DAMA PAJOUH ARVIN Co.

Innovative Engineering Solutions

Hot Stage Microscopy

HSM 702 HT

About Us

Dama Pajouh Arvin Co. as the first and largest knowledge-based company in the field of design and production of thermal analysis Instruments has started its activities since 2013 and with its specialists and experienced staff has been able to supply its advanced instruments such as Dilatometer, DSC, TGA, STA, HSM to the costumers at different temperatures.

HSM

Hot Stage Microscopes were originally developed for analyzing the melting characteristics of ashes. In addition, the heating microscope has proven to be a reliable instrument for analyzing the softening and melting characteristics of ceramic materials, glasses, casting powders and various other materials.

Modern heating microscopes from DPA contain state-of-the-art software and hardware with high resolving power and newly developed evaluation algorithms. As a result, modern devices can be used for analytical methods extending beyond the analysis of softening and melting characteristics. Their analytical capabilities include:

- process-oriented modifications of the test piece, e.g. granules
- phase transitions involving a change in volume
- thermal expansion characteristics

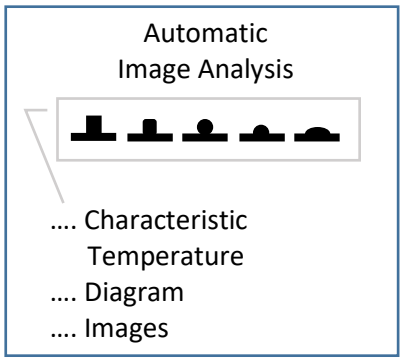
The HSM 702 can be made in various models with different maximum temperatures and heating rates. The overall construction of the HSM 702 is based on a modular principle in which the individual components are mounted in separate housings. This simplifies adaptation to individual requirements and minimizes the influence of vibrations, allowing precise, reliable analyses.

Main features

In the HSM 702 heating microscope, test pieces are analyzed optically using a non-contact technique at temperatures of up to max. 1400°C. The VENUS software automatically analyses silhouettes of the test piece and determines geometric parameters and characteristic temperatures. The design of the measuring cell allows materials to be heated to temperatures above their melting point.

The HSM 702 is therefore suitable for determining:

- Sintering characteristics
- Softening characteristics
- Melting characteristics
- Thermal expansion characteristics
- Wetting characteristics.

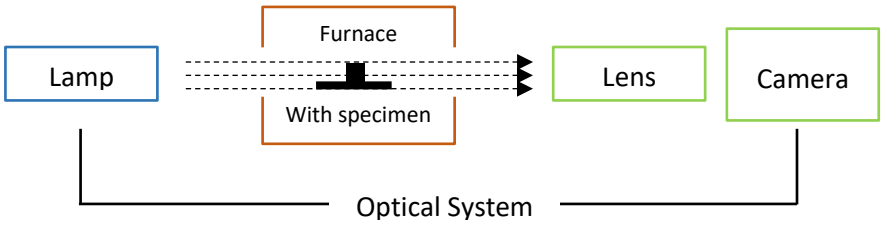


Fields of use and applications

The HSM 702 is used in research, development and quality control – not only in industry but also in institutes and universities. As well as for analyzing the melting characteristics of ashes, the heating microscope has applications in the glass, ceramic and metalworking industries. The following standards for analyzing the melting characteristics of ashes are implemented in the HSM 702:

- DIN 51730:2007
- DIN EN ISO 21404:2020
- ISO 540:2008-06
- CEN/TS 15370-1:2006 and CEN/TR 15404:2006

The DPA Instruments method, which is based on DIN 51730:1984.



Heating microscope's components:

- Optical bench with lamp, stands and camera
- Furnace system with furnace control unit, furnace and transformer
- VENUS heating microscope software on preconfigured measuring station computer with accessories
- Optional: Recirculating cooler and other accessories

Comparison of the heating microscope models

Furnace	HSM 702 HT	HSM 702 LT
Max. furnace temperature	1400 °C	1200 °C
Max. furnace temperature	1350 °C	1150 °C
Max. heating rate	≤ 30 K/min up to 1400 °C	≤ 30 K/min up to 1200 °C
Heating conductor		
Working tube … Material … Installation … Inner diameter … Length	 ≤ 99,7 % Al_2O_3 Removable 20 mm 180 mm	 ≤ 99,7 % Al2O3 Removable 20 mm 180 mm
Camera resolution		

The Core of the Heating Microscope – the VENUS Software:

The operation of the VENUS software is based on the workflow in the laboratory, which means the software can be used easily and intuitively. The training period is extremely short. Routine applications are done quickly and safely. As soon as the test object is prepared and placed in the furnace with substrate on the sample holder, VENUS supports any further work with the heating microscope:

Sample setup:

VENUS offers auxiliary functions for the alignment of the camera and lens, with which the image settings for the analysis can be optimized. A successful analysis test confirms the appropriate setting for the image analysis.

Measurement:

Step-by-step guide for the measurement and its documentation of all necessary information, such as the temperature/time profile, the starting temperature or the criterion to finish the measurement. Queries ensure that nothing is forgotten. Routine conditions are recorded in the method storage, the corresponding measurement conditions are in this way at any time quickly available.

When a measurement is started, information about the progress of the measurement is displayed on the screen: in tabular form, in curve form and, of course, images of the test object in real time. During an ongoing measurement most of the features of the software are blocked, since the measurement must be completed without any interruption.

Evaluation:

When a measurement has been completed, the results page is displayed with the measurement values, characteristic temperatures, graphical presentation of the results and images. A standardized one-sided summary record can be used as a clear test report. All of the important measurement conditions and results and images of test object silhouettes are documented and a comment in text form can be added.

Alternatively, an individually comprehensive test report can be compiled. This one can contain as many images, graphs, text and data tables as desired. If changes have

been made manually, e. g. sintering or deformation temperature was manually set, then this is documented as a change in the test report. The evaluation and documentation of the measurement conditions and results meet all current quality management requirements.

Control and display

- Input and management of heating programs
- Relaying of heating programs to furnace control unit
- Indication of heating microscope's communication status
- Real-time display of measurement results

Measurement and evaluation

- Measurement preparation: adjustment of camera image and input of measuring parameters
- Automatic measurement (according to standard)
- Automatic data collection
- Automatic evaluation in real time
- Automatic termination of measurements according to defined end criteria
- Automatic determination of characteristic temperatures in accordance with standards
- Assistance with manual evaluation once measurement is complete

Documentation and display

- Interactive display media (table, graph, images, video)
- Automatic generation of test reports
- Automatic generation of custom reports according to user specifications

Manage Data

- Measurements in the measurement database
- Methods for storage of measuring parameters
- Users and rights
  Function for archiving measurements

Quality & Continues Improvement

Are

Our Top Priority

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