Zwick / Roell

Messphysik
Materials Testing

Product Information
Electromechanical Creep Testing Machine Kappa DS

Kappa 50 DS (extended)

Application

The Electromechanical Creep Testing Machine KAPPA DS offers a wide range of applications.

- Creep tests
- Creep rupture tests
- Stress rupture tests
- Relaxation tests
- Creep crack tests
- Definition of individual stepless sequences of load and temperature
- ‘Advanced creep‘ - Tests
  - Creep fatigue tests
  - Creep strain modelling (e.g. to give creep strength at various levels of strain)
  - Creep ductility
  - Creep property deterioration due to service exposure
  - Creep data from component tests
- Additional load-, stress- and strain-controlled tests such as tensile, compression, flexure, LCF or fracture toughness
- Ambient or elevated temperature
- For long term tests (reaching up to 10,000h)

Load Frame and drive system

- Stand-alone floor machine
- High stiffness, precision and flexibility by 4-columns-design and double screw design
- Precise axial alignment according to ASTM E 292 by precision crosshead guiding and special seating load train
- Requires no special base or foundation
- Includes vibration isolation with Sylomer-dampers under the load frame
- High resolution crosshead resolver and high resolution load channel permit excellent control characteristics
- Precise speed of +/-0.1% of set speed in range of 1µm/h to 100 mm/min (no load or constant load) measurement (average over 5 sec or 10 mm)
- High durability by use of brushless AC-motors
- Drive control sampling and adjustment frequency 6 ms
- Optional integration of high temperature controller in Kappa DS base

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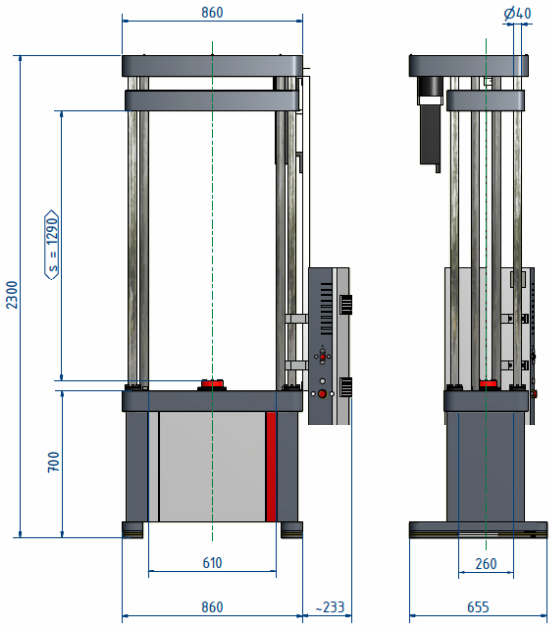
Specification Kappa 50 DS / 100 DS / 150 DS / 250 DS

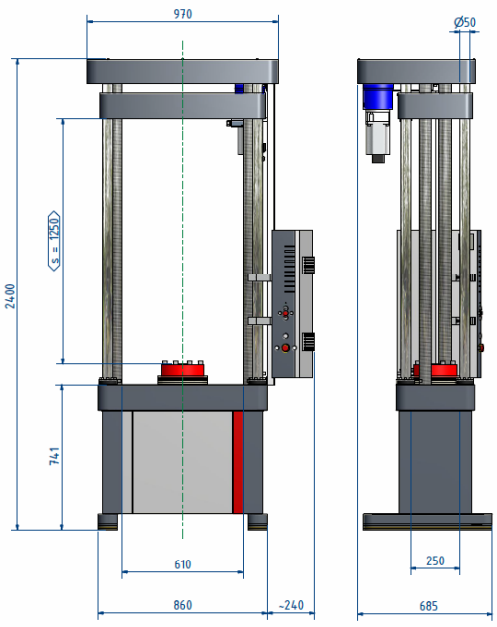
Technical data:

	Kappa 50 DS Kappa 100 DS	Kappa 150 DS Kappa 250 DS
load capacity	50 kN / 100 kN	150 kN / 250 kN
test area-depth	unlimited	unlimited
test area-width between drive screws	610 mm	610 mm
test area-height[1]	max. 1290 mm	max. 1250 mm
crosshead strokes	1290 mm	1250 mm
Lateral support of moving crosshead	precision sliding bearing on four hard chro-mium plated columns (40 mm diameter), (50 mm diameter 250 kN)	
Test speed range	0.001 mm/h to 100 mm/min	0.001 mm/h to 100 mm/min
Return speed	100 mm/min	100 mm/min
Crosshead speed accuracy	+/- 0.1 % of setting (no load or constant load averaged over 10 mm or 5 s)	+/- 0.1 % of setting (no load or constant load averaged over 10 mm or 5 s)
Resolution of stroke-encoder	0,003 µm	0,003 µm
Frame Dimensions (WxDxH)	860 x 655 x 2300 mm	970 x 685 x 2400 mm
Weight	840 kg	1120 kg
Power requirements	230 VAC, 1 kVA	230 VAC, 1 kVA

[1] vertical clearance (including mounted standard load cell but without jigs- and fixtures/grips)



Kappa 50/100 DS



Kappa 150/250 DS

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Electromechanical Creep Testing Machine Kappa DS

Accessories

Load cells

- Rotational symmetrical Design
- Precise axial alignment
- Electronic „Plug and Play“-Type (Calibration and technical data are saved in sensor plug)
- High accuracy (Linearity, Repeatability, Hysteresis, Resolution) acc. to ASTM E 4 and ISO 7500-1
- High measurement range in class 1 acc. to ISO 7500-1 from 0.2 % ....100% of nominal load
- Extreme low temperature sensitivity

Pull rods

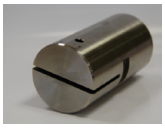
- Pull rods made of nickel-based superalloy
- Durability > 3 years at full load
- Upper pull rod with spherical bearing, lower pull rod with clamping lever
- Axial alignment acc. to ASTM E 292 and NADCAP-requirements
- No additional alignment cardan joints necessary

Specimen adapters

- Specimen adapters made of nickel-based superalloy

- Screw head
  - Round specimen

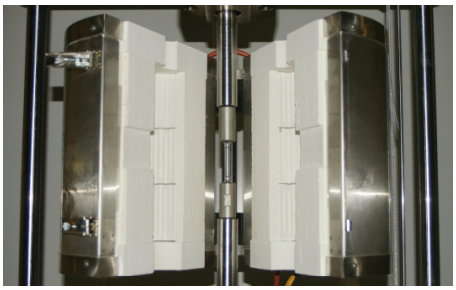
- Clevis couplings
  -Flat specimen



- Clevis couplings
  - Pipe segment specimen

Accessories

High temperature furnace and controller



HT-furnace

- 3-zone furnace standard from 100/200°C to 1.200 °C
- Internal diameter: 100 mm
- Heated length: 300 mm
- Vertical positioning of furnace: furnace stays in the centre of the specimen during test
- Openings for load train, Thermocouples and Extensometers
- Optional side windows for optical strain measurement
- 3 Thermocouples for furnace controller, up to 3 additional Thermocouples for temperature control at the specimen

HT-controller

- Integrated, sophisticated Control-Algorithm for a precise Temperature along specimen and to prevent Temperature overshooting
- Empirically determined control parameters for different temperatures are no longer required
- Automatic Controller settings from 100/200°C to 1.200°C
- Temperature-tolerances acc. ASTM E 139
- Interface for 6 Thermocouples (3 for furnace, 3 for specimen special configurations possible)
- Digital display of temperatures
- Stand Alone or PC-operation possible

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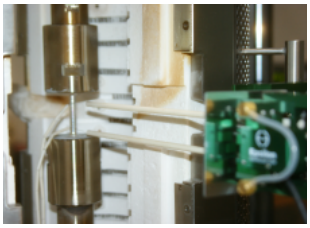
Accessories

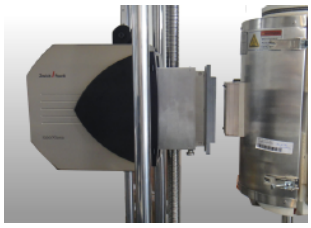
Extensometers

Measurement of axial strain

Side Entry:



Contacting Extensometer



Optical Extensometer

Axial Entry:

ME 31-400.1200°
(up to 1200°C - Ceramics)

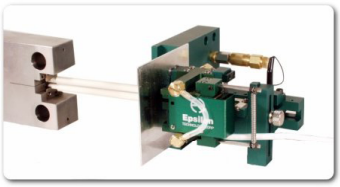
ME 31-400.850°
(up to 850°C - metal)

Measurement of flexure and compression

Highlights
- Simple attachment of feeler arms by use of adjustment wheel
- Quick set up for testing
- Measurement by reference feeler arms (2 x parallel to test axis to compensate temperature-caused extension of centric feelerarm (1x in test axis)
- Flexure: measurement of deflection of loaded specimen
- Compression: measurement of axial deformation of loade specimen

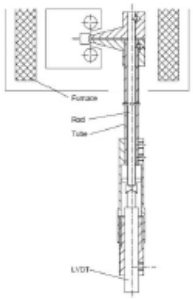
Measurement of Load line Deflection

Side entry



- up to 1.200 °C
- high purity alumina rods
- mounted on the HT-furnance
- Option: water cooling

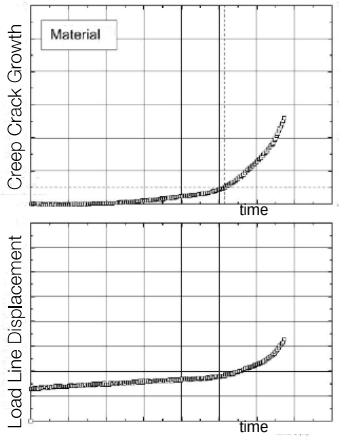
Axial entry



- up to 1.200 °C
- rod-in-tube-Design

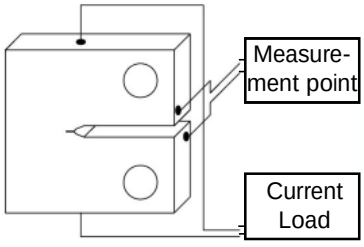
Creep Crack Growth measurement

Typical presentation of Creep Crack Growth Test
- Load Line Deflection measured by rod-in-tube Extensometer
- Crack length measured by DCPD-System



Creep growth

Load Line
deflection



DCPD Connection