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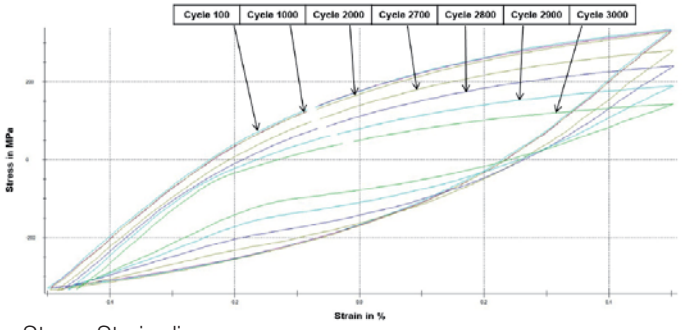
**Messphysik**
Materials Testing

# Product Information

## Electromechanical Creep Testing Machine Kappa SS-CF


Kappa 100 SS-CF with videoXtens HT/TZ




Stress-Strain diagram

### Application

The Electromechanical Creep Testing Machine KAPPA SS-CF offers a wide range of applications.

- Creep fatigue tests (through-zero)
- 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 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
- Tensile, compression, flexure, LCF or fracture toughness tests
- Ambient or elevated temperature
- For long term tests (reaching up to 10,000h)

### Load Frame and drive system

- High precision planetary gear and servo-motor placed centrically in load line
- Planetary gear and servo-motor moving up and down with the travelling cross-head
- Equal-zero backlash for cyclic through-zero testing
- High resolution crosshead resolver and high resolution load channel permit excellent control characteristics
- Stand-alone floor machine
- High stiffness, precision and durability by 4-columns-design and central single screw
- Precise axial alignment according to ISO 23788 and NADCAP-requirements by precision cross-head guiding and adjustable alignment device
- Requires no special base or foundation
- Includes vibration isolation with sylomer dampers under the load frame
- 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)
- Load-, stress- and strain-control
- High durability by use of brushless AC-motors
- The high drive control frequency of 1000 Hz enables fast, precise force and strain control

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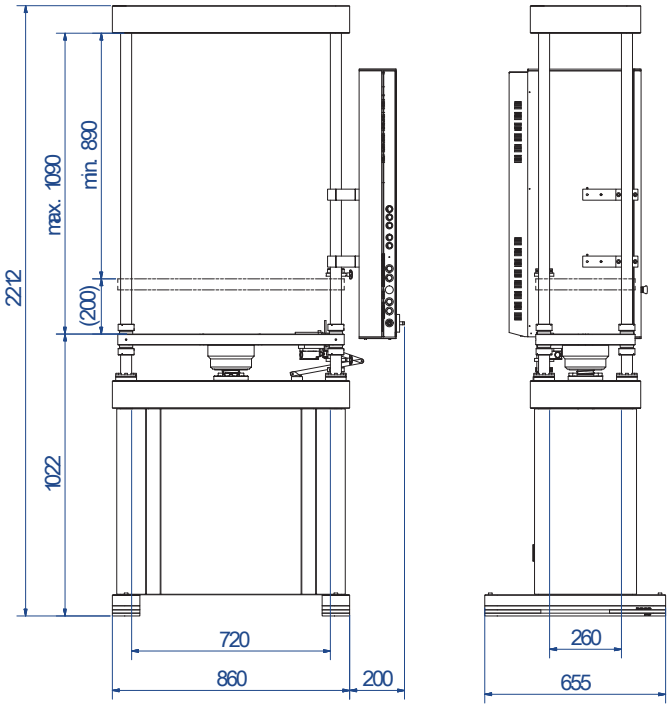
## Electromechanical Creep Testing Machine Kappa SS-CF

## Specification 50 SS-CF / 100 SS-CF

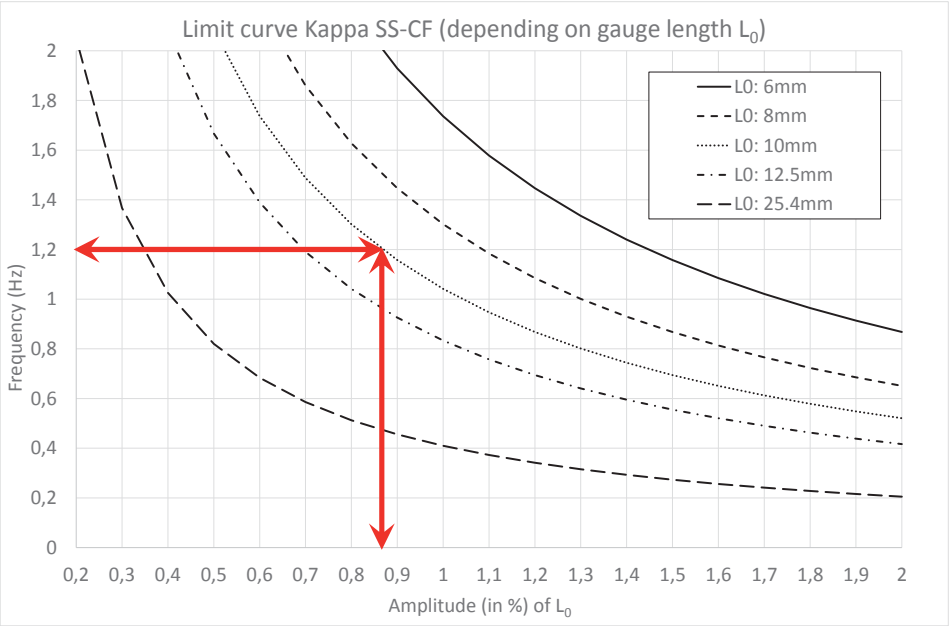
Technical data:

| | Kappa 50 SS-CF | Kappa 100 SS-CF |
|---|---|---|
| Load capacity | 50 kN | 100 kN |
| Test area-depth | unlimited | unlimited |
| Test area-width between drive screws | 720 mm | 720 mm |
| Test area-height | max. 1090 mm | max. 1090 mm |
| Crosshead stroke | 200 mm | 200 mm |
| Lateral support of moving crosshead | precision sliding bearing on four hard chromium-plated columns (40 mm diameter) | |
| Test speed range | 0.001 mm/h to 200 mm/min | 0.001 mm/h to 200 mm/min |
| Return speed | 200 mm/min | 200 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 | 0,14 nm | 0,14 nm |
| Frame Dimensions (WxDxH) | 860 x 655 x 2212 mm | 860 x 655 x 2212 mm |
| Weight | 700 kg | 700 kg |
| Power requirements | 230 VAC, 1 kVA | 230 VAC, 1 kVA |




## Dependency of cycling frequency and amplitude

Example: At a gauge length of 10 mm and a frequency of 1.2 Hz the max. amplitude is 0,87 % (≙0,087 mm) of initial gauge length and vice versa. The area of operation is below limit curve.



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# Product Information

## Electromechanical Creep Testing Machine Kappa SS-CF

### 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

#### Creep fatigue tooling & pull rods

- Creep fatigue tooling & pull rods made of nickel-based superalloy
- Durability > 3 years
- Axial alignment acc. to ISO 23788 and NADCAP-requirements by adjustable alignment device

#### Specimen adapters

- Specimen adapters made of nickel-based superalloy
- Round specimen

  - Screw head

  - Button head

### 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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# Product Information

## Electromechanical Creep Testing Machine Kappa SS-CF

### Extensometry for Creep Fatigue Tests

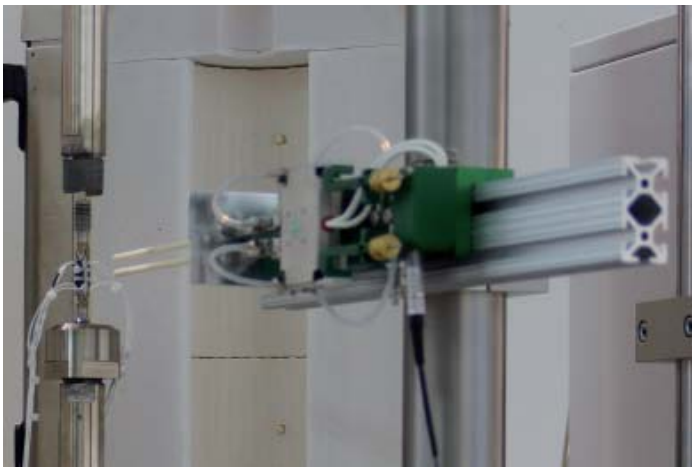
### a) Non-contacting Extensometer videoXtens HT/TZ


Marked test specimen

**Highlights:**

- High resolution video extensometer
- Designed to meet the demanding requirements of creep fatigue tests
- No influence (notching) on specimen
- No wear
- No break of feeler arms
- Equipped with high resolution lense and high power LED lighting
- Automatic target recognition
- Recording of initial gauge length
- Resolution down to 0.25µm (depending on field of view)
- Compliant with ISO 9513 class 0,5 requirements for accuracy (at field of view < 35 mm)
- VideoXtens software including calibration routine, calculation of both %-strain an mm-elongation
- Video processor based on a personal computer

### b) Contacting Extensometer



**Highlights:**

- Designed to meet the demanding requirements of creep fatigue tests and strain controlled testing, such as required by ISO 6892
- Designed to isolate the strain sensing components from external vibrations
- Compliant with ASTM E83 class B1 and ISO 9513, class 0.5 requirements for accuracy
- Quick set up for testing
- Hot mounting on samples possible
- Simple attachment of feeler arms
- Low contact force for easy, repeatable placement of the extensometer on subsequent specimens
- Mounted on stiff mounting device with horizontal guide rail
- Gauge length: 10mm
- Measurement range: +20%/-10%
- Gauge length can be easily adjusted to virtually any gauge length through the use of gauge length spacers

Extensometry for Creep Tensile, Flexure, Compression and CCG: see Product Information “Kappa SS”.