value. When detecting dangerous conditions, heating of the blocks can be switched off also automatically by the software (independent on the same function of a temperature controller). From the computer it is possible to set test temperature for the heating blocks and sampling intervals of data from transducers. Temperature controller can be calibrated and corrected by the software based on data from mercury thermometers or digital temperature calibrator.

OZM Research is an experienced manufacturer of instruments for testing of energetic materials and it is able to design and manufacture a type-specific equipment according to the customer's needs. Above-described instrument is considered to be the standard version; any specific requirements of a customer for customized version of the vacuum stability tester are welcome.

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STANDARD INSTRUMENT PARTS

STB-MUA-20-FAE	Main unit for operating 1 or 2 heating blocks and up to 20 independent pressure transducers - 2 temperature controllers - 2 limit (safety) controllers - 2 x heating block output - 20 x pressure transducers input - 1 x barometric pressure transducer
STB-HB-Ex	Aluminium heating block - 10 holes (diameter 19 mm, depth 160 mm) - maximal temperature 160 °C - 2 inbuilt independent temperature sensors - stainless steel head plate - evacuation manifold 10 valves
STB-PT100	Piezoresistive pressure transducer - pressure range 0 - 100 kPa (0.25 % FSO) - stainless steel conical fitting
STB-PS-AC	Pressure sensor for ambient conditions - pressure range 80 - 120 kPa (0.25% FSO) - holder included
STB-TTEP02	Glass test tube with an evacuation port - test assembly volume 25 ± 2 ml - diameter 18 mm, length 160 mm - volume calibration certificate
DIG-T200	Digital thermometer - temperature range 0 - 200 °C - resolution 0.1 °C - sensor Pt 100 (length 230 mm)
Winstab 3.0	Software Winstab 3.0 Eng for Windows 7
DAEU-17	Data acquisition and evaluation unit (notebook with this minimum configuration or higher: 17" display, 2 GHz processor, 1,8 GB RAM, DVD-RW, HDD 250 GB, WLAN, BT, LAN, USB, Win 7)
STB-VP	Rotary vane vacuum pump - min. pressure 10 Pa - flow rate 25 l.min ⁻¹ - spare vacuum oil 500 ml SN56 - oil filter & fittings
STB-ATS	Ambient temperature sensor - type Pt100 - temperature range -40 to +180 °C - accuracy ± 0.1 °C - cable length 1.6 m
STB-accessories	Accessories: - test tubes & transducers holder - suction hoses - leading and communication cables - low viscosity silicone grease 100 g - high viscosity silicone grease 100 g - silicone oil 500 ml M15 - cleaning brush - glass funnel

TECHNICAL PARAMETERS

Temperature range:	30 - 160 °C
Temperature control accuracy:	±0.1 °C
Digital thermometer accuracy:	±0.1 °C
Pressure transducer range:	from 0 to 100 kPa, accuracy: 0.25 %
Barometric pressure transducer range:	from 80 to 120 kPa, accuracy: 0.25 %
Test tube volume:	25 ± 2 ml
Sampling rate:	1 s ⁻¹ / 1 min ⁻¹
Minimal vacuum:	0.3 kPa
Typical sample weight:	5 g
Material of test tubes:	Simax [®] - a borosilicate glass with increased chemical resistance

OPTIONAL ACCESSORIES

STB-MT100	Mercury thermometer - temperature range 40 - 110 °C - resolution 0.2 °C
STB-MT180	Mercury thermometer - temperature range 110 - 180 °C - resolution 0.2 °C
STB-TTEP-20	Glass test tube with an evacuation port - set of 10 pcs - test assembly volume 20 ± 0.5 ml - diameter 17 mm, length 180 mm - volume calibration certificate
STB-TTEP-XX	Glass test tube with an evacuation port - set of 10 pcs - test assembly volume in the range 15 - 30 ml - diameter 17 or 18 mm - volume calibration certificate
Winst 3.0 AL	Additional license of WINSTAB 3.0 software
Winstab support 2	Winstab technical support and maintenance - 2 years
Winstab support 5	Winstab technical support and maintenance - 5 years

CONSUMABLES

M14-100	Spare low viscosity silicone grease 100 g
M20-100	Spare high viscosity silicone grease 100 g
VP-oil-SN56	Spare vacuum oil 500 ml SN56
SC-oil-M15	Spare silicone oil 500 ml M15

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INSTALLATION REQUIREMENTS

Main Unit dimensions:	W x L x H: 170 x 260 x 320 mm; Weight: 6 kg
Heating block dimensions:	D x L: 290 x 290 mm; Weight: 30 kg
Electric power source:	230 V / 50 Hz (120 V / 60 Hz), 360 W per one heating block, IP 52
Local exhaust or a fume hood	
Personal computer with Windows 7	
Recommended UPS	

EXPORT LICENSE

Export of STABIL VI apparatus is subject to export license for military goods from the Czech Republic. The apparatus can only be exported after having received the approval of the licensing authority concerned. To apply for the valid export license, international import certificate or end-user certificate is required.

SHIPPING DATA

Package dimensions (W x L x H):
50 x 60 x 70 cm

Package gross weight:
with 1 heating block: 95 kg
with 2 heating blocks: 120 kg

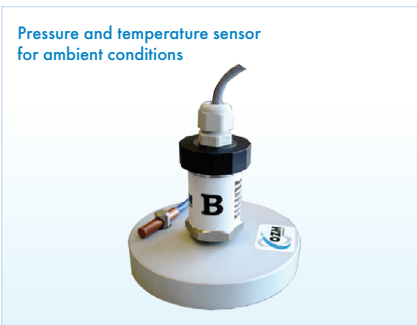
Country of origin: Czech Republic

Custom code: 9026 20 20

STABIL VI Uninterruptible Power Supply (UPS) Specification

- Smart-UPS or compatible with true sine wave output on battery
- Minimum rated output power capacity:
 - 1 × (STB-MUA-20-FAE) + 1 × (STB-HB-Ex) = 700 Watts
 - 1 × (STB-MUA-20-FAE) + 1 × (STB-HB-Ex) + 1 × (DAEU-17) = 800 Watts
 - 1 × (STB-MUA-20-FAE) + 2 × (STB-HB-Ex) = 1350 Watts
 - 1 × (STB-MUA-20-FAE) + 2 × (STB-HB-Ex) + 1 × (DAEU-17) = 1450 Watts

STABIL Main Unit - Front and Back view



STABIL Heating Block - Front and Side views

