

## Product Information

### Load String for high-temperature tensile tests up to 1,200°C

CTA: 210409 210410



Load string with mounting studs and furnace



Load string with T-slotted shoe connector and furnace

#### Applications

The high-temperature pull rods transfer the force from the high-temperature specimen adapters in the furnace to the high-temperature pull rod coupling outside of the furnace. This load string is used for high-temperature tensile tests up to 1,200°C.

Interchangeable high-temperature specimen adapters enable tensile tests on:

- Round specimens with threaded head
- Flat specimens with shoulders
- Flat specimens with shoulder head and hole

The high-temperature load string consists of:

- High temperature pull rod coupling
- High-temperature pull rod
- High-temperature specimen adapter

#### Advantages and features

- Easy changeover with ambient temperature accessories via mounting studs or T-slotted mounting
- Secure alignment in accordance with ASTM E1012 due to automatic compensation of the smallest angular error with self-aligning spherical axial bearing.
- Easy changeover of specimen adapter according to specimen sizes and shapes
- Secure and quick gripping without tools
- High-temperature pull rods and specimen adapters are made from nickel-based alloy that has a high tensile and creep strength at temperatures up to 1,200°C
- A high-temperature pull rod made from ceramics with operating temperatures of up 1,500°C can also be combined with the high-temperature pull rod coupling.

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#### High-temperature pull rod coupling

The high-temperature pull rod coupling is connected to the mounting stud of the load cell or the flange, or the T-slotted mounting.

The high-temperature pull rod coupling can be combined with the metallic and the ceramic high-temperature pull rods. There are several mounting stud sizes available depending on the test load capacity.

#### High-temperature pull rod

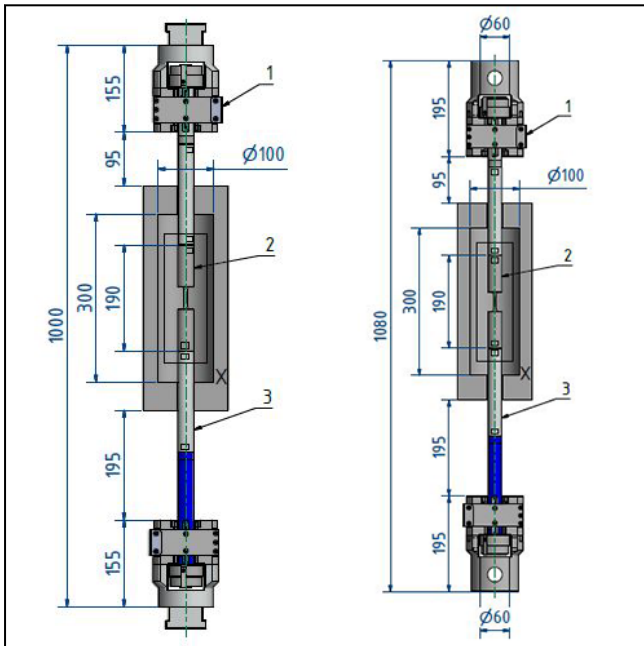
The overall length of the high-temperature system depends on the configuration (i.e. specimen adapter and furnace used). The overall length of the preferred version is 95 mm above and 195 mm below.

The high-temperature pull rod consists of a spherical axial bearing and two-part, high-temperature resistant pull rods.

After a one-time prealignment with the alignment rod, a spherical axial bearing secures the compensation from slight angular errors ensuring low-torque force transmission to ASTM E1012.

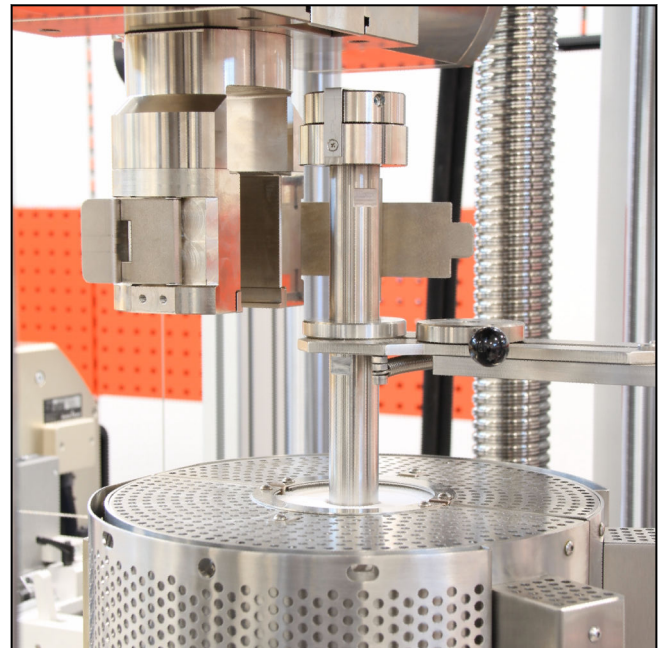
The overall length of the high-temperature load string at an installation height of the specimen adapters including specimens at 190 mm is a minimum of 1000 mm (T-slotted mounting) and a minimum of 1080 mm (mounting stud  $\varnothing$  60 mm).

CTA: 253112 210411



Installation scenario for load string with mounting stud (left) and T-slotted shoe connector (right) with fix furnace model series

- 1 High-temperature pull rod coupling
- 2 High-temperature specimen adapter
- 3 High-temperature pull rod



High-temperature load string is inserted into the high-temperature pull rod coupling

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#### High-temperature specimen adapter

The specimen adapters for various specimen sizes and types can be easily interchanged. Their adjusted length ensures that the specimen center always correlates to the furnace center for the various specimen sizes.

Furthermore, the height of the furnace can be adjusted steplessly and the furnace height can be automatically centered to the specimen center during the test.

The specimen adapters are suitable for tensile tests on metals at high temperatures (up to 1,200°C).

#### I) High-temperature specimen adapter for round specimens with threaded head

The specimen adapter is designed for round specimens with threaded head, according to size, to DIN EN ISO 6892-2 and ASTM E21. The force is transmitted through form fit connection via the threaded head.

#### II) High-temperature specimen adapter for flat specimens with shoulder head and hole

These specimen adapters are for flat specimens with a hole in the shoulder head to DIN EN ISO 6892-2 and ASTM E21. The force is transmitted through form fit connection via a lock-pin.

The specimen adapter is equipped with a double-sided adjustable centering stop. This ensures easy centering of various specimen thicknesses.

#### III) High-temperature specimen adapter for flat specimens with shoulders, without hole

The specimen adapter is designed for flat specimens with shoulder head to DIN EN ISO 6892-2 and ASTM E21. The force is transmitted through form fit connection via the shoulder radius.

The specimen adapter is equipped with a double-sided adjustable centering stop. This ensures easy centering of various specimen thicknesses.

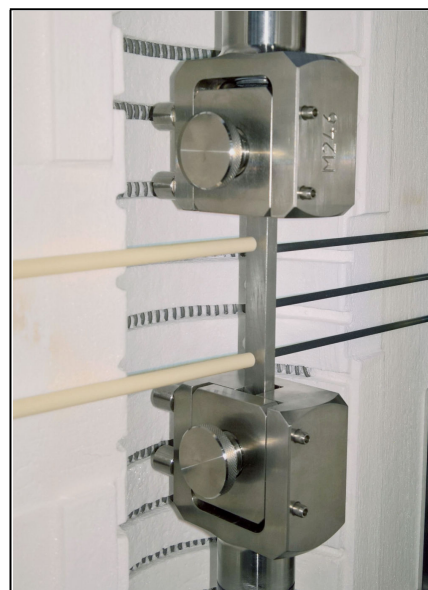
CTA: 75296 210368 210369



I) High-temperature specimen adapter for round specimens with threaded head and variable thermocouples (not attached)



II) High-temperature specimen adapter for shoulder-end specimens with hole and fixed thermocouples (attached)



III) High-temperature specimen adapter for flat specimens with shoulders and extensometer (attached at the front) and variable thermocouples (attached at the rear)

## Product Information

### Load String for high-temperature tensile tests up to 1,200°C

#### Technical data

##### High-temperature pull rod coupling

Scope of delivery: 1 pair	752128	016988	016987	043025	
Scope of delivery: 1 piece	085494	085493	085492	085495	
Fmax	10	50	250	250	kN
Connector	Ø 20	Ø 36	Ø 60	Via T-slotted mounting	mm
Installation height per piece	157	165	195	155	mm

##### High-temperature pull rod (scope of delivery 1 pair)

Description	Item number
HT pull rod for placing in the HT pull rod coupling - Fmax 100 kN - Temperature range: Ambient temperature up to 1,200°C	016618

##### High-temperature specimen adapter: Round specimens with threaded head (scope of delivery: 1 pair)

Thread size	Maximum force at temperatures up to 800°C [kN]	Maximum force at temperatures up to 1,000°C [kN]	Maximum force at temperatures up to 1,200°C [kN]	Installation height <sup>1)</sup> [mm]	Item Number
M 3	2.6	0.7	0.2	190	052794
M 4	5.5	1.5	0.5	190	016711
M 5	8.7	2.4	0.8	190	052796
M 6	12.5	3.5	1.15	190	043295
M 8	19.6	5.4	1.8	190	018290
M 10	28.2	7.8	2.6	190	016629
M 12	42	11.5	3.8	190	016627
M 14	54	15	5	190	019429
M 16	68	18.8	6.3	190	016657
M 18	76	24.8	8.2	190	023442
M 20	100	33	11	190	017437

1) 2 specimen adapters with specimen

##### High-temperature specimen adapter: Flat specimens with shoulders (scope of delivery: 1 pair)

Item Number	038626	052795	1064158	1064160	1064161	1064159	
Parallel width	6	10	12.5	12.5	12.5	20	mm
Thickness	8	12.5	8	12.5	12.5	8	mm
Shoulder length/width	25 / 20	30 / 28	25 / 25	25 / 50	30 / 28	25 / 40	mm
Shoulder radius	R12	R16	R20	R13	R16	R20	
Temperature range	5 ... 1,200	5 ... 1,200	5 ... 1,200	5 ... 1,200	5 ... 1,200	5 ... 1,200	°C
Installation height (pair)	2 x 70	2 x 70	2 x 70	2 x 70	2 x 70	n.s.	mm

##### High-temperature specimen adapter: Shoulder head with mounting hole (scope of delivery: 1 pair)

Item Number	016656	021823	016631	067623	016632	
Specimen thickness	0.5 ... 7	0.5 ... 7	0.5 ... 12	0.5 ... 12	0.5 ... 12	mm

All data at ambient temperature.

We reserve the right to make technical changes in the course of ongoing development.

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Item Number	016656	021823	016631	067623	016632	
Locking pin	Ø 10	Ø 11	Ø 12	Ø 13	Ø 15	mm
Installation height (pair)	2 x 100	2 x 100	2 x 100	2 x 100	2 x 100	mm
Temperature range	5 ... 1,200	5 ... 1,200	5 ... 1,200	5 ... 1,200	5 ... 1,200	°C