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TECH NOTE

T14 ZIP TESTING KIT

Overview of Zip Testing

Scope

The T14 Zip Testing Kit is used to test and measure the performance of various parts of zip fasteners. It is used in conjunction with T27 Pneumatic Grips and Titan. The kit has accessories to cover the most commonly requested tests but does not contain accessories for all test procedures. It is not applicable to resistance to reciprocation, nor is it applicable to the torque test, different apparatus is required for these procedures.

Safety of Operators

Testing the zip components can result in small parts and fragments being ejected at high speed from the specimen under test and the Laboratory should carry out their own risk assessment of the test procedures to establish safe working practices.

It is recommended that Operators (and other staff in close vicinity) wear eye protection and that Operators are aware of the potential of finger traps as many of the test procedures require the upper and lower grips to be moved into very close proximity of each other.

Standards

EN 16732
BS 3084 (withdrawn and superseded by EN 16732)
NF G91-005
ASTM D2061

About this Overview

This overview will describe in a simple way how each test procedure is set up on the Titan and with TestWise Test Analysis Software, and is based on the procedures in EN 16732, with some reference to ASTM D2061. This will be done mainly with pictures showing how the accessories are setup on Titan. In the description of each procedure, a list of the required tooling is given. In one example, Annex B, it will show the various steps to be followed while using TestWise.

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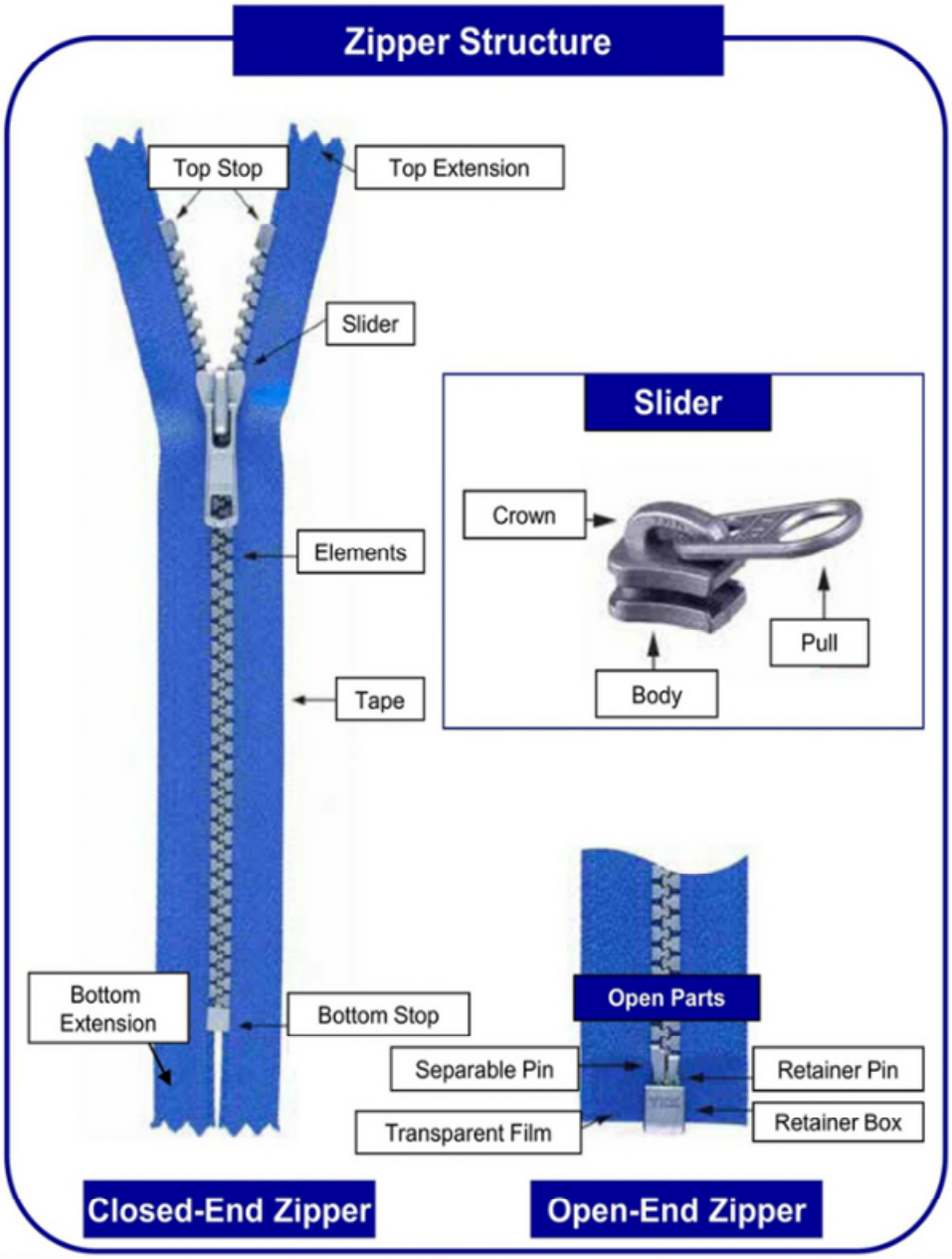
Anatomy of a Zip Fastener

Picture from YKK website



EN 16732:2015 - Slide fasteners (zips) - Specification

Published in 2015, this standard has replaced the popular BS 3084. In most parts, EN 16732 is very similar to BS 3084 in terms of the test procedures. However, it should be noted that some of the specifications have changed. EN 16732 details the test procedures in the normative Annexes B to K. The procedures described are those applicable to Titan (see table below).

EN 16732 Annexes

Annex	*Description*	*Apparatus*
B	Test for strength of puller attachment	CRE
C	Test for strength of closed-end	CRE
D	Test for strength of top stop	CRE
E	Test for strength of open-end slide fastener box	CRE
F	Test for resistance to reciprocation	RZT
G	Test for lateral strength of slide fastener	CRE
H	Test for lateral strength of open-end attachment	CRE
I	Test for strength of slider locking device	CRE
J	Test for open-end slide fastener single stringer slider retention	CRE
K	Torque test	TT

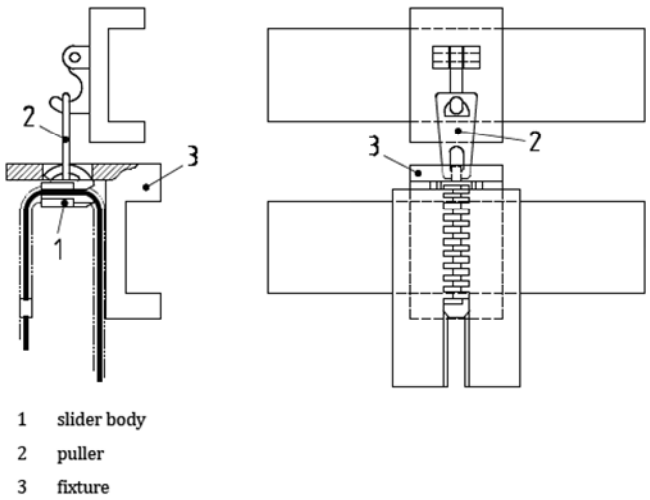
CRE Constant Rate of Extension Tensile Tester (Titan)
RZT Reciprocating Zip Tester
TT Torque Tester

Annex B - Test for strength of puller attachment

This section will also describe how to use TestWise for this type of test.
A video of this test is also available using this link
https://www.dropbox.com/s/zhs4wd1b8n9zin6/ZipTestingWithTitanAndTestWise.mp4?dl=0

Tooling Required:

- T27 Grips with full width rubber jaw faces, and set to "manual" (auto-open disabled)
- Holding Hook – with hole perpendicular to plane of jaw faces
- Hook – suitable size for puller
- Puller Fixture – fixed in lower jaws

Apparatus Schematic Diagram	*Setup on Titan*
 1 slider body 2 puller 3 fixture	
Other Pictures	*Setup on Titan with Specimen*
(None)	

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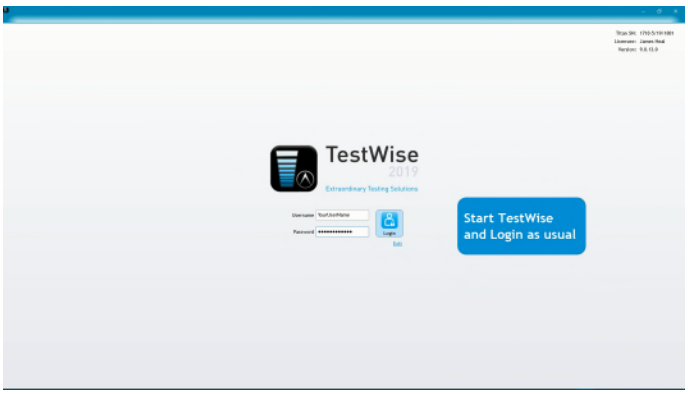
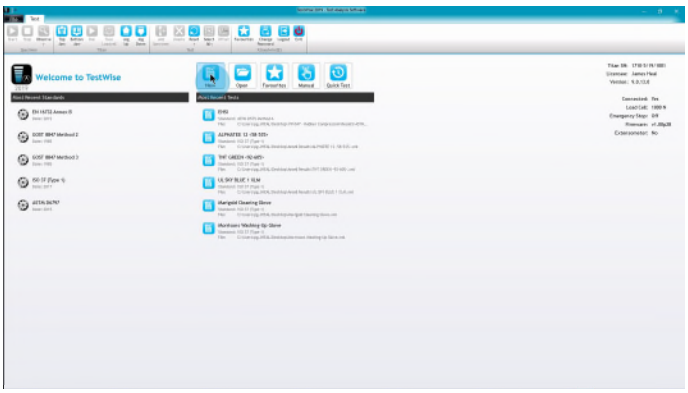
TECH NOTE

Using TestWise to carry out a Test

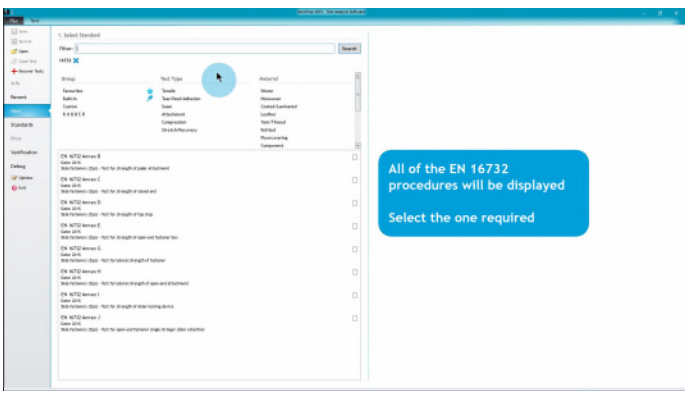
This example illustrates how to perform the EN 16732 Annex B Test for strength of puller attachment. Other test will use different attachments from the T14 Zip Testing Kit, however, the principle is the same.



Start TestWise and Login as usual



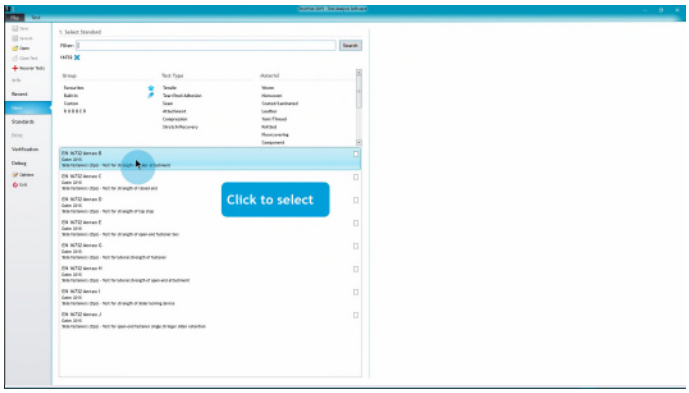
Start a New test



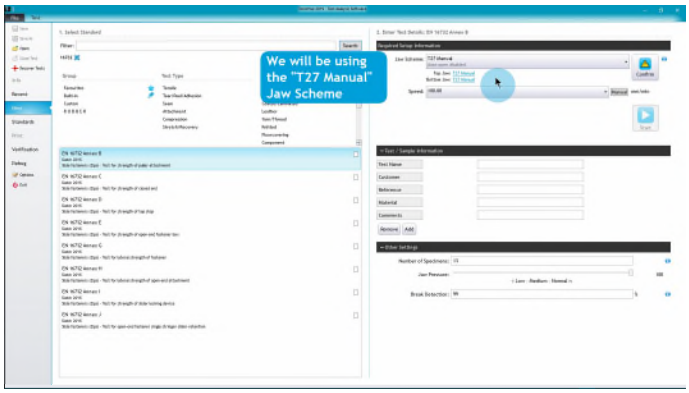
Type 16732 in the search bar and press Enter

All of the EN 16732 test procedures will be shown

Select the option required
We are selecting Annex B in this example

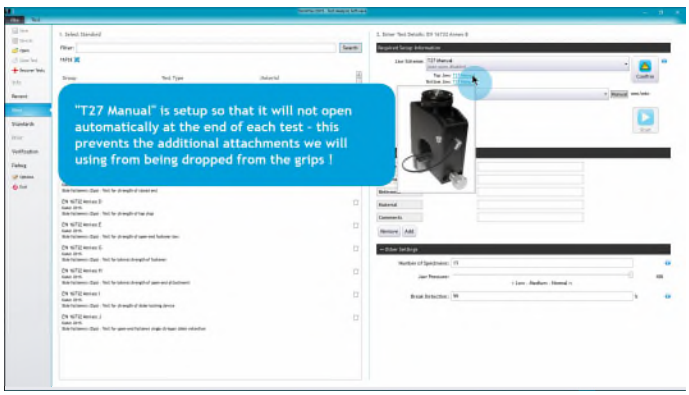


Click on the option required

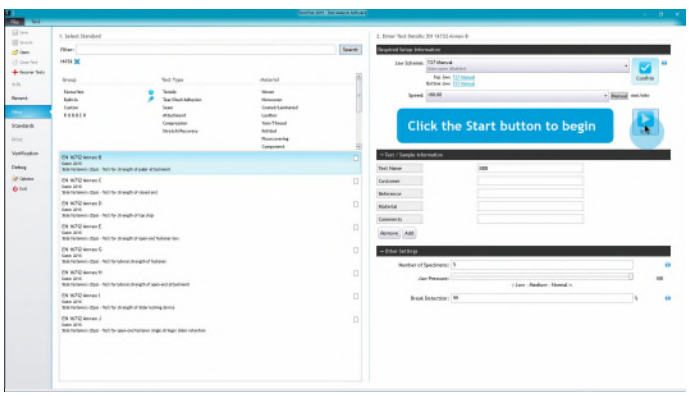


Select the "T27 Manual" Jaw Scheme
Check that the T27 Grips are physically connected to Titan and click the Confirm button

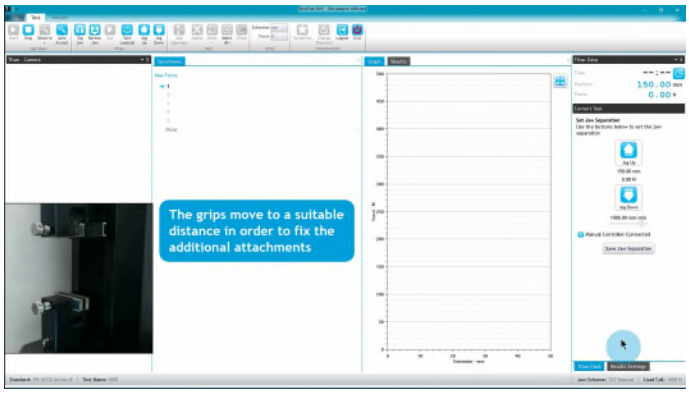
Enter details of the sample and number of specimens to be tested



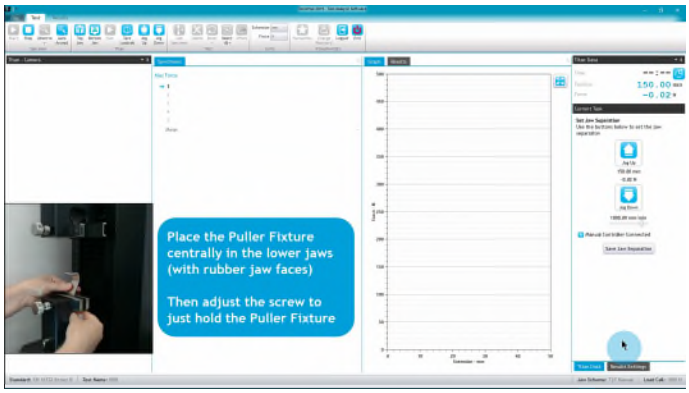
The "T27 Manual" Jaw Scheme is setup so that it will not open automatically at the end of each and therefore prevents the additional attachments from being released when opened



To commence the test, click Start

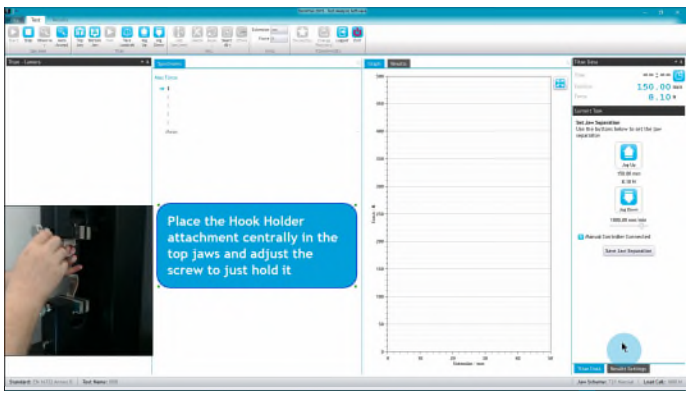


The jaws move to a suitable distance in order to fix the additional attachments



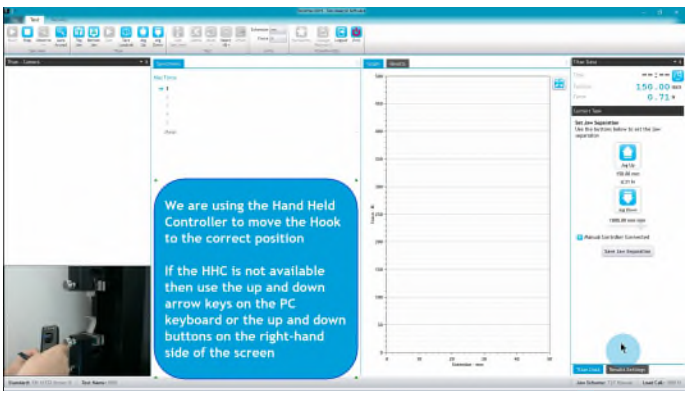
Place the Puller Fixture centrally in the lower jaws (with rubber jaw faces)

Then adjust the screw to just hold the Puller Fixture



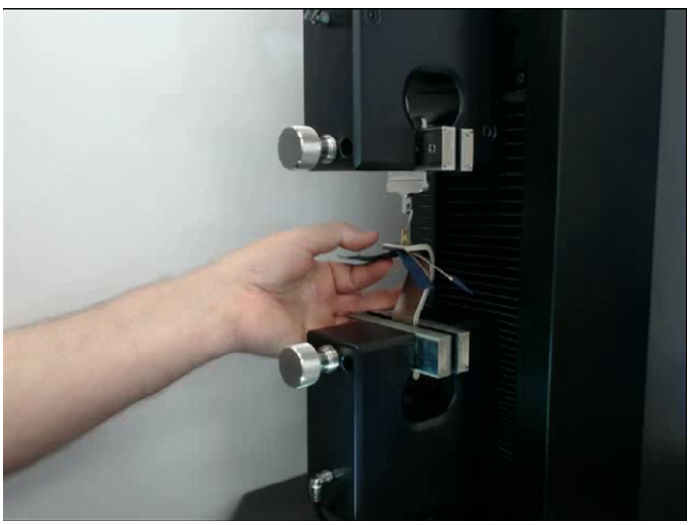
Place the Hook Holder attachment centrally in the top jaws and adjust the screw to just hold it

Finally, insert Hook
(of suitable size for the puller being tested)
into the Hook Holder



We are using the Hand Held Controller to move the Hook to the correct position

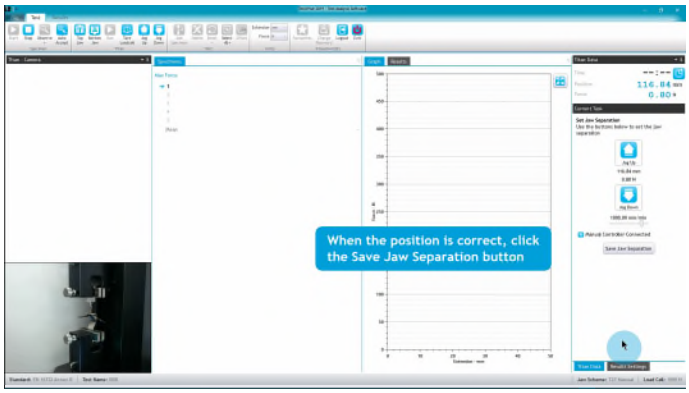
If the HHC is not available, then use the up and down arrow keys on the PC keyboard, or the up and down buttons on the right-hand side of the screen



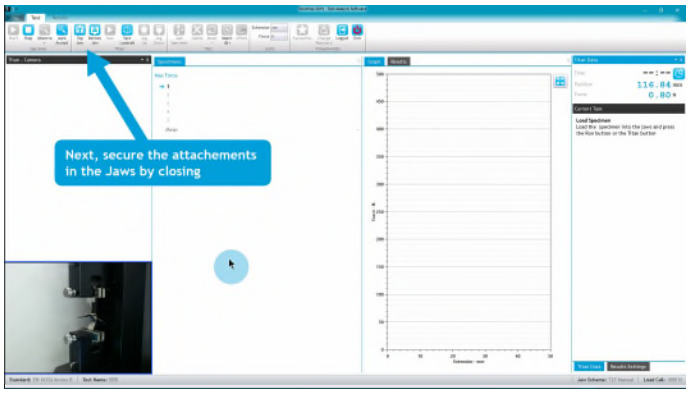
Insert the zip puller, from below, into the Puller Fixture

Position the Hook so that it can be passed through the hole in the puller (tab)

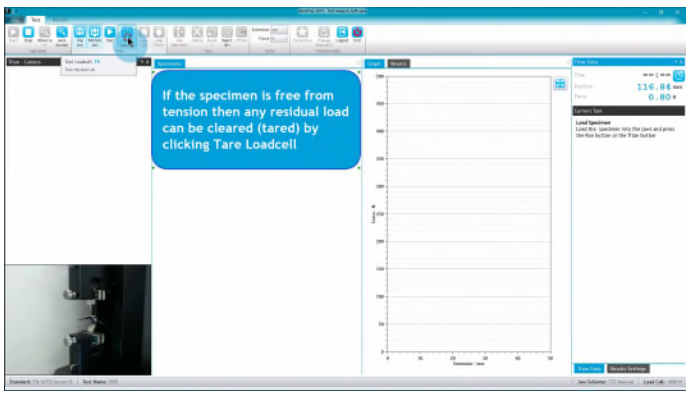
The final position should be enough hold the Hook in the Puller but without applying tension



When the position is correct, click the Save Jaw Separation button

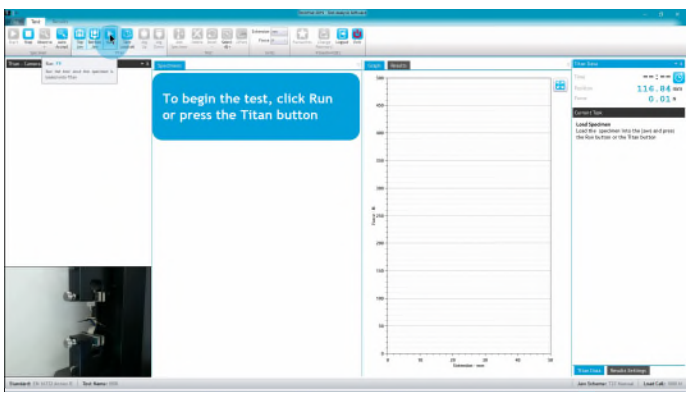


Secure the upper and lower attachments by closing the jaws

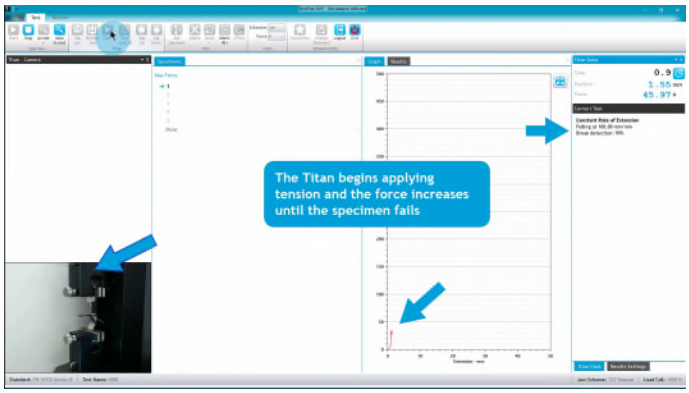


If the specimen is free from tension then any residual load can be cleared (tared) by clicking Tare Loadcell

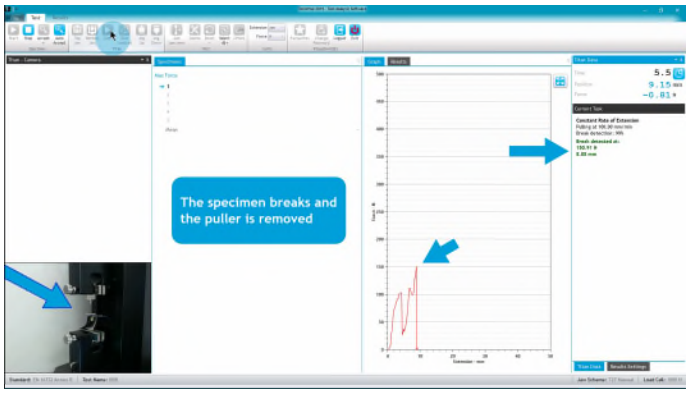
Do not tare the loadcell if the specimen is under tension - first remove the tension by adjusting the position, then tare the loadcell



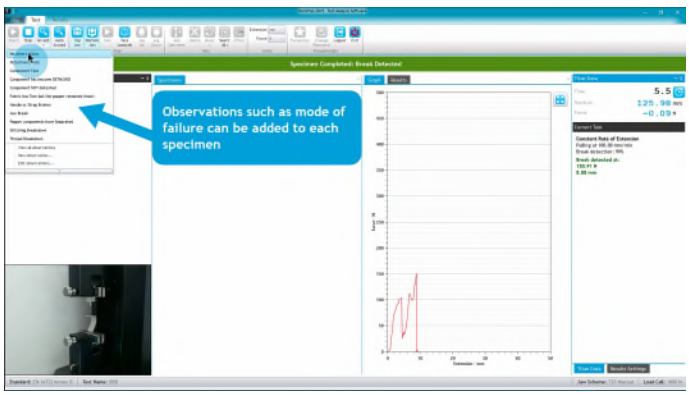
To begin the test, click Run or press the Titan button



The Titan begins applying tension and the force increases until the specimen fails



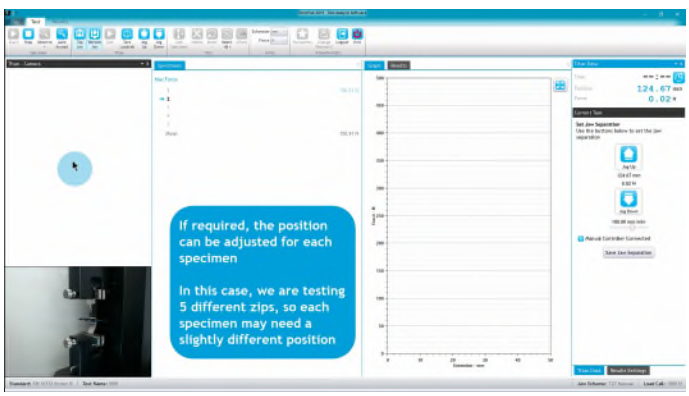
The specimen breaks and the puller is removed from the slider.



If required, Observations, such as mode of failure, can be added to each specimen.

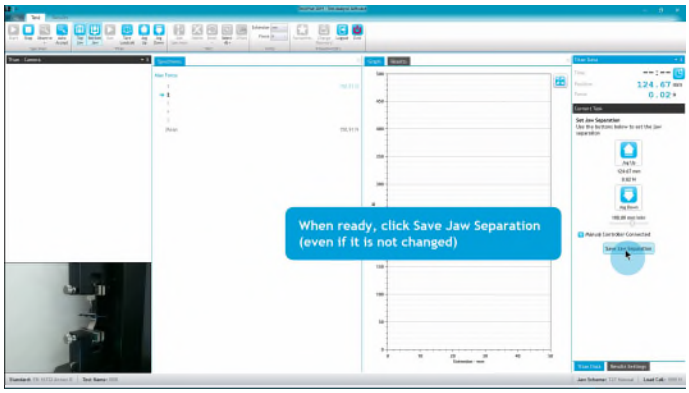
If Observations are not required then click Auto-Accept, and the result will be immediately accepted and move on to the next specimen

Observations can be added later if required

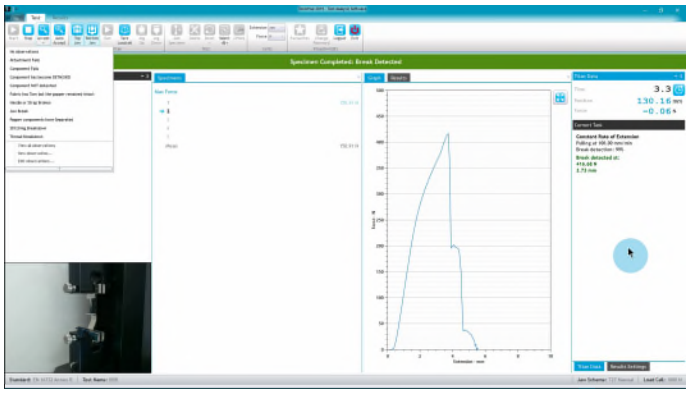


If required, the jaw separation position can be adjusted for each specimen

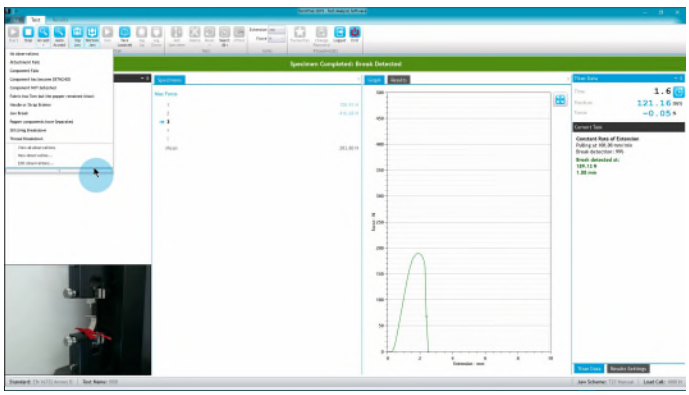
In this example, we are testing five (5) different zips, so as a consequence, each specimen may need a slightly different jaw separation position



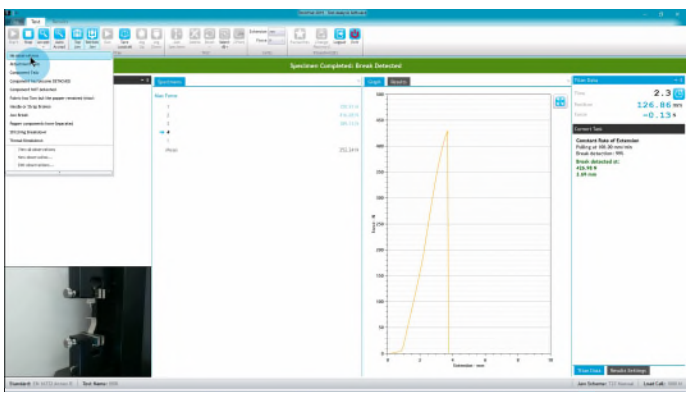
When the jaw separation position is set, click Save Jaw Separation, even if it is the same as previously used



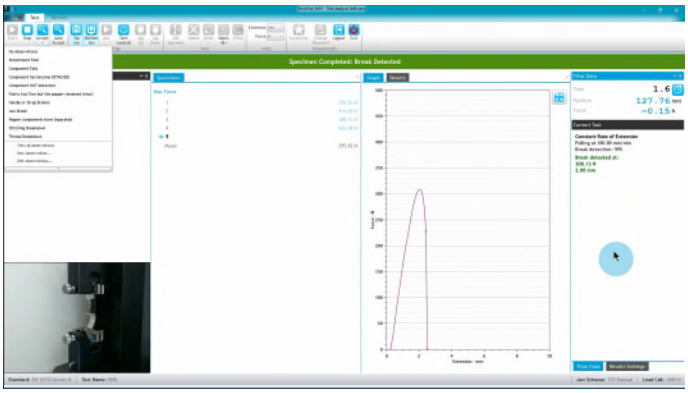
Result for specimen number 2



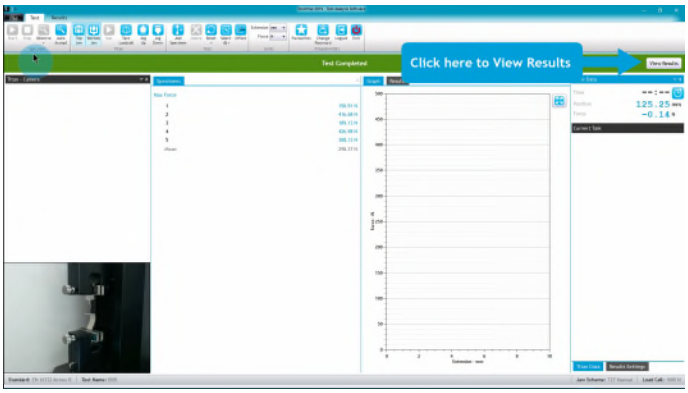
Result for specimen number 3



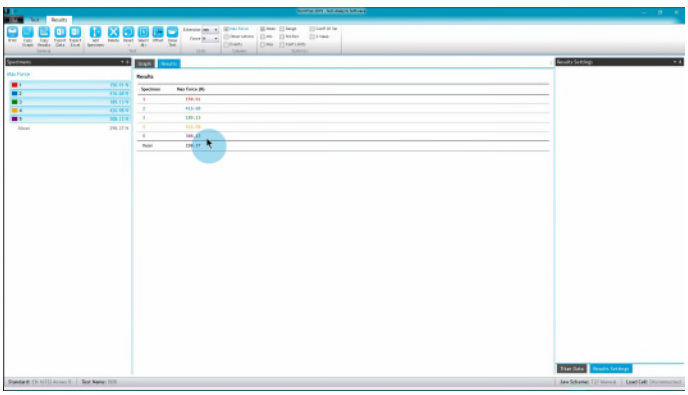
Result for specimen number 4



Result for specimen number 5

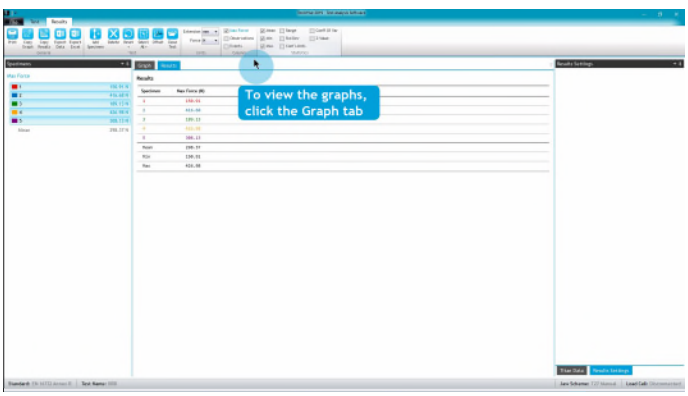


To view the results, click the View Results button

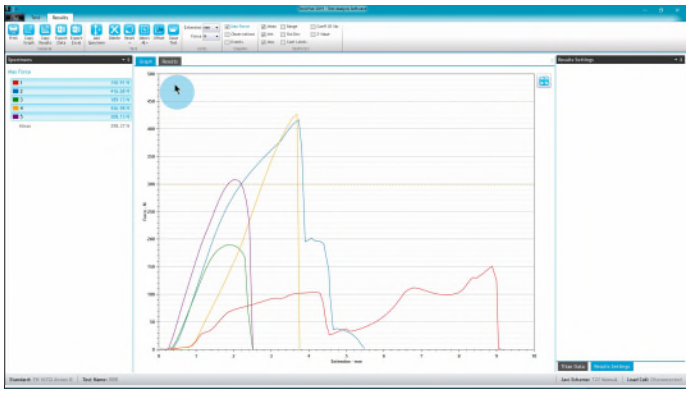


TestWise displays the Results tab

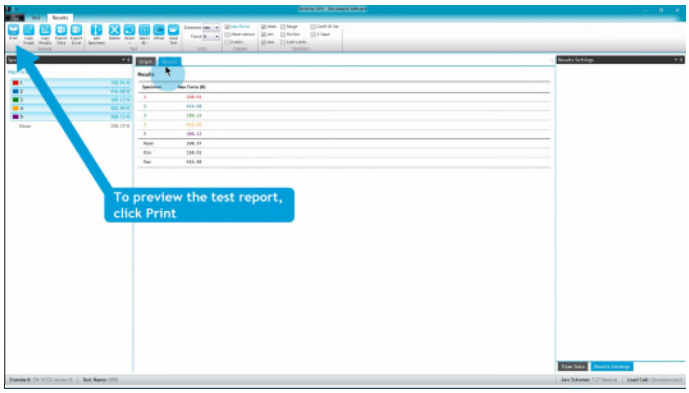
To add more statistics, in addition to the mean (average), simply check the boxes in the Statistics section of the ribbon



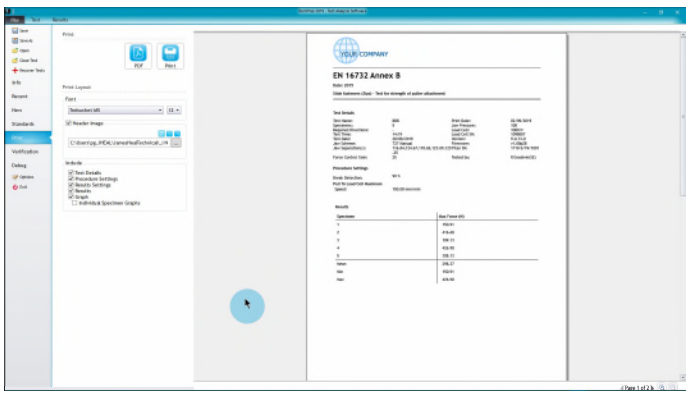
To switch to graph view, click the Graph tab



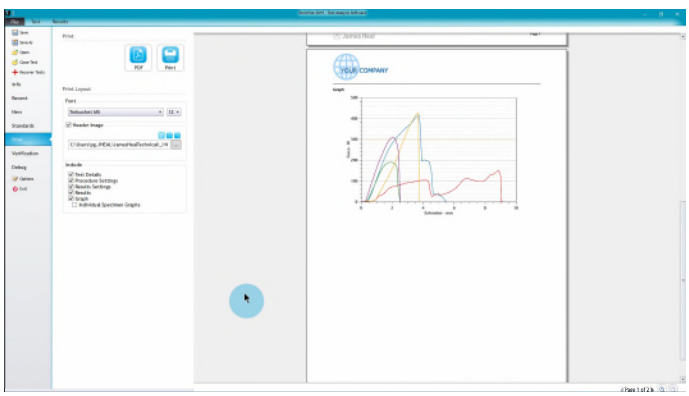
Graph view of selected specimens



To see a preview of the test report, click the Print button

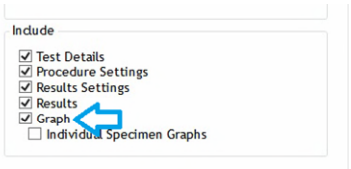


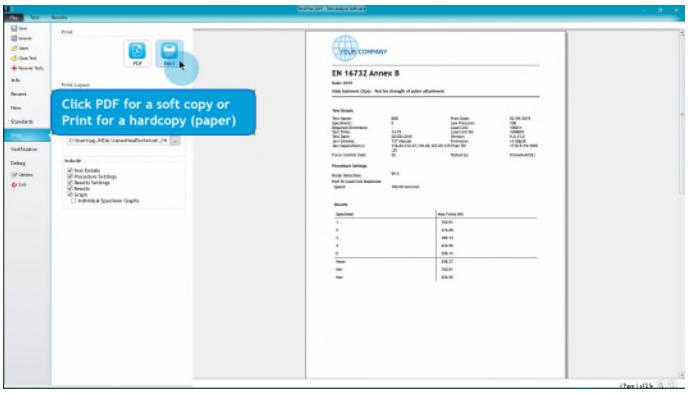
A preview of the test report is prepared for the selected specimens



Scroll down to view the graphs if required

If graphs are *not required* in the test report, then uncheck the Graph checkbox on the left-hand side of the screen





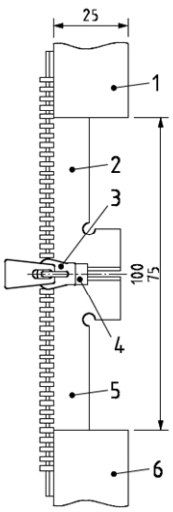
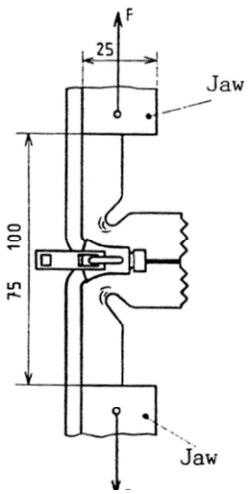
Click the PDF button for a soft copy or the Print button for a hard copy (paper)

Finally, do not forget to Save your results

Annex C - Test for strength of closed-end

Tooling Required:

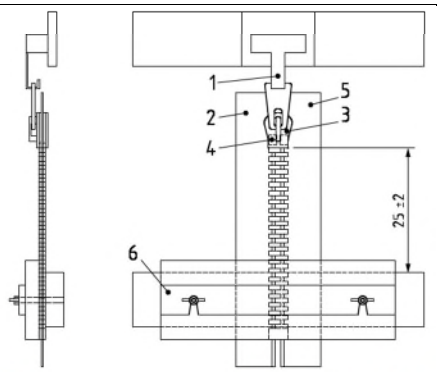
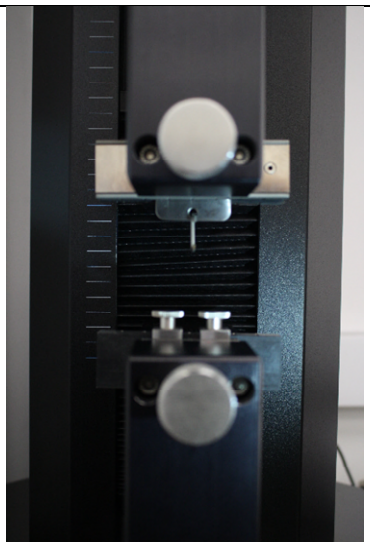
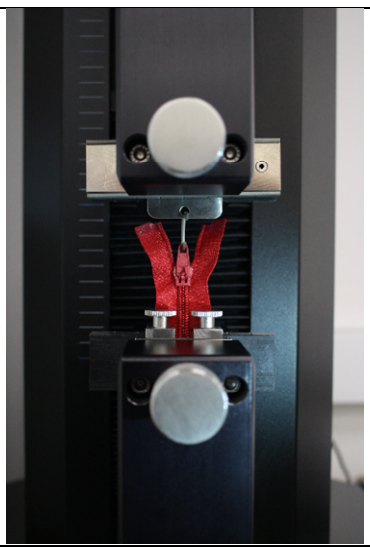
- T27 Grips with serrated grab jaw faces (normal T27 Jaw Scheme)

Apparatus Schematic Diagram	*Setup on Titan*
 Dimensions in millimetres **Key** 1 upper clamp 2 stringer 3 slider body 4 bottom stop 5 stringer 6 lower clamp (jaw)	
Other Pictures	*Setup on Titan with Specimen*
	

Annex D - Test for strength of top stop

Tooling Required:

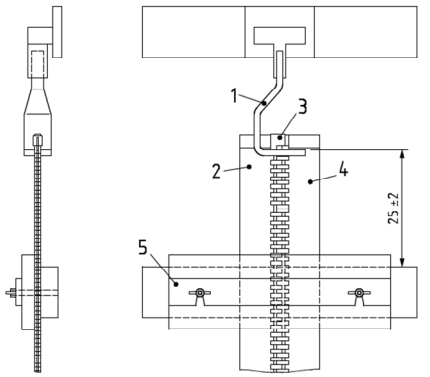
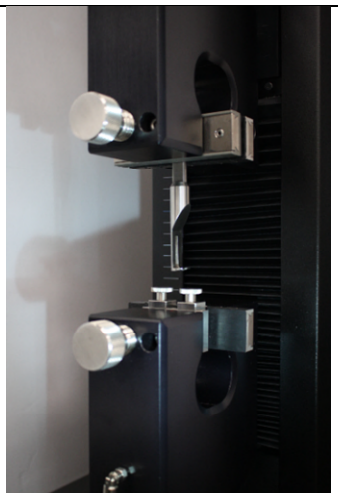
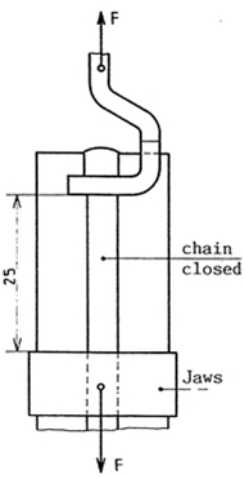
- T27 Grips with full width rubber jaw faces, and set to "manual" (auto-open disabled)
- Holding Hook – with hole in the plane of the jaw faces
- Hook – suitable size for puller
- Sliding Jaw Face – fixed in front lower jaw

Apparatus Schematic Diagram	*Setup on Titan*
 Key 1 puller 2 stringer 3 slider body 4 top stop 5 stringer 6 lower clamp (jaw) Dimensions in millimetres	
Other Pictures	*Setup on Titan with Specimen*
(None)	 The sliding jaw face allows the zip to be gripped without damage to the elements

Annex E - Test for strength of open-end slide fastener box

Tooling Required:

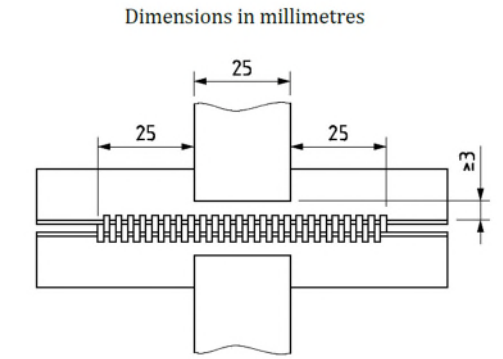
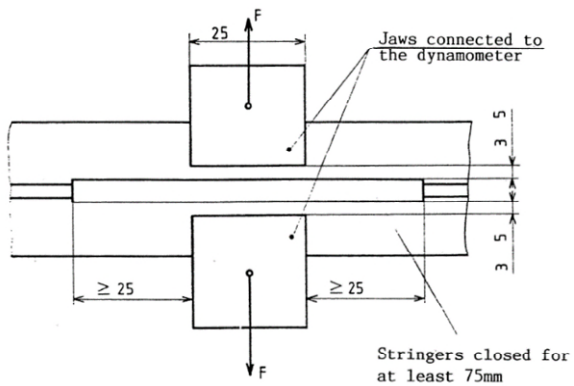
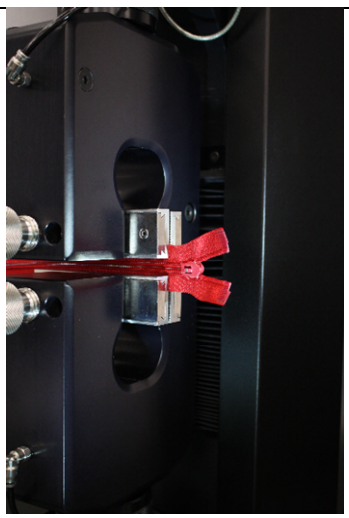
- T27 Grips with full width rubber jaw faces, and set to "manual" (auto-open disabled)
- Slotted Foot - fixed in the top jaws
- Sliding Jaw Face – fixed in the front lower jaw

Apparatus Schematic Diagram	*Setup on Titan*
 **Key** Dimensions in millimetres 1 upper clamp with slotted plate 2 stringer 3 open end box 4 stringer 5 lower clamp	
Other Pictures	*Setup on Titan with Specimen and with Box pulled off*
	 

Annex G - Test for lateral strength of slide fastener

Tooling Required:

- T27 Grips with serrated grab jaw faces (normal T27 Jaw Scheme)

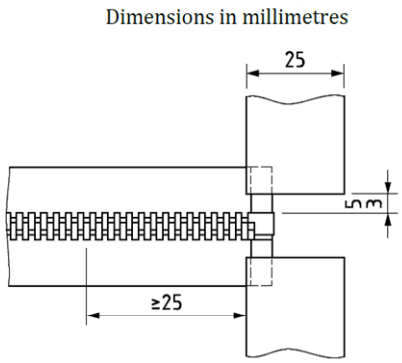
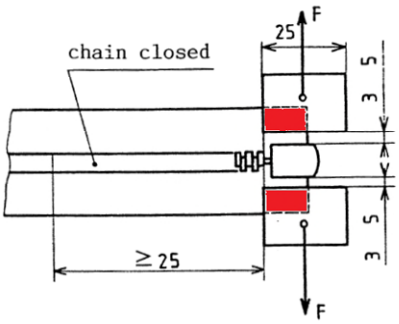
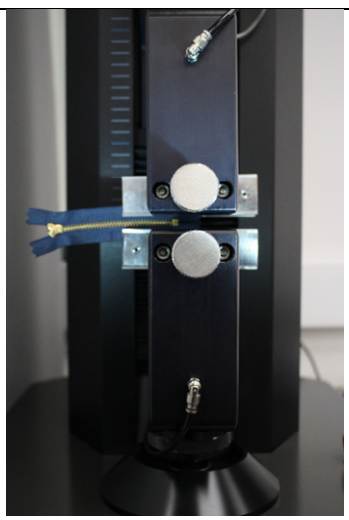
Apparatus Schematic Diagram	*Setup on Titan*
	 
Other Pictures	*Setup on Titan with Specimen and Failure (Fabric Tears)*
	 

Annex H - Test for lateral strength of open-end attachment

Tooling Required:

- T27 Grips with serrated grab jaw faces (normal T27 Jaw Scheme)

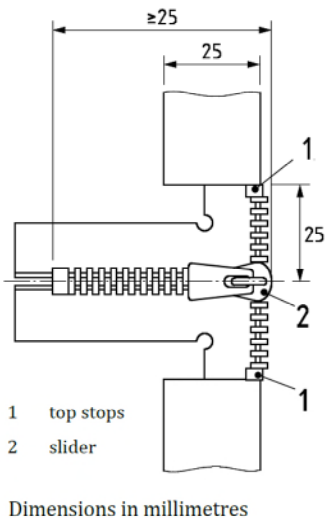
Only the area enclosed by the dashed line (and highlighted red) is gripped in the jaws.

Apparatus Schematic Diagram	*Setup on Titan*
	
Other Pictures	*Setup on Titan with Specimen*
	

Annex I - Test for strength of slider locking device

Tooling Required:

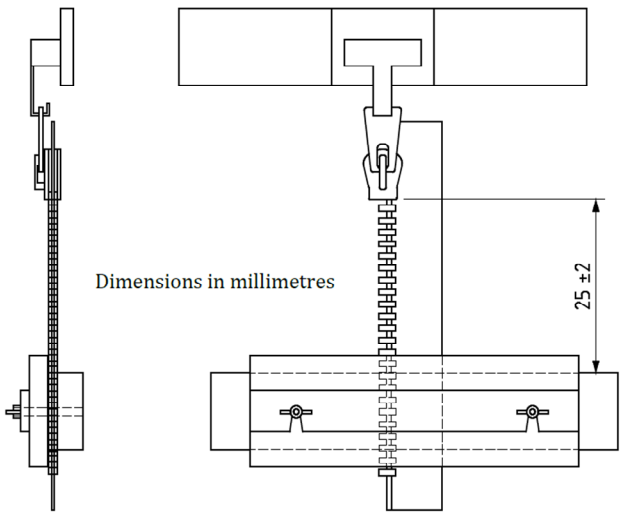
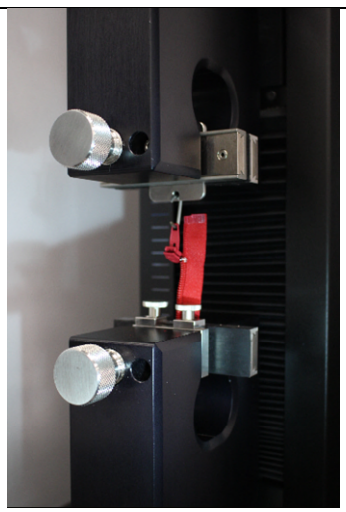
- T27 Grips with serrated grab jaw faces (normal T27 Jaw Scheme)

Apparatus Schematic Diagram	*Setup on Titan*
	
Slippage of the locking mechanism	*Setup on Titan with Specimen*
	

Annex J - Test for open-end slide fastener single stringer slider retention

Tooling Required:

- T27 Grips with full width rubber jaw faces, and set to "manual" (auto-open disabled)
- Sliding Jaw Face – fixed in the front lower jaw
- Holding Hook – with hole in the plane of the jaw faces
- Hook – suitable size for puller

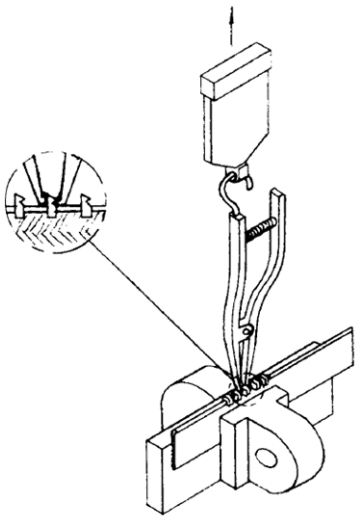
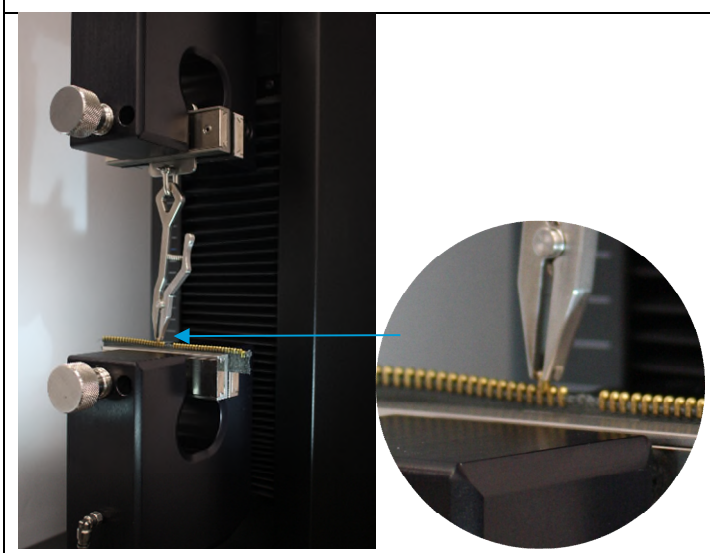
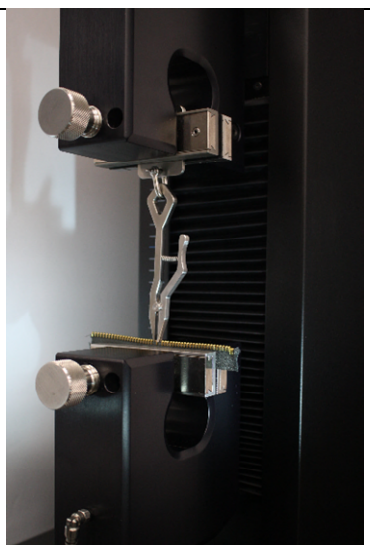
Apparatus Schematic Diagram	*Setup on Titan*
	
Top stop failed and puller removed	*Setup on Titan with Specimen*
 	

ASTM D2061 – 10.2 – Element Pull Off

Tooling Required:

- T27 Grips with full width rubber jaw faces, and set to "manual" (auto-open disabled)
- Holding Hook – with hole in the plane of the jaw faces
- Forceps Clamp

It may be necessary to remove adjacent elements to access a single element.

Apparatus Schematic Diagram	*Setup on Titan*
	
Element Removed	*Setup on Titan with Specimen*
	

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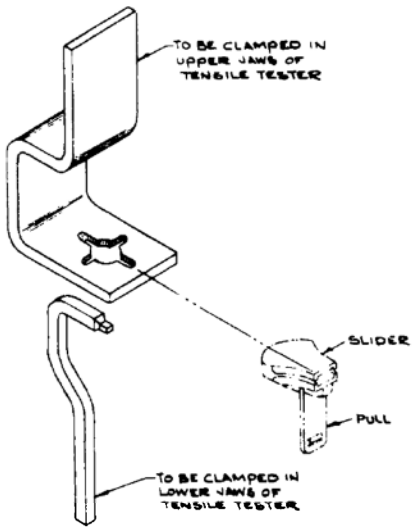
TECH NOTE

ASTM D2061 – 73.1 – Resistance to Pull-Off of Slider Pull

Tooling Required:

- T27 Grips with full width rubber jaw faces, and set to "manual" (auto-open disabled)
- Puller Fixture – fixed in upper jaws
- Fixed Retainer Pull Off tool – fixed in lower jaws

Apparatus Schematic Diagram	*Setup on Titan*
	
Other Pictures	*Setup on Titan with Specimen*