



## UNI-Heat

### ALL IN ONE STABILITY TESTER

UNI-Heat presents a complex versatile and variable system for stability inspection and determination. It was developed for multiple investigations of chemical stability and compatibility of almost any energetic materials.

#### Application

Monitoring of chemical stability is essential for reliable risk and safety management of nitrocellulose, gun powders, rocket fuels and other propellants, pyrotechnic mixtures, explosives, hazardous chemicals, polymers, composites, binders and others. An integral part of this monitoring is compatibility consideration of mixtures.

Stability and compatibility consideration is tight relation with a shelf life of determination. This is an essential quality of material and determines its application, production technology, transportation safety, warehousing and disposal. Most of the military products require periodical inspection during their lifetime.

A typical example is a supply chain of gun propellants. Producer of propellant determines and declares its stability as required by quality management. The product is dispatched and transported for processing (eg. ammunition production). Acceptance of the propellant shall include verification of declared values. The final product end user shall perform his own quality inspection of declared values before acceptance for storage.

#### Compliance

ČOS 137602, STANAG 4178, AOP-48, AOP-7, MIL-STD-286C

#### Principle

The unstable behaviour of energetic materials is associated with decomposition product formation. Methods for qualitative and quantitative detection of these products were a subject of research and development since the 19th century. A wide range of developed methods for stability determination was united and several standardized methods are used worldwide.

Most of the methods are focused on **qualitative** (detection) or **quantitative** (determination) investigation of nitrogen oxides ( $\text{NO}_x$ ) produced by a sample at exactly given conditions. Conditions are characterized by dimensions of test tubes, heating blocks and temperature. Detection is performed with standard test papers (**Abel, Methyl Violet**) or **Red Fumes (100°C)**. Quantitative determination is performed by means of glass absorbers and titration of absorbed  $\text{NO}_x$  (**Bergmann-Junk 5A/5B/5C**).

The quantitative principle is used for weight loss monitoring during heat treatment (**Dutch Weight Loss**).



Energetic Materials  
Stability & Compatibility  
Heating Blocks



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#### Description

The **UNI-Heat** is a stand-alone and compact apparatus with an inbuilt aluminium heating block and a main controlling unit. It has its own precise temperature controlling, overheating protection, 4.3" LCD touch screen and allows external data acquisition of block temperature.

The display interface of the main unit provides instructions for active testing methods and management of calibration constants. The salient feature of the user interface is intuitive graphic monitoring of test time for each tube. This provides the highest precision of real exposition time and reduces stress-related to loading of all tubes into the block at one time. Delayed tube inserting is also possible with a clear time reference.

Ultimate variability of the **UNI-Heat** is achieved by blocks inserts which allow fast and easy conversion of the **UNI-Heat** to be in compliance with the required testing method or standard.

**UNI-Heat testing device contains no electronics related to the measurement of pressure so that it cannot be interchanged with DELT-Vac devices.**

#### Technical Specifications

Sample positions	12
Temperature limit (standard / opt.)	200 °C
Temperature accuracy	< ± 0.1 °C
Maximum hole diameter	34 mm
Maximum hole depth (wo/w insert)	278 / 285 mm
UNI-Heat weight	60 kg
UNI-Heat size (WxDxH)	42x45x48 cm
Power input (240 VAC, 50 Hz)	1500 W

#### Advantageous features

- Standalone device with color LCD touch screen interface
- Accurate temperature controlling
- Independent temperature limiting (overheating protection)
- Graphic interface for supported test methods
- Independent timer for each tube where applicable
- Self-programming of user profiles and testing procedures
- Fast conversion to comply with another testing standards

#### Supported Testing Standards

The **UNI-Heat** block holes have dimensions for inserting of high-pressure stainless steel tubes HPT34. Inserting of other tubes requires proper Block insert to create a hole of required diameter and depth. Holes dimension is defined by the followed testing standard or by the user (customisation of the inserts). The modular design significantly saves budget and space requirements.

The **UNI-Heat** supports testing methods in the following table. DELTIMA Precision improved features of single-purpose instruments such as Abel Heat Test, Bergmann-Junk Tests or Methyl Violet Test and these salient features are implemented also into interface.

Supported Standard Test Methods
Able Heat Tests / Heat Test
Methyl Viloet Test / Heat Test
100 °C Heat Test
Dutch Weight Loss Test
Bergmann-Junk Tests
Standard Ageing Procedures
Preliminary Safety Testing (by DELTIMA Precision)

#### Accessories

An integral part of **UNI-Heat** system is additional equipment for testing. DELTIMA Precision provides all necessary glassware and standard detection papers. Each testing method is supported with its own Block insert set for fulfilling of exactly given standard conditions.

An important and useful option is preliminary testing of unknown samples in stainless steel pressure resistant tubes. It can withstand decomposition of non-detonating samples and prevents an unexpected explosion in the laboratory.

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