



**MI&T Mess- & Prüftechnik Berlin**  
**Measuring Instruments & Testers**

# **Clamping Tools**

## **Test Fixtures**



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Measuring Instruments & Testers

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## General Information

The **MI&T** offers a wide range of standard tools and test fixtures. The variable design of the **MI&T** testers with the universal tool mounting adaptors in conjunction with the variety of standard fixtures and clamping tools makes it possible to use the **MI&T** testers for manifold applications.

In case of applications where the standard tools of the **MI&T** product range are not suitable it is possible either to adapt the standard tools to the respective application or to design customer-specific special tools and test fixtures, which are suitable to the respective application. The variable design of the testers of model series MTM, ATM, FTM and FTS facilitate custom-designed extensions and reconstruction of the testers also.

Die **MI&T** standard and special tools can be used also with testers of other manufacturers.

## Tool Set HLL/MLH for Cable Insulation Pull-Off Testing

The tool set **HLL/MLH** for cable insulation pull-off tests consists of a holding frame **HLL** for mm bore gauges for assembly on measuring point of **MI&T** test devices, a corresponding suitable bore gauge half shell set with different bore diameters and a suitable cable clamp ( e. g. DKS-20/ or SHA-12/A) for assembly on the load slide of the test device.

The cables to be checked must be prepared for the test in the way that a small section of the cable insulation is cutted out in a pre-determined distance from the cable end. This method avoids that the part of the cable insulation to be tested is prestressed with tension forces what can lead to false measurements.

The standard bore gauge set **MLH 1** consists of 23 bore gauge half shells with bore diameters from 1.0 to 12.0 mm with 0.5 mm graduation. Upon request, customer-specific bore gauges with customized bore diameters are available.

### Specification bore gauge set **MLH 1**:

Bore diameter: 1.0 to 12.0 mm, graduation 0.5 mm.

Material: stainless steel

Max. load capacity: 500 N.

Usable with testers of model series FTM, ATM, MTM



## Testing Tool SPA/ML for Cable Insulation Pull-Off Testing

For cable insulation pull-off tests a mm bore gauge is used, which is inserted in a height adjustable holding frame assembled on the load slide of the tester.

The bore gauge can be moved sideways within the holding frame. On the measuring point of the tester a suitable quick action grippers for cables is assembled.

For the pull-off test stripped test samples must be prepared. The stripped end of the cable is inserted through the respective fitting bore and gripped by the cable grip on measuring point.

### Specification **ML1**:

Bore diameters from 0.1 to 10 mm, graduation 0.1 mm.

Dimensions: ca. 190x76 mm (WxH), material thickness 2.2 mm.

### Specification **ML2**:

Bore diameters from 10 to 20 mm, graduation 0.5 mm.

Dimensions: ca. 190x76 mm (WxH), material thickness 2,2 mm.

Usable with testers of model series FTM, ATM, MPM



Tool set SPA/ML for cable insulation pull-off testing

## Clamping Crowns SG 40, SG 80, SG 90, SG 140

Rotatable Clamping Crowns for fixing of wire terminals, connectors and other end fittings during tensile tests.

### SG 40:

40 mm diameter, 6 slots from 1.2 to 5 mm width;

Max. load capacity: 500 N.

Available for testers of model series EPT 50, CT 50, DFG.



SG 40

### SG 80:

80 mm diameter, 9 slots with 1/1.5/2/2.5/3/4/5/6/8 mm width and a slot with 20 mm width and stepped pin with step diameters 4, 6 and 8 mm.

Max. load capacity: 2000 N;

Available for all tester models.



SG 80

### SG 90:

90 mm diameter, 8 slots with 1,5/2/3/4/7/7,5/10/15 mm width

### SG 90V2:

90 mm diameter, 8 slots with 2/3/5/6/7/8/9/11 mm width

Both versions with stepped pin with step diameters 8, 12 and 16 mm and pivoting protection cover plate.

Customer-specific designs with application-specific slot widths available on request.

Max. load capacity: 10 kN.

Usable with testers with 5 and 10 kN nominal load.



SG 90

### SG 140:

140 mm diameter, incl. pivoting protection cover plate.

Standard version: 8 slots with 10/12/13/14/15/17/19/21 mm width,

Customer-specific designs with application-specific slot widths available on request.

Incl. pivoting protection cover plate.

Max. load capacity: 10 or 50 kN (depending on version).

Usable with testers with 5/10 kN or rather 50 kN nominal load (depending on version).



SG 140

## Universal Turntable UDT 100

### Universal Turntable UDT 100:

Turntable with 100 mm diameter

12 gripping and fastening stations for fixing of wire terminals, sleeves, end splices, round plug connectors and other end fittings and a threaded bore M6 for user's individual needs.

Max. capacity: 1000 N;

Reinforced model UDT 101 with max. capacity 2000 N.

Usable with testers of model series PT, FT, FTS, FTM, ATM, MTM.



## Fixture ADE for cable end sleeves

Fixture for testing cable end sleeves.

To avoid measuring errors during the test of end sleeves the fixture must grip between end sleeve and cable insulation in such a way that neither the end sleeve nor the conductor is crushed.

The ADE fixture provides 2 diameter adjustable blades, which can grip between end sleeve and cable insulation. The diameter adjustment for the cable cross section is continuously variable between 0 and 8 mm.

Max. load capacity: 500 N.

Available for all tester model series.



## Quick Action Grippers KSH-6

Quick Action Grippers for clamping cables, wires, fibres and shaped parts.

Clamping range from 0 to 6 mm.

The clamping diameter can be adjusted by the toggle arm action of the eccentric jaw mechanism, which can be released and arrested by locking screws.

Self-tightening toggle arm mechanism with increasing clamping pressure at increasing test loads.

Max. capacity: 500 N. Weight ca. 300 g.

Measuring point arrangement: KSH-6/M, Load slide arrangement: KSH-6/A

Available for testers of all model series.



## Quick Action Grippers SHA-12

Quick Action Grippers for clamping cables, wires, fibres and shaped parts.

Clamping range from 0 to 12 mm.

The clamping diameter can be adjusted by the toggle arm action of the eccentric jaw mechanism, which can be released and arrested by locking screws.

Self-tightening toggle arm mechanism with increasing clamping pressure at increasing test loads.

Max. capacity: 1000 N. Weight ca. 500 g.

Measuring point arrangement: SHA-12/M, Load slide arrangement: SHA-12/A

Usable with testers of model series FT, FTS, FTM, ATM, MTM.



## Quick Action Grippers SHA-20

Quick Action Grippers for clamping cables, wires, fibres and shaped parts.

Clamping range from 0 to 20 mm.

The clamping diameter can be adjusted by a central adjustment spindle, enabling a rapid diameter adjustment.

Self-tightening toggle arm mechanism with increasing clamping pressure at increasing test loads.

Max. capacity: 2000 N. Weight ca. 1.0 kg.

Measuring point arrangement: SHA-20/M, Load slide arrangement: SHA-20/A

Usable with testers of model series FTS, FTM, ATM, MTM.



## Quick Action Grippers SHA-40

Quick Action Grippers for clamping cables, wires, fibres and shaped parts.

Clamping range from 0 to 40 mm.

The clamping diameter can be adjusted by a central adjustment spindle, enabling a rapid diameter adjustment.

Self-tightening toggle arm mechanism with increasing clamping pressure at increasing test loads.

Max. capacity: 10000 N. Weight: ca. 3.4 kg

Measuring point arrangement: SHA-40/M, Load slide arrangement: SHA-40/A

Usable with testers of model series FTM, ATM, MTM with 5 or 10 kN nominal load.



For SHA-40W with exchangeable gripping jaws, please see separate description

### Mini Cable Clamp MK-8

Self-clamping cable clamp for pull-off tests of small cables, wires, strips, etc.  
The test specimen is inserted between the eccentric cam and the static block and is clamped by rotating the cam. The clamping pressure increases automatically during increasing test load. A diameter adjustment of the tool is not necessary.  
Clamping range 0-6 mm.  
Max. capacity: 500 N.  
Available for testers of model series PT, FT, FTS, FTM, ATM, MTM.



### Cable Clamp DKS-20

Self-clamping cable clamp for pull-off tests of cables, wires, strips, etc.  
The test specimen is inserted between the two eccentric cams and is clamped by rotating the cam by its small lever. When the tension load is applied the cams tighten automatically. The clamping pressure increases automatically during increasing test load. The cams adjust symmetrically.  
A diameter adjustment is not necessary.  
Clamping range 0-20 mm.  
Max. capacity: 2000 N.  
Usable with testers of model series PT, FT, FTS, FTM, ATM, MTM.



### Quick Action Grippers KSP-8

Quick Action Grippers with parallel clamping jaws for clamping cables, wires, fibres and shaped parts.  
Clamping range from 0 to 8 mm.  
The jaws can be opened by actuating the lateral small hand lever.  
Self-tightening toggle arm mechanism with increasing clamping pressure at increasing test loads.  
A diameter adjustment is not necessary.  
Max. capacity: 1000 N  
Usable with testers of model series PT, FT, FTS, FTM, ATM, MTM



**Quick Action Grippers KSP-8/Aa with automatic opening and closing mechanism**  
Special version of the KSP-8 for assembly on tester's load slide with additional mechanism for automatic opening and closing. The KSP-8/Aa opens automatically when the load slide drives back into starting position and closes automatically when the load slide drives during the test run.  
Max. capacity: 1000 N  
Usable with testers of model series FTS, FTM, ATM, MTM



### Cam-operated Grip DES-10

Cam-operated grip for testing the tensile strength of wires, stranded wires, enamel wires, cables, etc.  
The specimen is inserted between the parallel holding blocks and is clamped by rotating the cam by its hand lever. The division of the tension blocks with middle gap ensures the clamping of hard and smooth wires without slipping.

Max. capacity: 1000 N.  
Usable with testers of model series FTS, FTM, ATM, MTM.





## Special Cable Clamp KSS-25/A

Cable clamp for clamping cables, wires etc;  
The respective clamping diameter is adjusted using the adjusting spindle of one of the 2 clamping jaws. The cable is clamped using the clamping spindle of the other clamping jaw.  
The V-shaped clamping jaws tightly locks around the clamped cable and ensure an effective clamping.  
Opening width from 0 to 25 mm, infinitely adjustable.  
Clamping jaw length: 100 mm:

Max. capacity: 10000 N  
Material: stainless steel

Complete tool for assembly on the load slide of test stations with 5 or 10 kN nominal load.



## Special Cable Clamp KSW-25/A

Cable clamp for clamping cables, wires etc;  
Cable clamp with 2 complementary interengaging waved clamping jaws;  
The respective clamping diameter is adjusted using the adjusting spindle of one of the 2 clamping jaws. The cable is clamped using the clamping spindle of the other clamping jaw.  
Opening width from 0 to 25 mm, infinitely adjustable.  
Clamping jaw length: 100 mm:

Max. capacity: 10000 N  
Material: stainless steel

Complete tool for assembly on the load slide of test stations with 5 or 10 kN nominal load.



## Eccentric Cam Clamp ESP 20

Self-clamping cable clamp for pull-off tests of cables, wires, etc.  
Eccentric cams arranged in two rows (3+2) with half offset, eccentric cams with knurled surface.  
Simultaneous, even rotation of all cams for optimal clamping;  
rearward cam with hand lever for opening and closing of the eccentric cams.

Opening width from 0 to 18 mm, infinitely adjustable

Max. capacity: 10000 N;  
Material: stainless steel

The cable is inserted between the two rows of eccentric cams and is clamped slightly by rotating the cam with the small lever. When the tension load is applied the cams tighten automatically so that the clamping pressure increases during increasing test load. The cams adjust symmetrically.

A diameter adjustment for different cable sizes is not necessary.

For different cable types the ESP 20 is available in different versions with cams with different profiled surfaces.

Complete tool for assembly on the load slide of test stations with 5 or 10 kN nominal load.



## Eccentric Cam Clamp ESV 40

Self-clamping cable clamp for pull-off tests of cables, wires, etc. Eccentric cams arranged in two rows (3+2) with half offset, mounted on 2 moveable plates; lateral hand wheel for simultaneous, even adjustment of the moveable plates and for increasing the clamping force during the test if necessary.

The cable is inserted between the two rows of eccentric cams. Then the eccentric cams are applied to the cable by hand. When the tensile load is applied to the cable the eccentric cams tighten automatically so that the clamping pressure increases during increasing test load. If necessary the clamping force can be increased during the test procedure by pressing the adjustment plates together using the lateral hand wheel.

Eccentric cams with knurled surface.

Height of eccentric cams: 40 mm.

Opening width from 0 to 40 mm, infinitely adjustable.

Diameter of hand wheel: 20 mm (material: steel bronzed).

Max. capacity: 10000 N

Material: stainless steel

Complete tool for assembly on the load slide of test stations with 5 or 10 kN nominal load.



## Quick Action Gripper SHA-40

Quick Action Grippers for clamping cables, wires, fibres and shaped parts.

Clamping range from 0 to 40 mm.

The clamping diameter can be adjusted by a central adjustment spindle, enabling a rapid diameter adjustment.

Self-tightening toggle arm mechanism with increasing clamping pressure at increasing test loads.

Max. capacity: 10000 N. Weight: ca. 3.4 kg

Measuring point arrangement: SHA-40/M, Load slide arrangement: SHA-40/A

Usable with testers of model series FTM, ATM, MTM with 5 or 10 kN nominal load.

## Quick Action Gripper SHA-40W

Special version of quick action gripper SHA-40 with quick change clamping jaws.

The special version SHA-40W makes it possible to change the clamping jaws quickly and easily. Various standard designs of clamping jaws with different profiles are available in order to adapt the gripper to different test specimen.

Measuring point arrangement: SHA-40W/M, Load slide arrangement: SHA-40W/A

Available standard clamping jaws:

S1W: saw tooth profile

S2W: corrugated profile

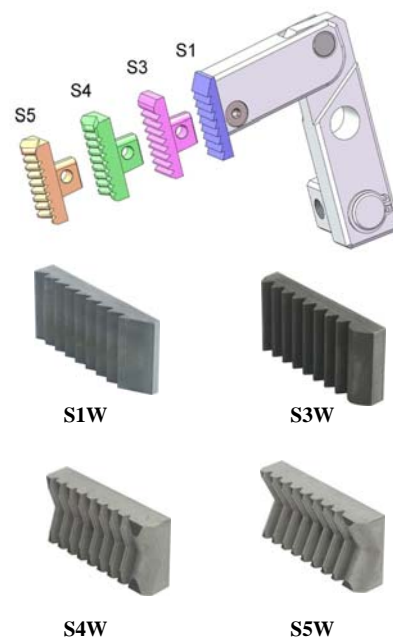
S3W: corrugated profile as jaw S2 but with rounded (spherical) front edge

S4W: V-shaped grip 2 mm with corrugated profile and rounded (spherical) front edge

S5W: V-shaped grip 4 mm with corrugated profile and rounded (spherical) front edge

S6W: fine saw tooth profile for small or sensitive specimens

Of course customer specific clamping jaws, which are adapted to the corresponding application, can be supplied also.



## Clamping Crowns SG 150 series

150 mm diameter, incl. pivoting protection cover plate.

Max. capacity: 25 kN

Available with quick-change adapters for mounting on test devices STM 25 kN

The clamping crowns of the 150 series are available in 3 standard versions:

**Model SG 150:**

8 slots with 5/6/7/8/9/10/11/13 mm width

**Model SG 151:**

6 slots with 10/12/13/15/15/17 mm width

**Model SG 152:**

5 slots with 17/19/21/24/25 mm width

Customer-specific special designs with application-specific slot widths available on request.



## Special Fixture SW-GA25-32/4Z

Special testing fixture with swage for testing the pull force strength of ultrasonic metal welding connections of wires at contact plates (axial welded cable on weld pad).

Swage with 2 adjustable fixing bars for contact parts with weld pads with a width of 12 to 32 mm and a maximum thickness of 4 mm.

Slidable protective cover plate to protect against test specimens parts flying around if the test specimen is destroyed.

Inclusive quick-change adapter for mounting on test devices STM 25 kN.

Max. capacity: 25 kN

Customer-specific special designs with application-specific fixtures for test specimens available on request.

Application examples:



SW-GA25-32/4Z

## Wedge Grip WCC 25 kN

Wedge grip with quick-change clamping jaws for clamping cables, flat and round specimens.

Jaws with different profiles and thicknesses can be used in the movable jaw holders of the WCC 25 kN

Depending on the thickness of the clamping jaws used, test objects with a thickness/diameter of 2 to 30 mm can be clamped.

Front and rear insert clamping jaws are available for optimal clamping, especially of cables, which, when using different profiles, enable optimal adaptation to the test object for non-destructive clamping.

Inclusive quick-change adapter for mounting on base plate of test device STM 25 kN

Max. capacity: 25 kN

Front standard insert jaw types (WxH 50x48 mm):

KV-S1: Saw tooth profile

KV-S3: Corrugated profile

KV-S4 (V12-S3): V-shaped jaws 12x2 mm with corrugated profile for round samples

KV-S5 (V16-S3): V-shaped jaws 16x4 mm with corrugated profile for round samples

KV-K: Pyramid (serrated) jaws

Rear standard insert jaws (WxH 15x48 mm)

KH-SZ5: 5 mm straight and sharp tooth profile

Further application-specific clamping jaw designs available on request



KV-S1

KV-S2

KH-SZ5



KV-S4

KV-S5

KV-S6



## Plug-in Plate SL-BAT for battery cable terminals

The plug-in plate SL-BAT features 7 standard receptions for battery cable terminals.

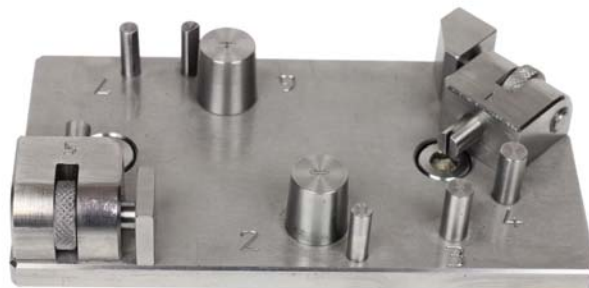
For the use of all receptions, which are arranged on both sides of the SL-BAT plate the plate must be reversed in the tool mounting adapter.

Special gripping stations designed according to customer's test samples are available on request.

Max. capacity: 5000 N;

Reinforced model SL-BAT-v: max. load capacity of 10000 N.

Usable with testers of model series FTM, ATM, MTM.



## Pull & Press Tappet STC

Pull and press tappet e. g. for shearing tests of welded joints, for push-out and press-in forces etc.

With quick-release lever on the top side for locking and releasing the tappet

On the front end of the tappet there is a mounting bore on the lower side in order to fix an application specific test pin.

A test pin is not included in the scope of delivery.

Custom-designed test pin according to specifications are available.

Max. capacity: 10000 N

Usable with testers with 5 and 10 kN nominal load..



## Testing Fixtures KU

Testing fixtures for testing the pull force strength of specimen with greater space requirements, e. g. for big cable lugs, wire terminals, welded joints, connectors and other end fittings, test specimen with housings, etc.

According to the respective application the testing fixtures KU can be supplied with customer-specific slot width or specimen-specific receptions with swages

Available for all tester models

Material: stainless steel

Complete testing fixture incl. quick-change tool reception for assembly on MI&T test stations.



**Detail:**  
fixation of crimped terminal

## Clamping Fixtures SW-MAK12 (90°/180°)S and SW-MCON12 (90°/180°)S for peel tests

Special testing fixture for testing the strength of welded joints (peeling tests) at contacts MAK 12 (90°/180°) and MAK 8 (90°/180°) respectively MCON 12 (90°/180°)

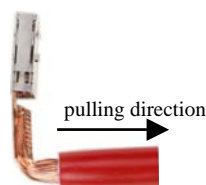
Suitable for angular and axial welded cables on weld pad.

SW-MAK12(90°/180°)S for MAK 8 and MAK 12 contacts (Lear)

SW-MCON12(90°/180°)S for MCON12 contacts (TE connectivity)

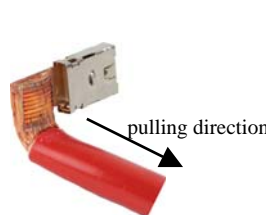
Max. capacity: 5000 N

Material: stainless steel



Complete testing fixture incl. quick-change tool reception for assembly on the measuring point of test stations models FTM/ATM/MTM 500/1000 in horizontal orientation.

By request also special receptions for other customer specific test samples can be designed and manufactured.



Usable with testers with 5 and 10 kN nominal load.

## Clamping Fixtures SW-MAK12 180°Z and SW-MCON12 180°Z for pull tests

Special testing fixtures for testing the pull force strength of welded joints at contacts MAK12 180° respectively MCONK12 180° (axial welded cable on weld pad).

SW-MAK12 90°Z for MAK 12 contacts (Lear)

SW-MCON12 180°Z for MCON 12 contacts (TE connectivity)

Max. capacity: 5000 N

Material: stainless steel

Complete testing fixture incl. quick-change tool reception for assembly on the measuring point of test stations models FTM/ATM/MTM 500/1000 in horizontal orientation.

By request also special receptions for other customer specific test samples can be designed and manufactured.



Usable with testers with 5 and 10 kN nominal load.

## Clamping Fixtures SW-MAK12 90°Z and SW-MCON12 90°Z for pull tests

Special testing fixtures for testing the pull force strength of welded joints at contacts MAK 12 90° respectively MCON 12 90° (angular welded cable on weld pad).

SW-MAK12 90°Z for MAK 12 contacts (Lear)

SW-MCON12 90°Z for MCON 12 contacts (TE connectivity)

Max. capacity: 5000 N

Material: stainless steel

Complete testing fixture incl. quick-change tool reception for assembly on the measuring point of test stations models FTM/ATM/MTM 500/1000 in horizontal orientation.

By request also special receptions for other customer specific test samples can be designed and manufactured.



Usable with testers with 5 and 10 kN nominal load.

## Clamping Fixture SW-SK14 90°S for peel test

Special testing fixture for testing the peeling forces of ultrasonic metal welding connections of wires at flat and angled contact plates (with axial welded cable on weld pad).

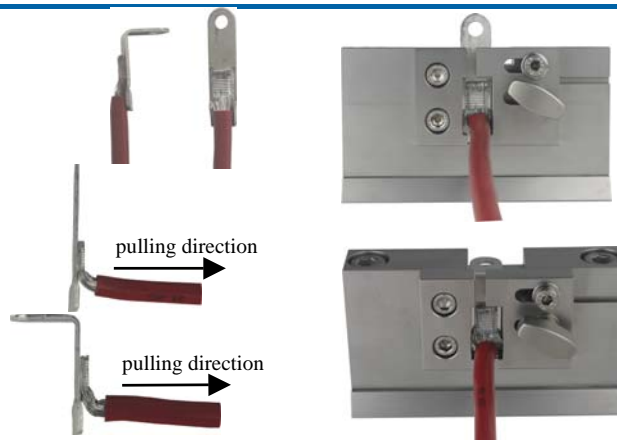
Max. capacity: 5000 N

Material: stainless steel

Complete testing fixture incl. quick-change tool reception for assembly on the measuring point of test stations models FTM/ATM/MTM 500/1000 in horizontal orientation.

By request also special receptions for other customer specific test samples can be designed and manufactured.

Usable with testers with 5 and 10 kN nominal load.Max.



## Clamping Fixture SW-SK14 180°Z for pull test

Special testing fixture with swage for testing the pull force strength of ultrasonic metal welding connections of wires at flat and angled contact plates (axial welded cable on weld pad).

Max. capacity: 5000 N

Material: stainless steel

Complete testing fixture incl. quick-change tool reception for assembly on the measuring point of test stations with 5 and 10 kN nominal load in horizontal orientation in horizontal orientation.

By request also special receptions for other customer specific test samples can be designed and manufactured.



## Clamping Fixture SW-WHT 90°S for peel test

Special testing fixture for testing the peeling forces of ultrasonic metal welding connections of wires at contact plates WHT (with axial welded cable on weld pad).

Max. capacity: 5000 N

Material: stainless steel

Complete testing fixture incl. quick-change tool reception for assembly on the measuring point of test stations with 5 and 10 kN nominal load in horizontal orientation.

By request also special receptions for other customer specific test samples can be designed and manufactured.



## Clamping Fixture SW-WHT 180°Z for pull test

Special testing fixture for testing the pull force strength of ultrasonic metal welding connections of wires at contact plates WHT (with axial welded cable on weld pad).

Max. capacity: 5000 N

Material: stainless steel

Complete testing fixture incl. quick-change tool reception for assembly on the measuring point of test stations with 5 and 10 kN nominal load.

By request also special receptions for other customer specific test samples can be designed and manufactured.



## Clamping Fixture SW-DEL841 90°S for peel test

Special testing fixture for testing the peeling forces of ultrasonic metal welding connections of wires at angled contact plates (DELPHI part no. 15542841 & 15542842 with 18 mm width).

Max. capacity: 5000 N

Material: stainless steel

Complete testing fixture incl. quick-change tool reception for assembly on the measuring point of test stations models FTM/ATM/MTM 500/1000 in horizontal orientation.

By request also special receptions for other customer specific test samples can be designed and manufactured.

Usable with testers with 5 and 10 kN nominal load.Max.



## Clamping Fixture SW-DEL841 180°Z for pull test

Special testing fixture with swage for testing the pull force strength of ultrasonic metal welding connections of wires at angled contact plates (DELPHI part no. 15542841 & 15542842 with 18 mm width).

Max. capacity: 5000 N

Material: stainless steel

Complete testing fixture incl. quick-change tool reception for assembly on the measuring point of test stations with 5 and 10 kN nominal load in horizontal orientation in horizontal orientation.

By request also special receptions for other customer specific test samples can be designed and manufactured.



## Clamping Fixture SW-PIN15 180°Z for pull test

Special testing fixture with swage for testing the pull force strength of ultrasonic metal welding connections of wires on weld pads of contact pins (e. g. of Rosenberger HPK and RKP plugs).

Max. capacity: 5000 N

Material: stainless steel

Complete testing fixture incl. quick-change tool reception for assembly on the measuring point of test stations.

By request also special receptions with swages for other customer specific test samples can be designed and manufactured.

Usable with testers with 5 and 10 kN nominal load.



## Clamping Fixture SW-PIN15 90°SV and SW-PIN15 90°SG for peel test

Special testing fixtures for testing the peel forces (peeling tests) of ultrasonic metal welding connections of wires welded on weld pads of contact pins (e. g. of Rosenberger HPK and RKP plugs).

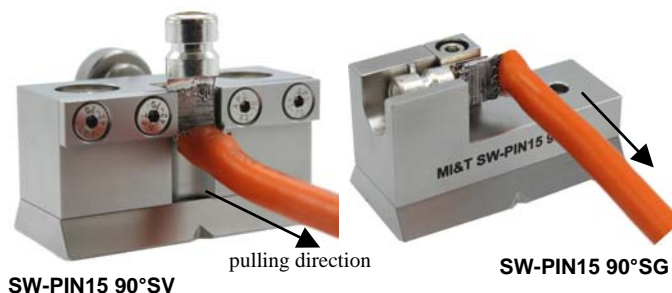
SW-PIN15 90°SV: suitable, if free areas to the right and left of the welded wire of the weld pad are available (according to Rosenberger specification)

SW-PIN15 90°SG: for large cable cross sections, if no sufficiently free edges of the weld pad besides the welded joint are available

Max. capacity: 5000 N;

Complete testing fixture incl. quick-change tool reception for assembly on the measuring point of test stations.

Usable with testers with 5 and 10 kN nominal load.





## Clamping Fixture SW-STO 90°S for peel test

Special testing fixture for testing the peeling forces of ultrasonic metal welding connections of Aluminium wires 10/16/25 mm<sup>2</sup> at cable lugs (e. g. Stocko, with axial welded cable on weld pad).

Max. capacity: 5000 N

Material: stainless steel

Complete testing fixture incl. quick-change tool reception for assembly on the measuring point of test stations models FTM/ATM/MTM 500/1000 in horizontal orientation.

By request also special receptions for other customer specific test samples can be designed and manufactured.

Usable with testers with 5 and 10 kN nominal load. Max.



## Clamping Fixture SW-STO 180°Z for pull test

Special testing fixture with swage for testing the pull force strength of ultrasonic metal welding connections of Aluminium wires 10/16/25 mm<sup>2</sup> at Cable lugs (e. g. Stocko, with axial welded cable on weld pad).

Max. capacity: 5000 N

Material: stainless steel

Complete testing fixture incl. quick-change tool reception for assembly on the measuring point of test stations with 5 and 10 kN nominal load in horizontal orientation in horizontal orientation.

By request also special receptions for other customer specific test samples can be designed and manufactured.



## Clamping Fixtures SW-KS0A-Z and SW-KS17W-Z for pull test

Special testing fixture for testing the pull force strength of crimped or ultrasonic metal welding connections of wires at ring terminals

SW-KS0A-Z for non-angled ring terminals with axially crimped or welded cables.

SW-KS17W-Z for angled ringed terminals with 17 degree tilt and axially crimped or welded cables

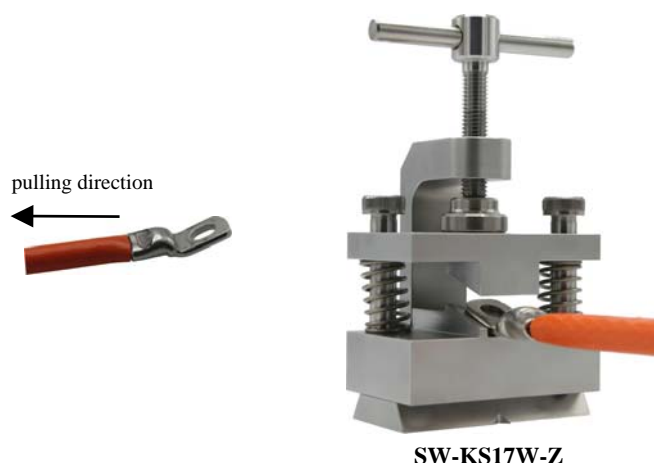
On request, the special fixturess can also be manufactured for customer-specific ring terminals of other dimensions and angles.

Max. capacity: 10000 N

Material: stainless steel

Complete testing fixture incl. quick-change tool reception for assembly on the measuring point of test stations with 5 and 10 kN nominal load.

By request also special receptions for other customer specific test samples can be designed and manufactured.



## Comb Tool KW e.g. for testing carbon brushes

The Comb Tools KW have slits with various widths and are suitable especially for great or bulky test specimen as for example carbon brushes. The comb tool can be lateral adjusted in the tool mounting adapter of the tester to position the needed slit in axial orientation to the grip on the load bar of the tester.

For gripping the connecting conductor of the carbon brushes suitable quick action gripper, cable clamp or miniature grip can be used.

Comb Tool KW 1:

Width: 100 mm, comb height 30 mm,  
6 Slits, width 3/4/5/6/7/8 mm, slit depth: 26 mm.

Comb Tool KW 2:

Width: 100 mm, comb height 20 mm,  
6 Slits, width 1.2/1.6/2/2.5/3/4 mm, slit depth: 19 mm.

Customer-specific versions available on request.

Max. capacity: 2000 N

Available for all tester model series.



Comb Tool KW 1



Comb Tool KW 2

## Slit Fixture AST

Slit fixture with adjustable slit width for testing the pull force strength e. g. of connector tubes, caps, seals or rings etc., which are fixed on cable insulations.

The reversible tool can be used from both sides so that also parts with greater diameter can be fixed with this fixture.

Slit width: continuously adjustable from 0 to 25 mm

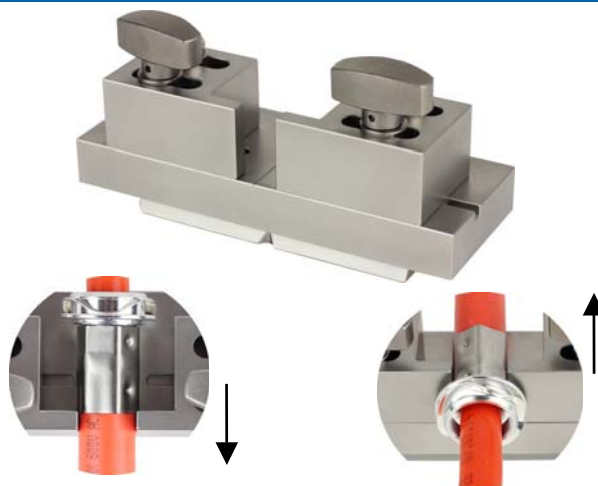
Jaw height: 20 mm

Max. capacity: 2000 N

Material: stainless steel

Complete testing fixture incl. quick-change tool reception for assembly on the measuring point of test stations.

Available for all tester model series



## Special Slit Fixtures SST

Slit fixtures in customized versions, e.g. for peel tests of ultrasonic welded cables on contact plates etc.

MI&T can adapt the slit fixtures SST to customer's individual application (e.g. SST-1, see picture on the right).

Max. capacity: 2000 N

Material: stainless steel

Complete testing fixture incl. quick-change tool reception for assembly on the measuring point of test stations.

Available for all tester model series



Fixture SST-1

## Comb Tool KW-BAT e. g. for accumulators

Comb tool with lateral retainers for testing connector pins and sheets of accumulators, batteries and capacitors.

The lateral retainers prevent that the test specimen turns during the test. The retainers are moveable to adapt the distance between them to specimen's size.

Comb width: 120 mm, comb height: 23 mm.

3 slits, width: 5/8/14 mm, slit depth: 20 mm.

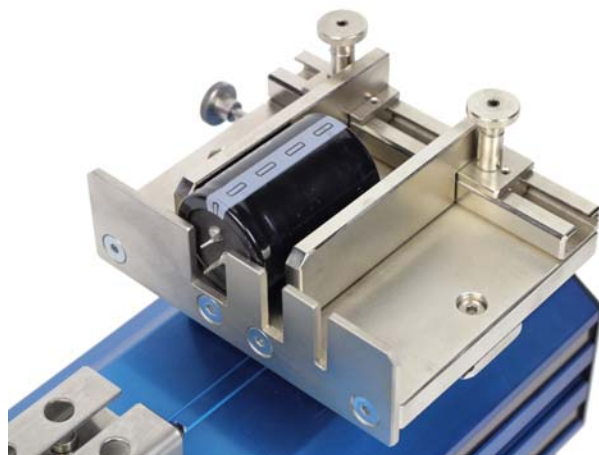
Customer-specific design available on request.

Max. capacity: 1000 N.

Arrangement on measuring point.

Available for testers of model series FTS, FTM, ATM, MTM.

For gripping the contact pins or sheets a height adjustable component grip KSEL-hv can be used.



## Fixture KU10-10S1

Special testing fixture for pull tests e. g. of cables with crimped terminals.

Carrier plate with slotted panel and 2 adjustable supports behind the slotted panel for lateral support of test specimen in order to prevent tilting/twisting of test specimen during test procedure.

The lateral adjustment of the supports facilitates the adaptation to different sizes and shapes of test specimen.

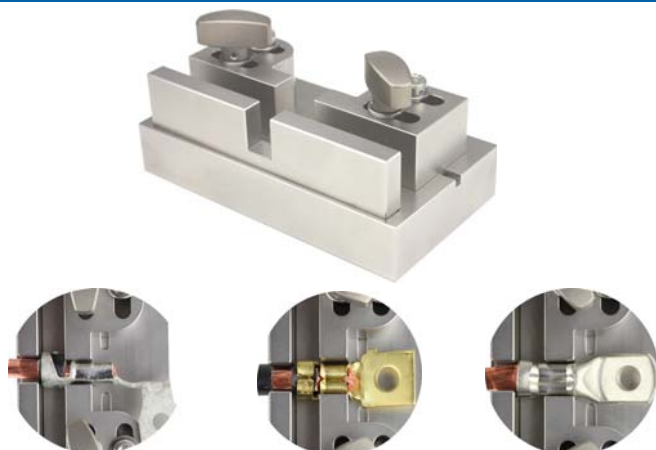
Slot width of standard panel: 10 mm, slit depth: 22 mm

Interchangeable slotted panel, panels with other slot widths (e.g. 12, 14, 16 mm) available on request.

Max. capacity: 10000 N.

Arrangement on measuring point.

Available for testers of model series FTS, FTM, ATM, MTM.



## Testing Tool HLL for retention tests of cable seals, cannulas, pressed joints etc.

The tool set HLL can be used for retention tests e. g. of cables seals, pressed joints, cannulas etc.

The tool set **HLL** consists of a holding frame HLL for mm bore gauges for assembly on measuring point of MI&T test devices, and a matching bore gauge half shell set with different bore diameters. The connected terminals, seals, connectors, cables, tubes etc. can be clamped with corresponding suitable clamping tools ( e. g. SSG, SSK, SHA-12) for assembly on the load slide of the test device.

### Specification bore gauge set MLH 1:

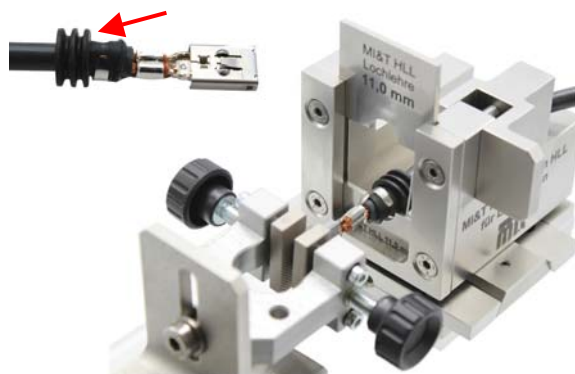
Bore diameter: 1.0 to 12.0 mm, graduation 0.5 mm.

Bore gauges with other diameters available on request.

Material: stainless steel

Max. load capacity: 500 N.

Usable with testers of model series FTM, ATM, MTM



Testing tool HLL for cable seal retention tests  
and Small Vise Grip SSG for clamping small terminals

## Miniature Component Grip FSEL

Narrow faced grip for small and difficult to grip parts as well as for gripping parts at hard to reach areas, e.g. for fine wires or electronic components.

Max. capacity: 500 N.

Measuring point arrangement: FSEL/M

Load slide arrangement: FSEL/A

Available for all tester model series



## Height adjustable Component Grip KSEL-hv

Narrow faced grip with clamping jaw for small and difficult to grip parts such as filaments, small components and other parts. The narrow grip on the jaws makes it ideal for testing on crowded circuit boards and other hard to reach places.

Height adjustable design for testing components or assemblies with different test points. By means of an additional laterally slidable fixture for the assembly to be tested each position on the assembly can be reached with the grip.

Load bar arrangement.

Max. load capacity: 500 N.

Available for all tester model series.



## Fixture ADE for cable end sleeves

Fixture for testing cable end sleeves.

To avoid measuring errors during the test of end sleeves the fixture must grip between end sleeve and cable insulation in such a way that neither the end sleeve nor the conductor is crushed.

The ADE fixture provides 2 diameter adjustable blades, which can grip between end sleeve and cable insulation. The diameter adjustment for the cable cross section is continuously variable between 0 and 8 mm.

Max. load capacity: 500 N.

Material: stainless steel

Available for all tester model series.



## Fixing and Clamping Tool SE 100

Fixing and clamping tool for testing of crimped or welded parts at SCHUKO or EURO connectors.

Plug-in plate with fixtures on both sides of the plate.

Max. capacity: 1000 N.

Available for all tester model series.

Customer-specific gripping stations or brackets designed according to customer's samples of test specimen can be assembled on the tool plate also.





## Self-tightening Grip TF 30

Grip for flat samples suitable for plastics, rubber, fabric, tapes, etc.  
Grip with eccentrically mounted serrated pressure roller for self-tightening of specimen during increasing test load.  
Max. gripping width: 25 mm (standard version).  
Max. capacity: 500 N.  
Customer-specific gripping widths are available on request.  
Available for all tester model series.



## Self-tightening Grip TF 30-50V

Grip in vertical arrangement for flat samples suitable for plastics, rubber, fabric, tapes, etc. with eccentrically mounted serrated pressure roller for self-tightening of specimen during increasing test load.  
Max. gripping width: 50 mm (standard version).  
Max. capacity: 500 N.  
Customer-specific gripping widths are available on request.

Available for all tester model series



## Eccentric Roller Grip TFH 50

Eccentric roller grip for tensile tests of flat specimen such as plastics, rubber, fabric, tapes, paper, packages, foil strips, etc.  
Pyramidal serrated roller  
Clamping width: 50 mm.  
Opening width: 0-7 mm

Max. capacity: 1000 N.

Available for all tester model series.



## Pincer Grip KSZ 10

Small pincer grip for small parts and flat specimen, foils, plastics, packages etc.  
Clamping surface ca. 12x12 mm, serrated  
KSZ 10/M for assembly on measuring point; KSZ 10/A for assembly on load slide  
(in both version the grip is mounted rotatable in the tool holder)  
KSZ 10D with M6 threaded bore for assembly at DFG gauge

Max. capacity: 500 N.  
Available for all tester model series.



## Pincer Grip KSZ 40

Small pincer grip for small parts and flat specimen, foils, plastics, packages etc.  
Clamping surface ca. 40x14 mm, serrated  
KSZ 40/M for assembly on measuring point; KSZ 40/A for assembly on load slide  
(in both version the grip can be used in horizontal and vertical arrangement)  
KSZ 10D with M6 threaded bore for assembly at DFG gauge

Max. capacity: 500 N.  
Available for all tester model series.



### Cam-operated Smooth Face Grip TF 40

Smooth face grip for testing the tensile strength of wires, small cables, films, foil strips, filaments etc.

The specimen is inserted between the gripping jaws and gripped by rotating the cam by the small lever.

In the standard version the gripping jaws have no profiling. Other designs are available on request.

Max. capacity: 500 N.

Available for all tester model series.



### Clamping Jaws TF 50

Clamping Jaws for tensile tests of flat samples such as plastics, paper, packages, cardboard strips, foil strips, etc.

Clamping width: 30 mm (standard version).

In the standard version the gripping jaws have no profiling. Other designs are available on request.

Max. capacity: 500 N.

Available for all tester model series.



### Vise Grip SSK

Vise grips in U-shape for tension tests of flat samples, foils, plastics, tapes, packages, tests at connectors and switches, etc.

SSK-10: Opening width from 0 to 10 mm, max. capacity: 2,5 kN

SSK-20: Opening width from 0 to 20 mm, SSK-30: Opening width from 0 to 30 mm,

SSK-50: Opening width from 0 to 50 mm, each with max. capacity of 1 kN

In standard version with pyramidal serrated jaw faces (pyramids 1,2x45°);

Alternative jaws: V-grooved jaws (for round test specimens), waved jaws (wave 5 mm, for flexible materials), diamond jaws (surface coated with synthetic diamonds), rubber jaws (1 mm rubber coating), blank jaws (steel blanks for your own treatment).

Fixation: threaded bore M6, optionally with quick-change tool mounting adapters



### Small Vise Grip SSG

Small vise grip in U-shape for tension tests of flat samples, foils, plastics, tapes, packages, tests at connectors and switches, etc.

Opening width: 0- 8 mm

In standard version with pyramidal serrated jaw faces (10x25 mm)

Alternative jaws: waved jaws (25x25 mm), diamond jaws (surface coated with synthetic diamonds, 10x25 mm), rubber jaws (10x25 mm), blank jaws (10x25 mm).

Fixation: threaded bore M6, optionally with quick-change tool mounting adapters

Max. capacity: 250 N.



### Test Cone TF 10

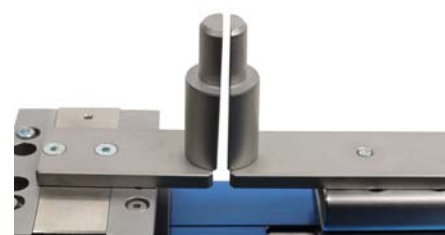
Divided mandrel for rubber, plastics or jewellery rings.

Stepped mandrel, diameter 14/24 mm. Adjusting the width of slit can vary the diameter.

Mandrel with customer-specific diameters available on request.

Max. capacity: 500 N.

Available for all tester model series.



## Insertion and Extraction Tool Set KLH

Tool set for measuring insertion and withdrawal forces of engagement-disengagement tests of crimp terminals, quick-connect terminals, connectors, antenna plugs, etc.

The tool set KLH consists of a moveable tool reception for assembly on the load slide of a force tester, featuring a parallel guidance bar with adjustable force idle facility to avoid pre-loads during change of test load direction, and for assembly on the measuring point of the tester a corresponding height adapted tool reception. The fixtures for the test samples are assembled on these tool receptions.

A fixture set for standard crimp terminals and a fixture set for antenna plugs is available as a standard.

Customer-specific fixtures adapted to customer's test specimen can be designed also.



Max. load capacity: 500 N.

Available for all tester model series.

## PCB Holding Frame LSS for shearing tests

Tool set for shearing tests of electronic components on PCBs consisting of PCB Holding Frame and Shearing Mechanism.

The PCB Holding Frame features an adjustable fixing bar for fixing PCB with side lengths of ca. 10 to 125 mm and a material thickness up to 3.5 mm.

Customer-specific holding frames can be designed also.

The shearing mechanism is height adjustable and features a vertical length adjustment of ca. 140 mm. The shearing pin has shearing blades on both sides with 2.5 and 6 mm width and can be reversed in the fastener.



Max. capacity: 500 N.

Available for all tester model series.

## Stepped Cone KBS for testing cable ties

Split stepped mandrel for testing cable ties.

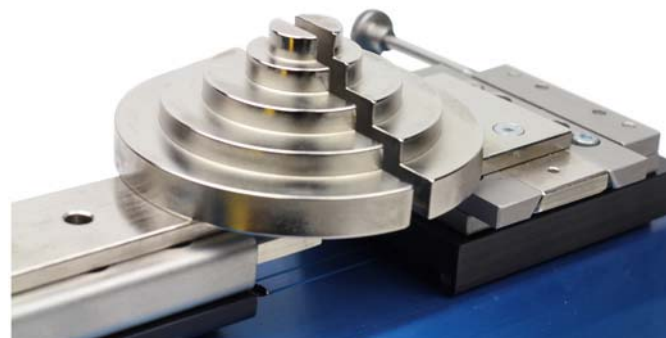
The cable tie is looped around a step of the mandrel with suitable diameter in such a way that the cable tie head is positioned to the side of the mandrel's slit.

During the test the two parts of the mandrel are extended by the testers load slide.

Stepped mandrel with 5 gradations: 18, 38, 48, 68, 86 mm. The diameters can be adapted additionally by the continuously adjustable length adjustment on the tool bar fixing of tester's load slide.

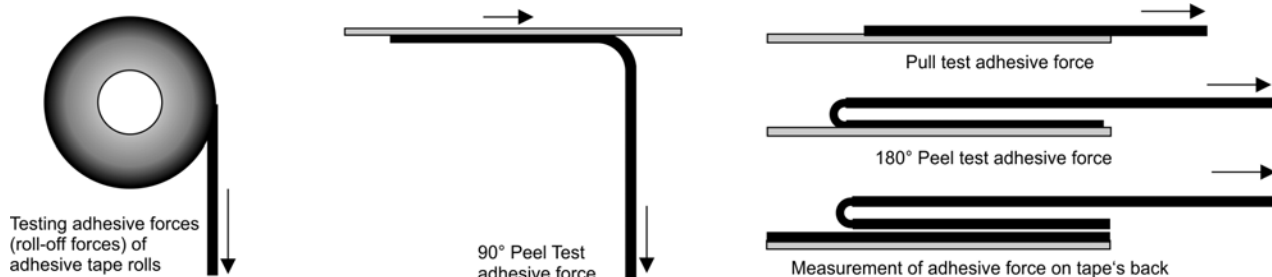
Max. capacity: 1000 N.

Available for all tester model series.



### Testing adhesive forces of adhesive tapes, foils etc.

Adhesive strength is the essential characteristic of adhesive tapes and a measure of the strength of the adhesive bond. For testing the adhesive force of adhesive tapes and foils different kind of tests can be carried out:



### Testing Tool TPT 90°S for 90° peel tests

Tool set for testing the 90° peeling forces of adhesive materials from a carrier plate.

The adhesive material is pasted on a carrier plate and the free end of the specimen is loaded under a right angle (90°).

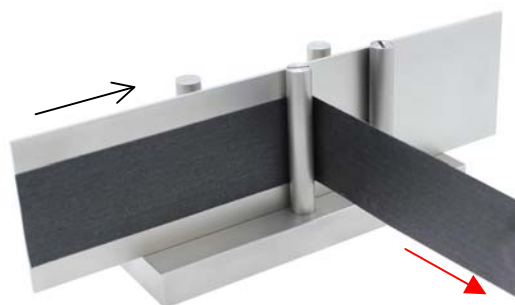
In order to ensure a 90° peel test with low-friction moving carrier plate the plate is inserted in a roller holder.

The free end of the tape can be gripped by a suitable grip, e.g. TFH 50, SSK, SSG, TF 30v or any other suitable grip, so that the tape can be peeled off from the carrier plate by the tester's drive unit.

Max. tape width: 50 mm

Length of carrier plate: 225 mm (max. adhesive length 175 mm)

Max. capacity: 500 N.



### Testing Tool TPT 0Z/180°S for pull (shearing) and 180° peel tests

Tool set for testing the pull (shearing) and 180° peeling forces of adhesive materials from a carrier plate or from tape's back.

The adhesive material is pasted on a carrier plate. For the pull (shearing) force test the adhesive material is loaded linear in the specimens plane. For the 180° peel test the free end of the pasted tape is folded in a 180° angle and is then peeled off from the plate or from tape's back.

The free end of the tape can be gripped by horizontal assembled self-tightening grips TFH 50, TF 30h or any other suitable grip.

Max. tape width: 50 mm

Length of carrier plate: 150 mm (max. adhesive length 150 mm)



### Fixtures TF 70 and TF 71 for adhesive tape rolls

Tool for testing adhesive forces (roll-off forces) of adhesive tape rolls.

The tape rolls are fixed on a rotatable mandrel. The mandrel TF 70 is suitable for tape rollers with inner core diameter of  $38,1 \pm 2$  mm (1,5"), the mandrel TF 71 is suitable for tape rollers with inner core diameter of  $76,2 \pm 2$  mm (3").

The free end of the tape can be gripped by a suitable grip, e.g. TFH 50, SSK, SSG, TF 30v or any other suitable gripping tool so that the tape can be uncoiled from its roll for the test by the tester's drive.

Max. tape width: 30 mm (TF 70), 50 mm (TF 71).

Max. capacity: 500 N.

Available for all tester model series.



TF 30 vertical

Ball Bearing Cone



## General Information

The versatile **MI&T** testers in combination with clamping tools and test fixtures suitable for the respective application provides flexible test systems for varying test applications in production line testing, material testing, incoming inspection and development. The special application presented below for testing cable ties and hand tools is an example for the versatile possible applications.

## Testing cable tie tighten pistols

For testing the tensile force of cable tie hand tools the tool set KBP can be used. The tool set consists of a special fixture for the cable tie pistol for assembly on the load slide of the tester and either of a plug-in plate with 3 pins of diameter 12, 20 and 30 mm or alternatively a suitable clamping tool for assembly on the measuring point of the tester.

For the test the cable tie is looped around one of the 3 pins or clamped by a quick action gripper and the strip end is inserted through the cable tie head. The tie is tightened firmly in such a way that one stroke of the pistol is sufficient to tension and cut-off. The free strip end is inserted into the open side of the cable tie tool head according to manufacturer's instructions. The head of the tool must have a distance of only a few millimetres to the cable tie head. Then the manual lever of the cable tie tool (trigger) is pulled to the stop. As soon as the pre-selected tension force of the pistol is reached, the free tie end is cut-off by the tool automatically. The tension force achieved at cut-off of the cable tie is determined and indicated on tester's display.

The special fixture for the cable tie pistol must be designed for the respective cable tie pistol model. Due to the manifold different shapes and dimensions of the different cable tie pistol models there is no all-purpose fixture, suitable for all pistol models, available. In principle special fixtures for all models of cable tie pistols are available respectively can be designed on request. Our standard delivery programme provides fixtures for cable tie tools model HellermannTyton MK3SP, MK3PNSP, MK 6PN, MK 7, MK 7HT, MK 7P, MK9, MK 9HT as well as Panduit GS2B, GS4H, PPTS and GTS.

The KBP tool sets are available for all tester models up to a nominal load of 1000 N and with tool reception bar on tester's load slide.



## Testing manually operated cable tie tighten pistols: Motor-driven actuation of the pistol trigger

In order to avoid influences to the test procedure by the operator during the tests of manually operated cable tie tighten pistols, for motorized testers of model series FTM, ATM and MTM also a special KBP tool set can be used, which enables to actuate the trigger of manually operated cable tie pistols with a constant actuating speed using the drive unit of the test station. Thus possible influences caused by different ways of actuation of the pistol trigger by the operator can be excluded during the test.

Using test stations ATM and MTM the test procedure can be carried out as an automated test so that after starting the test the test station actuates the trigger of the cable tie pistols with the selected actuation speed until the tension force of the pistol is reached and the cable tie is cut-off. After the cable tie has been cut-off by the pistol the load slide of the test station stops and drives back automatically to the starting position.

For further detailed information on this topic please see our brochure "Testing Cable Tie Tighten Pistols".





## Force Gauges Test Systems Test Stations



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