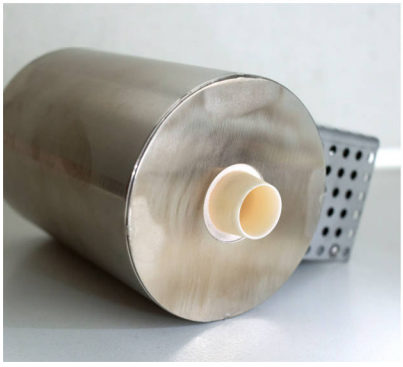
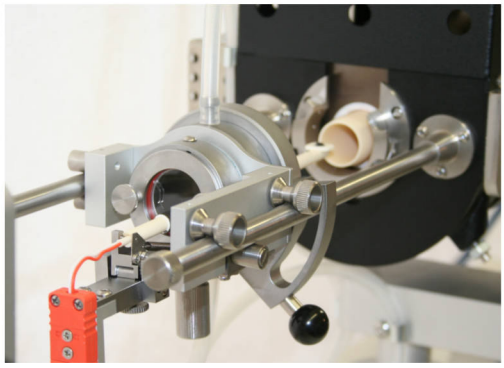
Hesse Instruments





Hesse Instruments Heating Microscopes

Catalogue

- Entire Systems and Accessories
- Consumables
- Wear Parts
- Services

effective from 01 May 2019

» Table of Contents

» Heating Microscope and Accessories

Hesse Instruments Heating Microscope

The heating microscope **EM301** includes (among others)

- … Lamp, furnace and camera, precisely adjustable on an optical bench[1)]
- … Furnace control unit with transformer
- … Measuring workstation computer[2)], ready to use, with OS Windows 10 and heating microscope software **EMI III**.
  The measuring workstation computer is pre-configured by **Hesse Instruments** and adjusted to the technical requirements of the heating microscope.

EM301 is available in two different versions, each with a different furnace model. The furnace control unit is adapted to the furnace; all other specifications are identical.

EM301-M16

Heating microscope with furnace **M16**

- … Furnace temperature: max. 1600 °C
- … Specimen temperature: max. 1500 °C
- … Heating rate: max. 80 K/min ≤ 1400 °C
  max. 50 K/min ≤ 1600 °C

EM301-M17

Heating microscope with furnace **M17**

- … Furnace temperature: max. 1700 °C
- … Specimen temperature: max. 1600 °C
- … Heating rate: max. 80 K/min ≤ 1400 °C
  max. 50 K/min ≤ 1600 °C
  max. 10 K/min ≤ 1700 °C

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1) You will find details about the optical bench, the three different heating microscope versions, the furnace control, the furnaces and the software in the respective data sheets from Hesse Instruments.
2) Business desktop PC with monitor and accessories like keyboard and mouse. Printer not included in the scope of delivery.

» Heating Microscope and Accessories

Installation of Heating Microscope and Peripheral Equipment

The heating microscope is a complex measuring instrument with the purpose of providing you with precisely determined measuring results. Hence, the installation of the heating microscope is carried out by trained technicians who are experienced in handling and operating the heating microscope.

If you purchase the heating microscope by one of our distributors, you can choose between an installation by the technical support of that distributor or by **Hesse Instruments**. If you purchase the heating microscope directly from **Hesse Instruments**, our technicians will carry out the installation.

We will provide you with an offer for the installation as well as an installation date upon request.

Scope of services includes:

- Final assembly of the complete heating microscope system, installation and function test at the customer‘s location
- Introduction into hardware and software operation
- Optional training course on request
- Equipment qualification report

Computer Accessory: Printer

The heating microscope software enables the user to print a measurement report as a pdf-file. The measurement workstation computer is equipped with a pdf reader software to open the produced reports.

The heating microscope's default scope of delivery does not include a printer.

We will provide you with an offer for a printer upon request.

» Heating Microscope and Accessories

Cooling Accessories: Circulating chiller and water filter

EM301 must be cooled during measurements, which can be done using the local water supply or a circulating chiller.

EM-CT107

Circulating chiller mini for the heating microscope, tested by **Hesse Instruments**

- Max. delivery: 20 l/min
- Max. delivery pressure: 0.2 bar – requires positioning of the chiller near the heating microscope[3)]
- Small footprint:
  Overall dimensions ca. 225 x 360 x 380 mm (W x D x H)
- Net weight ca. 23 kg
- Power supply requirement 230 V 1~ 50/60Hz; 300-700 VA[4)]

EM-WF215

Particle filter for protection of the flow rate sensor.

- For heating microscopes, which are cooled via the local water supply
- Filter element with 100 µm mesh size, removable for cleaning purposes

EM-SP208Z

Kit for preparation of cylindrically shaped specimens

- Hand press [EM-HP209Z] with small punch for demoulding and three tips for the hand press (diameters: 2 mm, 2.5 mm, 3 mm)[6)]
- Agate mortar and pestle
- Tweezers
- Spatula
- Drop-dispenser bottle
- Cleaning brushes

Protection Accessory: Dust cover

EZ-DC112

For protection of your heating microscope against dust and other environmental influences.

3) If such a placement is not possible, contact us for an offer for a chiller with a higher delivery pressure
4) Power supply requirements of the standard version of the chiller. Please contact us for an offer for a chiller with different requirements.
5) This article is only available in combination with a new heating microscope.
6) You can find detailed information about the hand press on page 9, article [EZ-HP209Z]

» Consumables

Alumina Substrates

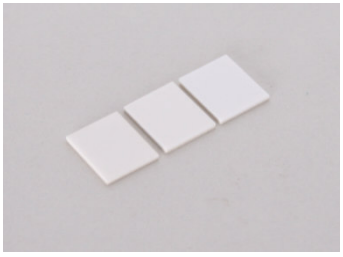
EZ-A121/997

Alumina substrates, 99.7 % Al_2O_3

- … Die pressed, surface "as fired“, rounded corners
- … Dimensions 12.0 x 10.0 x 1.5 mm, planar
- … Recommended application temperatures up to 1700 °C and higher – depending on furnace atmosphere and sample composition
- … Generally high corrosion resistance to aggressive ash melts
- … Substrates for optimal level of safety

Set of 100 pieces

EZ-A101/96



Alumina substrates, 96 % Al_2O_3

- … Tape casted and laser cut, limited performance on one side
- … Dimensions 12.0 x 10.0 x 1.0 mm, planar
- … Recommended application temperatures up to ca. 1600 °C – depending on furnace atmosphere and sample composition
- … Measurements of glass, glazes, vitreous enamels, ceramic material
- … Cost-saving substrates

Set of 100 pieces

Reference Material for Temperature-Calibration

EZ-TCK/Au

Test objects made of gold wire

- … for all furnaces
- … Purity 99.95 %, melting point 1064 °C
- … Wire diameter 0.25 mm

Set of 5 pieces

EZ-TCK/Pd

Test objects made of palladium wire

- … for furnaces with furnace temperatures > 1600 °C
- … Purity 99.99 %, melting point 1554 °C
- … Wire diameter 0.25 mm

Set of 5 pieces

» Parts Subject to Natural Wear

Wear Parts for the Measuring Cell – Individual Parts

EZ-HT/A180

Furnace working tube, 99.7 % Al_2O_3

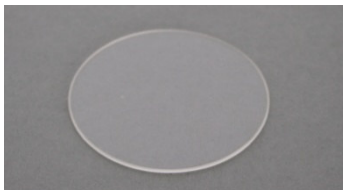
- … Suitable for tube furnaces **M16** and **M17**
- … Conical tube ends
- … Length 180 mm, inner diameter 20 mm, outer diameter 24 mm

EZ-SC171Br

Specimen holder with brass grommet

- … Alumina tube, one side closed, 99.7 % Al_2O_3
- … Length 171 mm, inner diameter 3 mm, outer diameter 6 mm

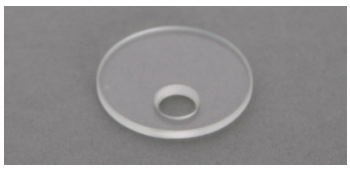
EZ-K501



Quartz glass disc 50/1
for furnace closure facing the camera

- … Vitreous silica, optically pure
- … Diameter depending on the design of your furnace closure 30 mm or 50 mm, thickness 1 mm
- … Not suitable for vacuum[7)]

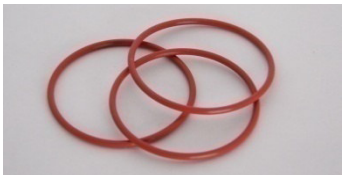
EZ-K301Bk



Quartz glass disc 30/2
for specimen carriage

- … Vitreous silica, optically pure
- … Diameter 30 mm, thickness 2 mm
- … With hole for specimen holder [EZ-SC171Br]

EZ-SR40/2



Silicone O-rings
for quartz glass disc [EZ-K501]

- … Diameter 50 mm

Set of 3 pieces

EZ-SR26/2

Silicone O-rings
for quartz glass disc [EZ-K301Bk]

- … Diameter 30 mm

Set of 3 pieces

7) Contact us for an offer for a vacuum suitable disc.

» Parts Subject to Natural Wear

Wear Parts for the Measuring Cell – Thermocouples

All thermocouples are delivered with an Al_2O_3 2-bore tube for electrical insulation.

Each thermocouple comes with a batch record from the manufacturer.

EZ-TC035S

Thermocouple type S, class 1
for furnaces with specimen thermocouple type S

- Colour coded plug and compensating cable (IEC 584): orange
- Wires protected by an Al_2O_3 2-bore tube, length 170 mm
- Wire diameter 0.35 mm, wire length 220 mm
- Operation temperature: specified to max. 1600 °C, recommended up to 1550 °C

EZ-TC035B

Thermocouple type B, class 2
for furnaces with specimen thermocouple type B

- Colour coded plug and compensating cable (IEC 584): gray
- Wires protected by an Al_2O_3 2-bore tube, length 170 mm
- Wire diameter 0.35 mm, wire length 220 mm
- Operation temperature: specified to max. 1800°C, recommended from 250 °C up to 1750 °C

Wear Parts for Specimen Preparation

Hand presses for the preparation of powder compacts are usually subject to abrasion. They need to be produced precisely in order to ensure the production of specimens with accurate dimensions.

EZ-HP209Z

Hand press for cylindrically shaped specimens

- Mould made of nitride hardened tool-steel
- Stainless steel punch with integrated spring
  Spring pressure of approx. 1.5 N/mm² (according to e.g. DIN 51730, CEN TS 15370, CEN TR 15404)
- Small stainless steel punch for demoulding the specimen
- Three stainless steel tips for the punch (diameters: 2.0 mm, 2.5 mm and 3.0 mm)

Specimen dimensions:

- Height 3.0 mm
- Three diameters: 3.0 mm, 2.5 mm and 2.0 mm

» Parts Subject to Natural Wear

Wear Parts for the Optical Bench

EZ-HB12/100

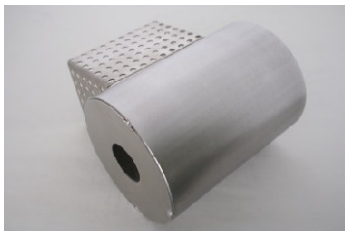
Halogen bulb suitable for the lamp of the heating microscope

… 12 V, 100 W

Tube Furnaces as Wear Parts

Furnaces – especially heating conductors – undergo natural ageing when exposed to high temperatures and temperature changes. Due to physico-chemical processes, a long-term wear cannot be avoided.

Based on a sophisticated material choice and technical design, **Hesse Instruments** furnaces are built for a high operating life time[8]. Especially molybdenum disilicide ($MoSi_2$) based heating conductors provide a long life span due to a protective SiO_2 surface layer.



EH-TF162

Furnace **M16**

Tube furnace with electric heating conductor of a dense material based on molybdenum disilicide ($MoSi_2$)

… Including exchangeable working tube (Al_2O_3) [EZ-HT/A180]
… Max. furnace temperature 1600 °C
… Heating rate: max. 80 K/min ≤ 1400 °C
max. 50 K/min ≤ 1600 °C[8]

EH-TF192L

Furnace **M17**

Tube furnace with electric heating conductor of a dense material based on molybdenum disilicide ($MoSi_2$)

… Including exchangeable working tube (Al_2O_3) [EZ-HT/A180]
… Max. furnace temperature 1700 °C
… Heating rate: max. 80 K/min ≤ 1400 °C
max. 50 K/min ≤ 1600 °C
max. 10 K/min ≤ 1700 °C[8]

8) You will find detailed information about the furnaces in the respective data sheets.

» Services

Maintenance of Heating Microscopes

Maintenance for both **Hesse Instruments** or retrofitted Leitz or Leica equipment.[9)]

Our well-trained and experienced technicians will inspect, clean, adjust and test your equipment in order to ensure the continued accuracy of your measurement results. Unexpected down-times are effectively prevented.

Throughout Germany, the maintenance of a heating microscope is carried out by **Hesse Instruments**. EU-wide and worldwide you can choose between a maintenance by **Hesse Instruments** or our local distributor.

We will provide you with an offer for the maintenance as well as a maintenance date on request.

Possible scope of services:

- Inspection, performance check, function related cleaning of specimen carriage, optical elements and furnace closures; optical adjustment
- Inspection of the image analysis system
- Optional one-point calibration of the temperature measuring chain
- Service report on all tasks carried out
- Necessary repairs, replaced parts or consumables will be charged separately

9) This article does not refer to immediate troubleshooting. In case of problems that need to be solved immediately, contact us per telephone or e-mail at cservice@hesse-instruments.de.

Expert Application Advice

Apart from day-to-day customer service or manuals and application notes, **Hesse Instruments** offers individual, application oriented customer support via telephone or e-mail as well as at your location or in our facility in Germany.

Scope of services includes:

- Training seminars with the heating microscope
- Development of measurement concepts
  optionally with a specific modification of your heating microscope
- Application measurements with evaluation and report

We will provide you with an offer for an application oriented customer support upon request.

Hesse Instruments Catalogue

for heating microscopes

effective from 01 May 2019

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