

Amphenol

COMMUNICATIONS SOLUTIONS

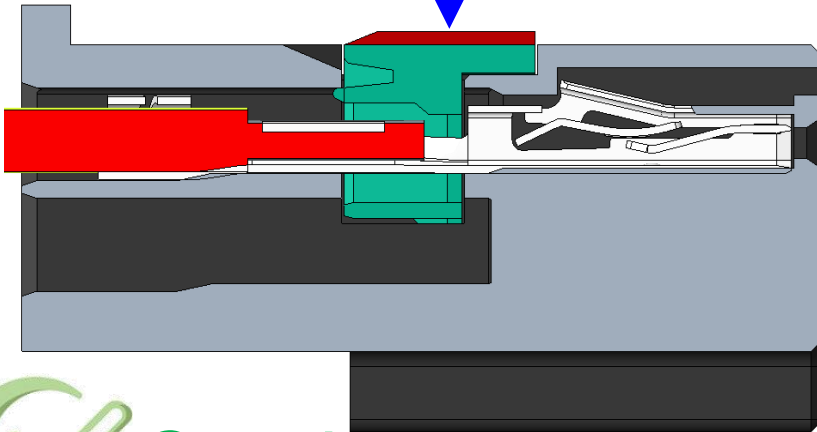
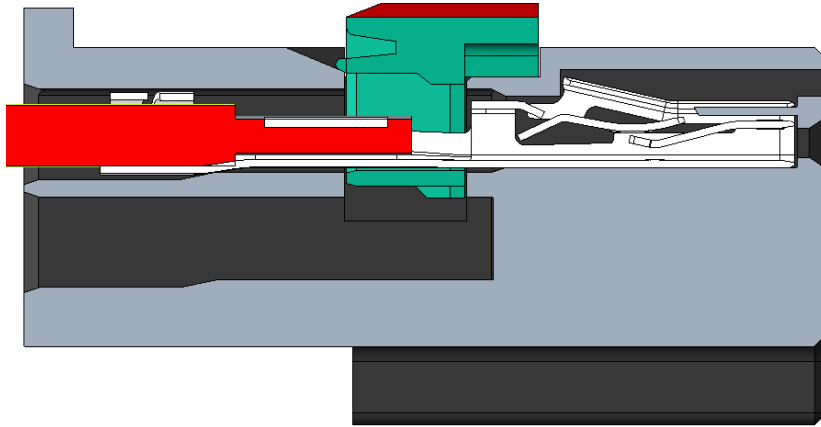
Wirelock CTW Improvement Proposal_10153126

2024/09/14

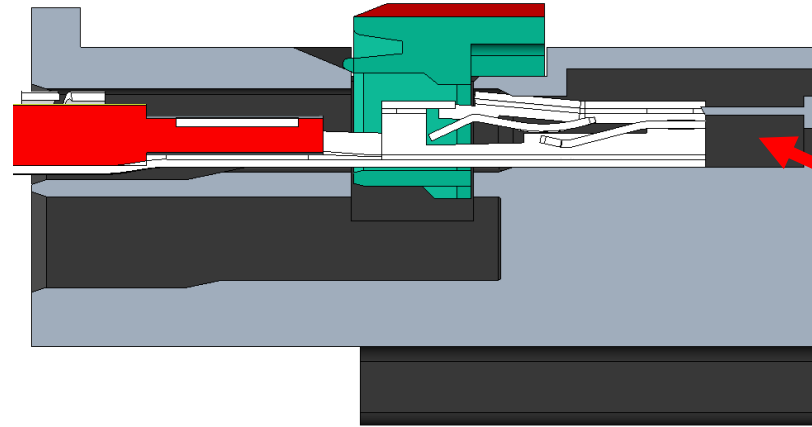
 **FCi Basics**

Wirelock CTW Assembly Analysis

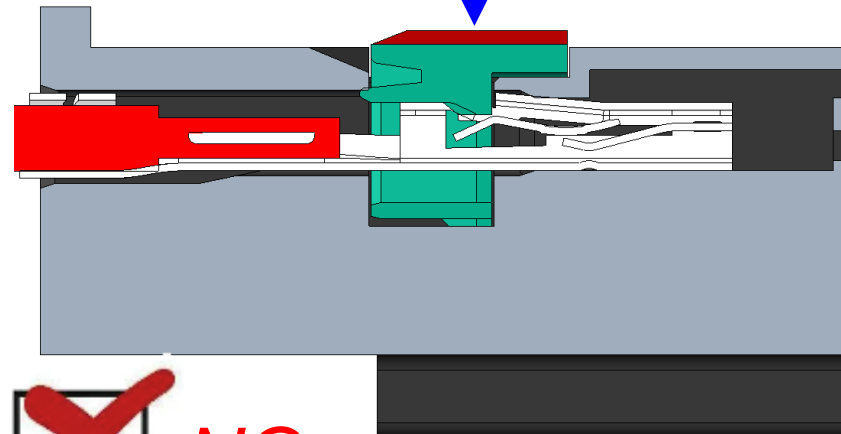
Correct Position



Wrong Position



The terminal is not fully inserted into the slot.

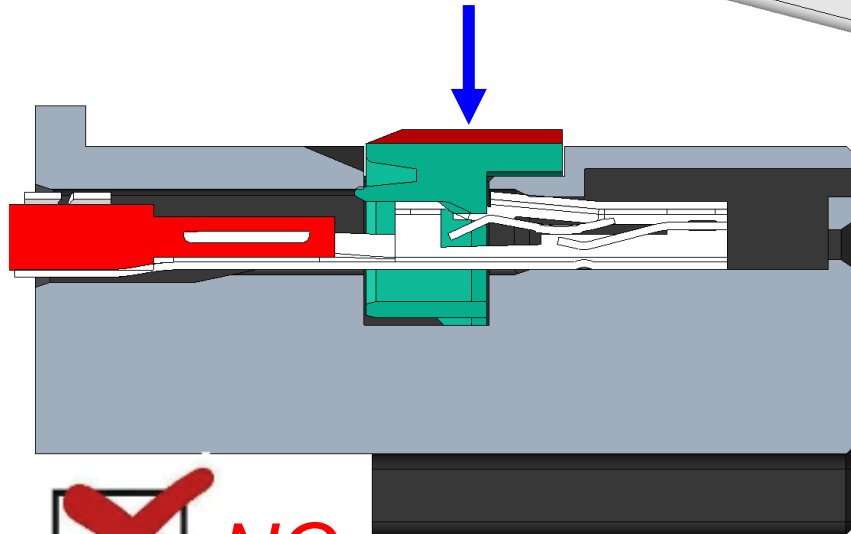
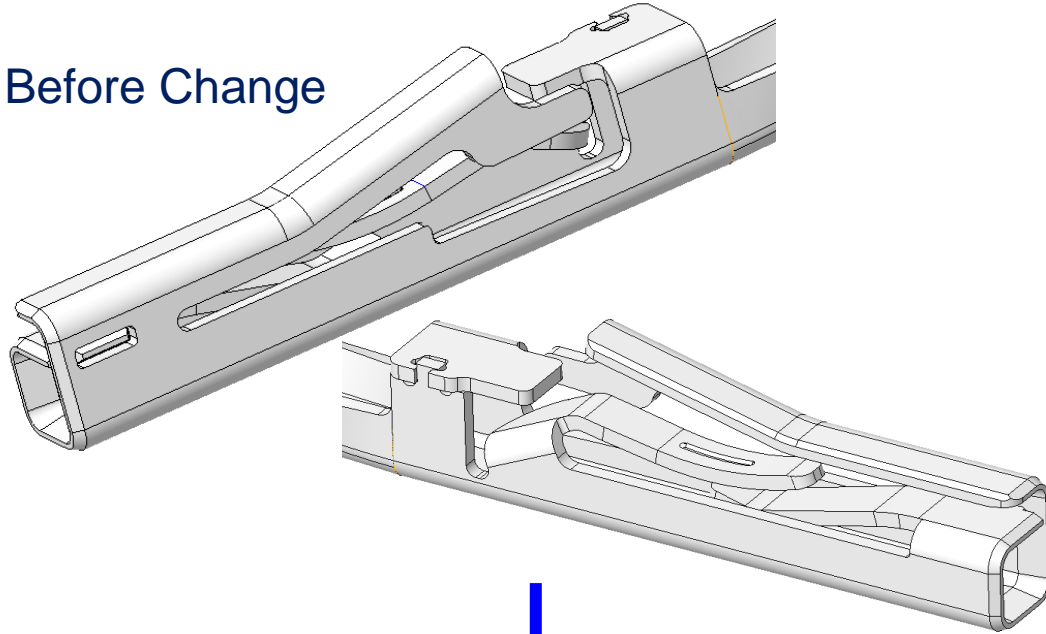


The TPA will touch the secondary locking position when terminal isn't correctly inserted.

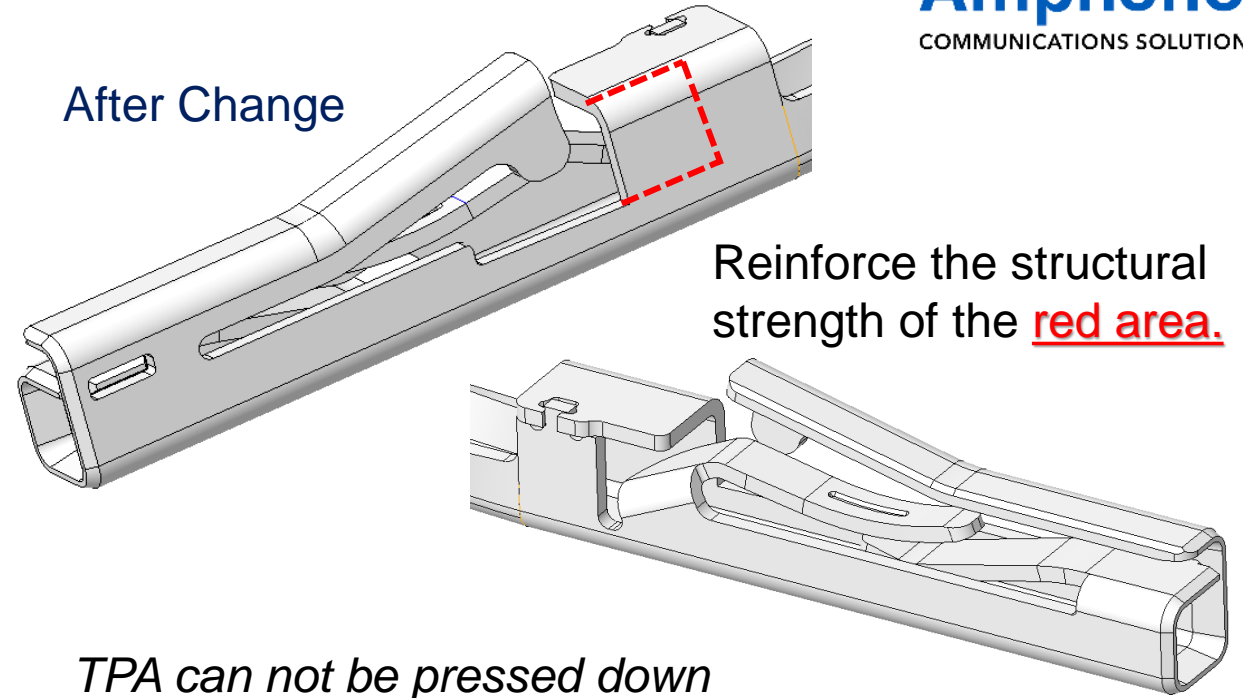


Change Details

Before Change

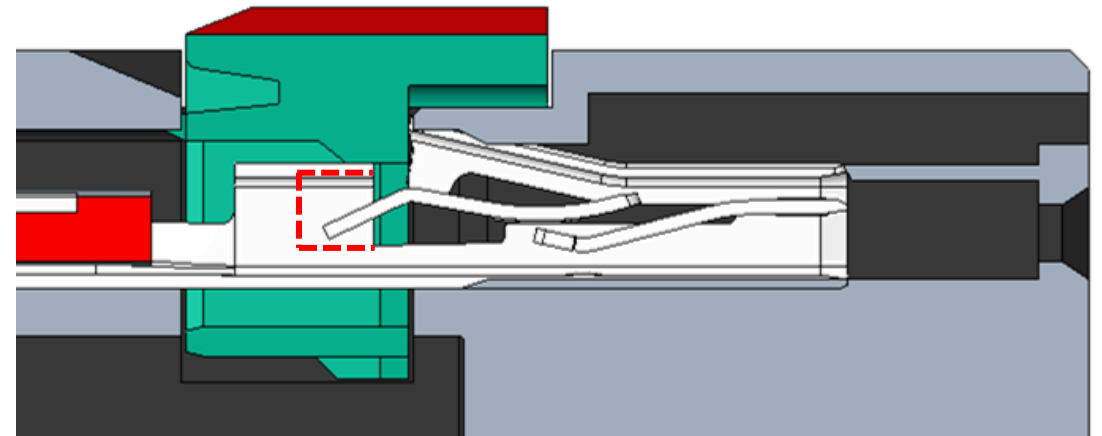


After Change



Reinforce the structural strength of the red area.

TPA can not be pressed down



Define test overview proposal

5.4.1 Terminal - Connector Insertion/Retention and Forward Stop Force

5.4.1.1 Purpose

This test is required in order to measure the Insertion Force of a terminal into its connector cavity. Retention testing is required to ensure that the terminal is retained in its housing with sufficient strength to withstand the rigors of the wiring harness and vehicle assembly processes.

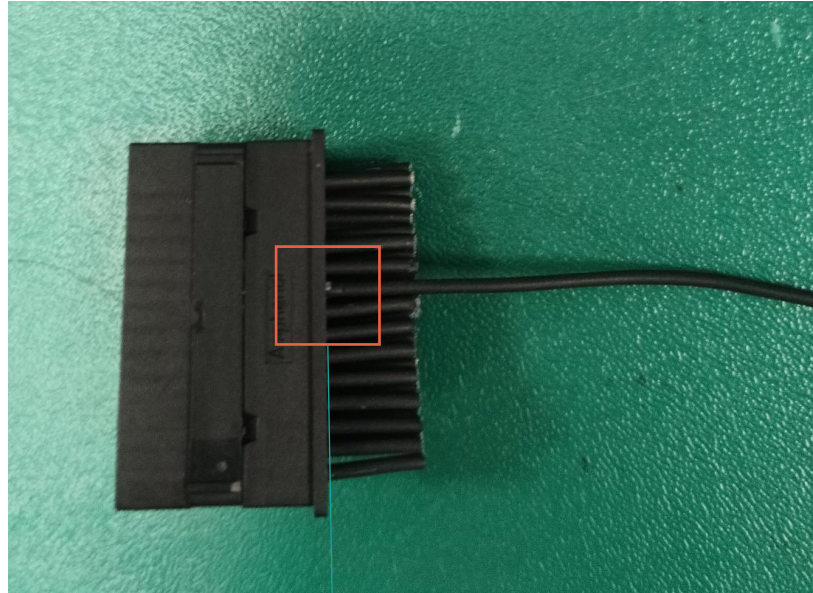
5.4.9 Cavity Damage Susceptibility

5.4.9.1 Purpose

This test is intended to demonstrate resistance to damage when the connector TPA (or PLR or ISL as applicable) is forcefully inserted on a connector with one or more terminals in an incomplete (un-seated) position. The cavity and other plastic and metal parts must subsequently be able to be assembled correctly and retain full function following such an event. This procedure does not apply to connectors where the TPA is designed to push the terminal into its seated and locked position or to TPAs that are designed such that their mating direction interferes or is perpendicular with a terminal that is unseated.

Recommended test items such as

- 1.USACR-2 5.4.1, combining ability between CTW and housing
- 2.USCAR-2 5.4.9, coordination between CTW and TPA

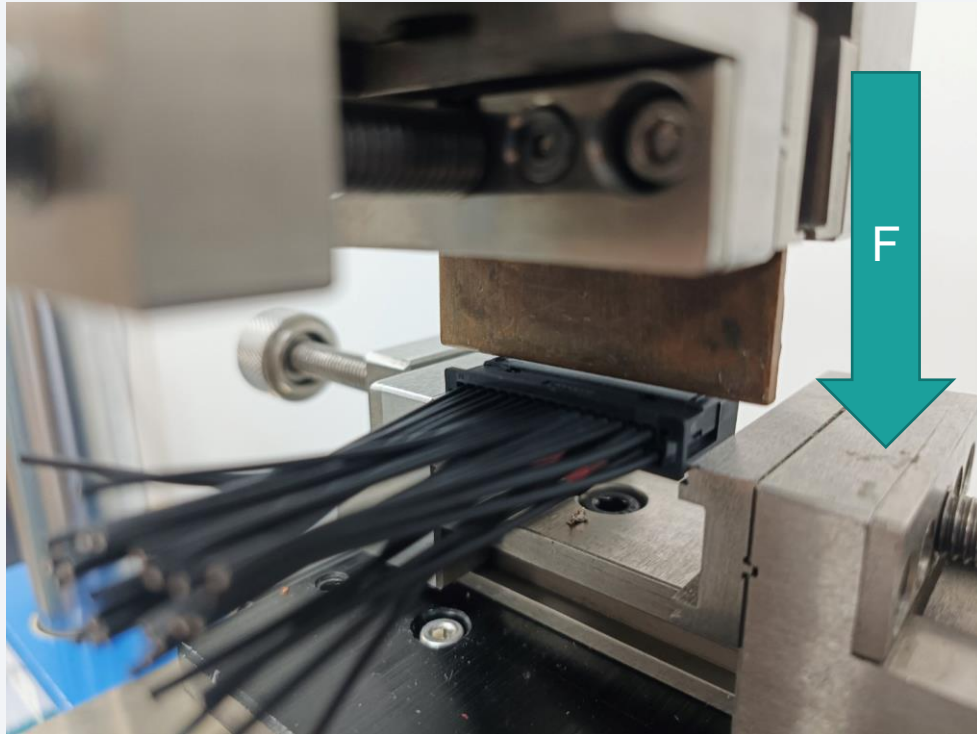


Take 3PCS of sample, at random position, one terminal is not fully inserted

Terminal:10153126

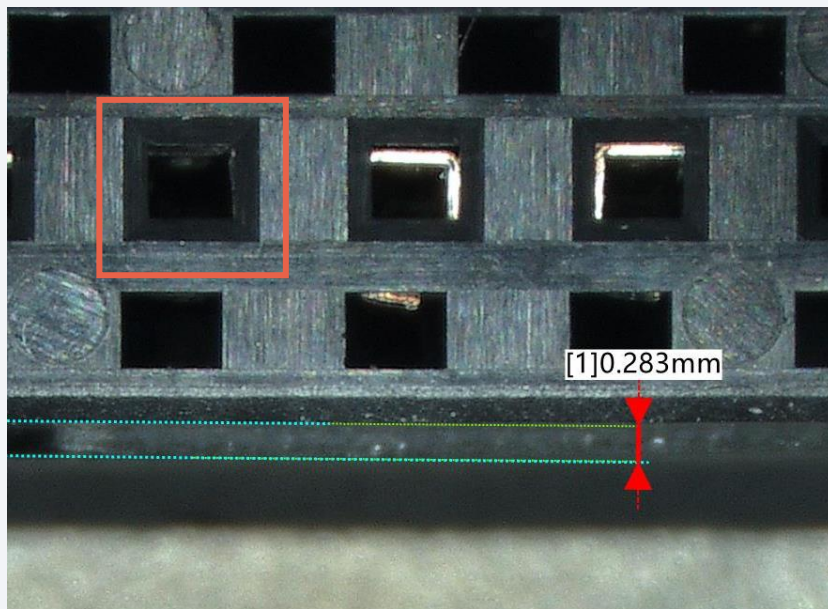
Test procedure

- USCAR-2 5.4.9 coordination between CTW and TPA

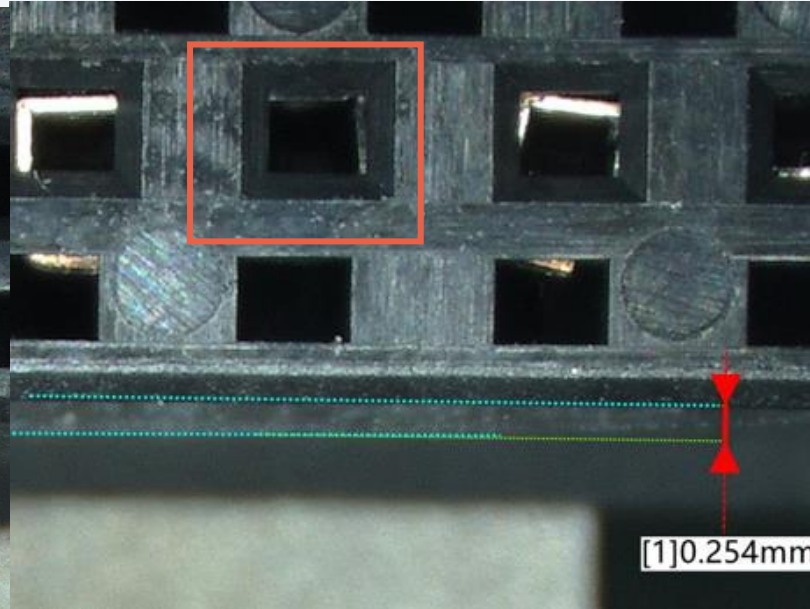


1. Applying a force of 60N in the direction F,
2. To see if the TPA is fully in place,
3. Take out the terminal and check whether it is damaged

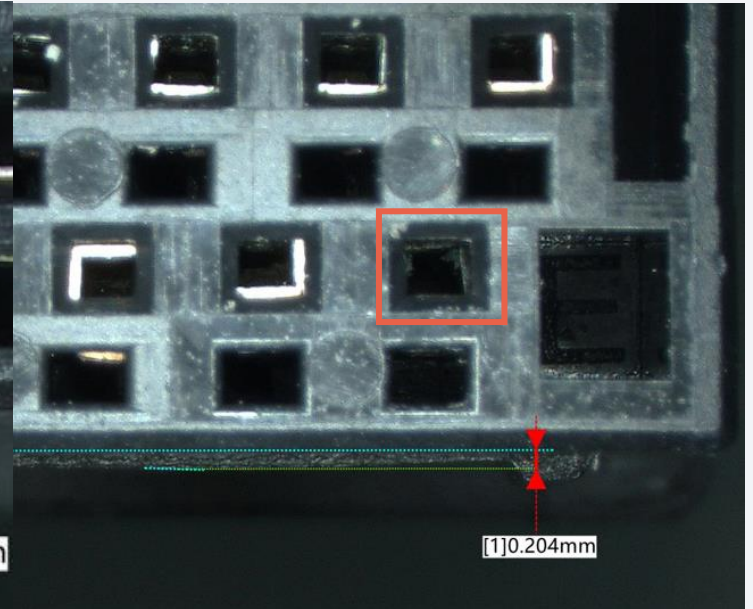
The terminals in the orange box are not properly installed



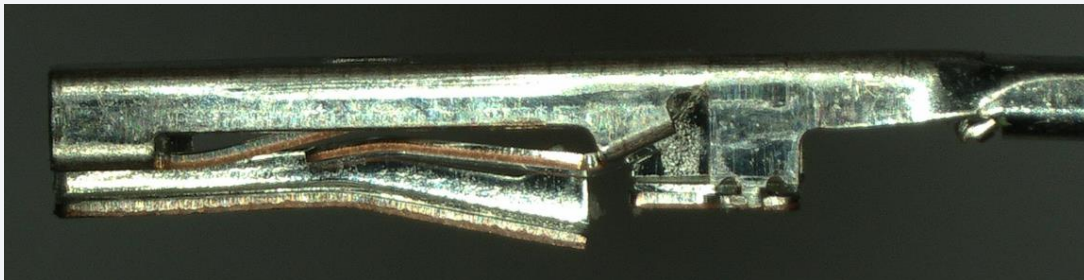
Sample 1:
TPA protrudes housing 0.283mm



Sample 2:
TPA protrudes housing 0.254mm



Sample 3:
TPA protrudes housing 0.204mm



Take out the terminal and observe
that no damage is found



EX2025003CR
J Cavity Damage S

Group D Test

-Test specifications refer to USCAR-2 5.4.1

Terminal-Connector Insertion/Retention and Forward Stop Force

TABLE 5.4.1.4A: INSERTION FORCE FOR TERMINALS

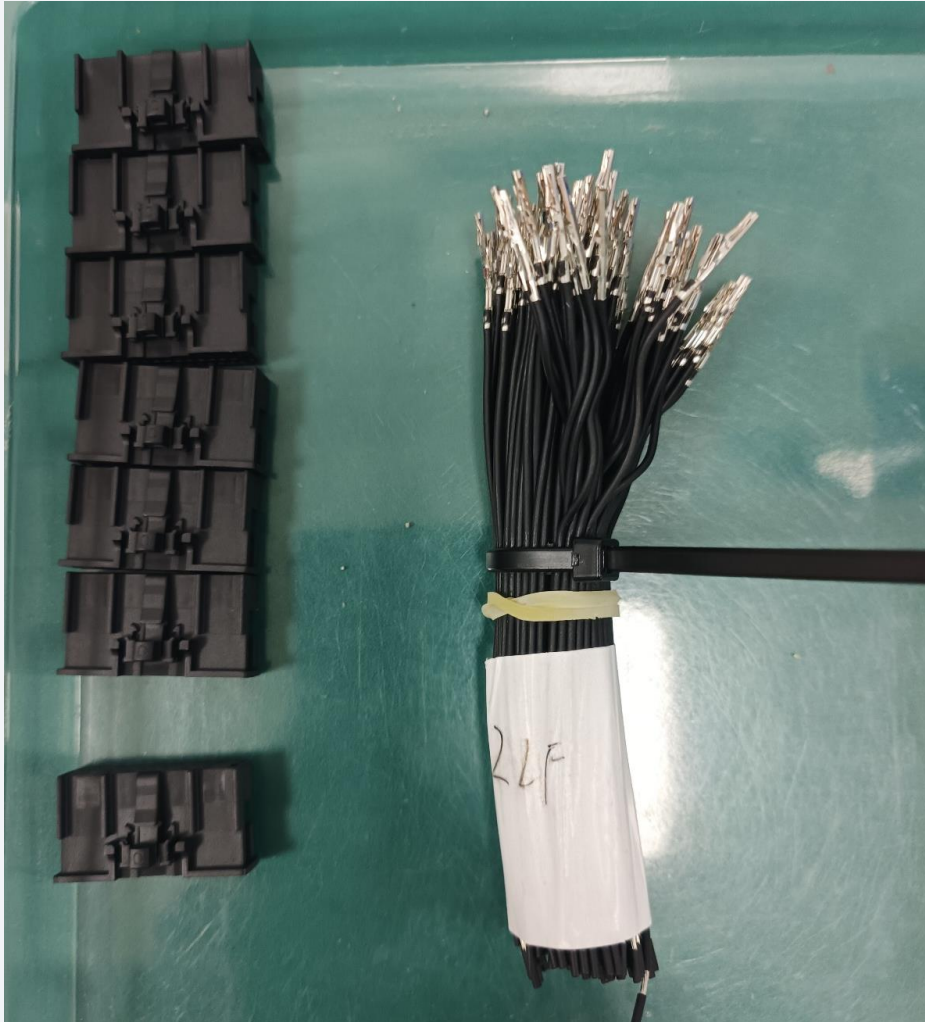
Terminal Size (mm)	Terminal Insertion (Max. N)	Forward stop* (Min., N)
≤ 0.5	15	≥ 35
≤ 1.2	15	≥ 50
1.2 < Term. ≤ 2.8	20	
2.8 < Term. ≤ 9.5	30	

* As tested in 5.4.1.3 A6)

TABLE 5.4.1.4B: TERMINAL-CONNECTOR MINIMUM RETENTION FORCE

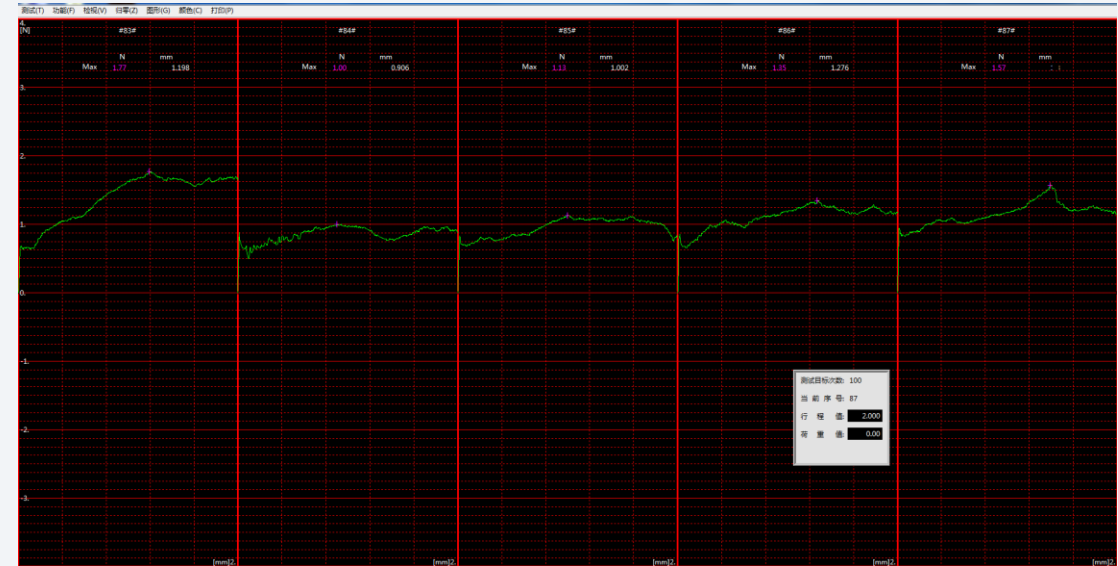
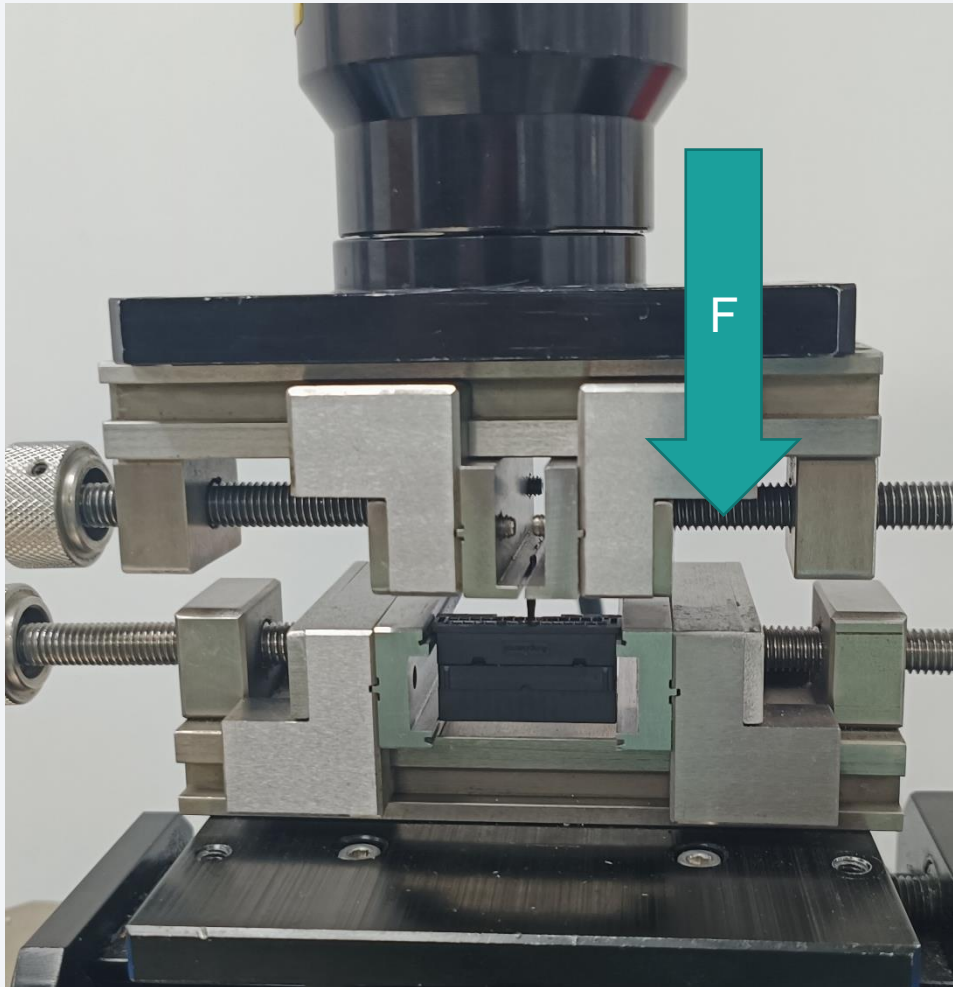
Max. Nominal Blade Width (mm)	Criteria (N) ⁶		
	Primary Lock Retention ³	Retention after Moisture Conditioning ⁴	Retention after Damage, Humidity and HTE ⁵
0.50	20	40	40
0.64	30	60	50
1.2	40	70	50
1.5	45	70	50
2.8	60	100	70
6.3	80	130	90
9.5	100	150	140
Mini Coax ⁷	60 ²	110 ^{1, 2}	80 ^{1, 2}
Traditional coax ⁷	70 ²	110 ^{1, 2}	80 ^{1, 2}
Jacketed twisted pair ⁸	60	110	80

F1:Terminal Insertion Force 15N Max.
F2: Forward Stop Force 35N Min.
F3:Primary Lock Retention 20N Min.



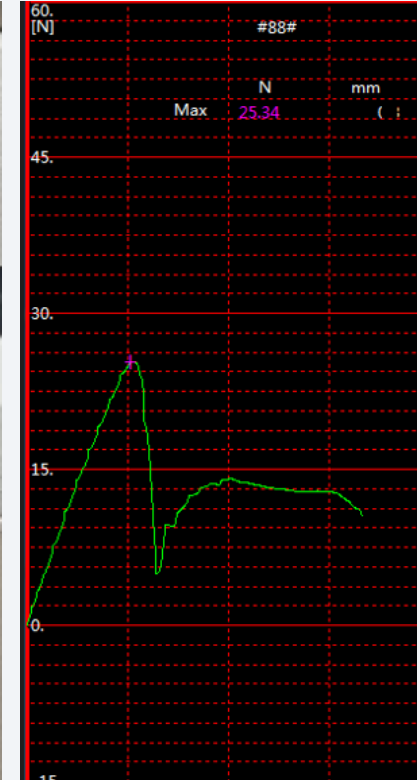
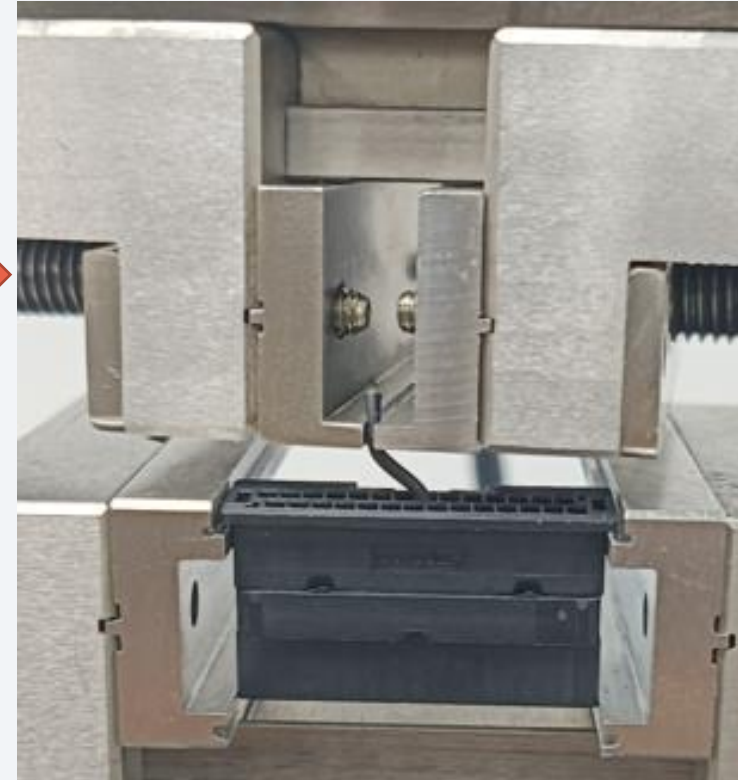
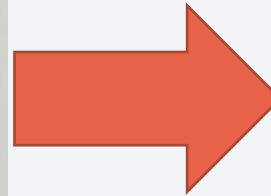
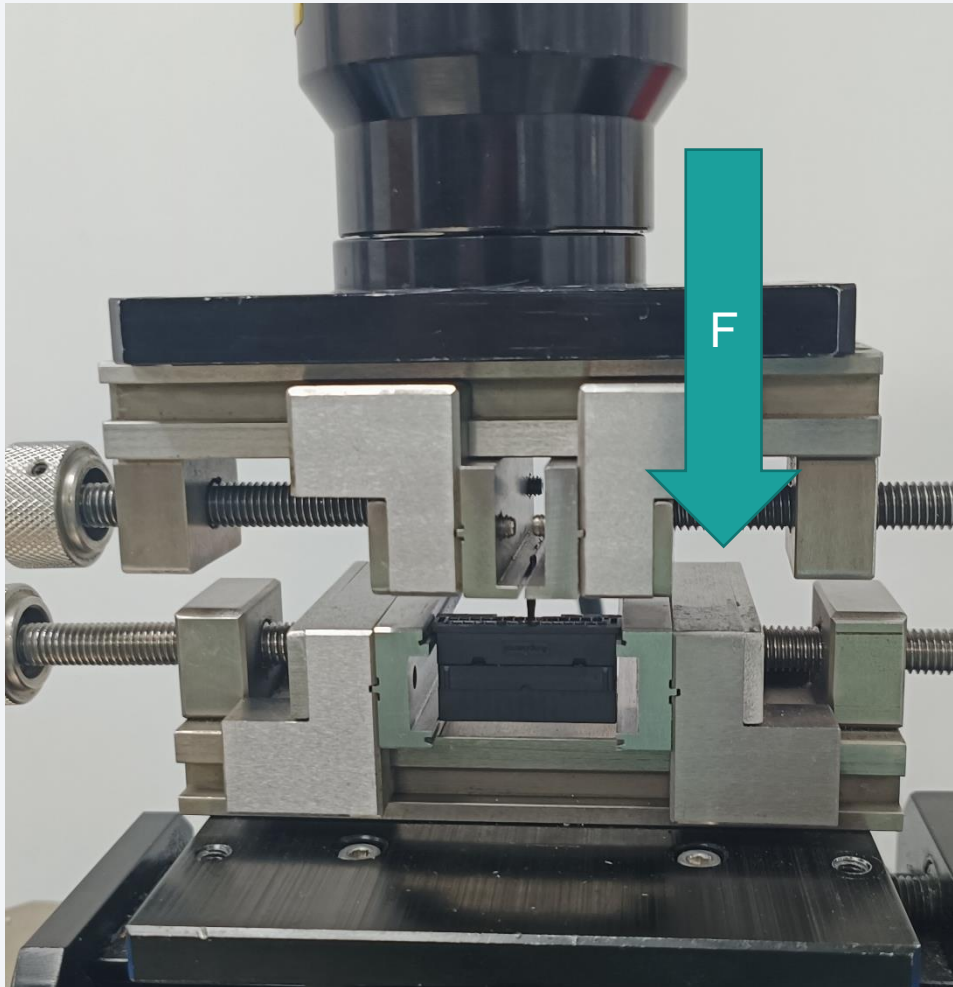
Housing: 10174393
CTW: 10153126

F1:Terminal Insertion Force 15N Max.



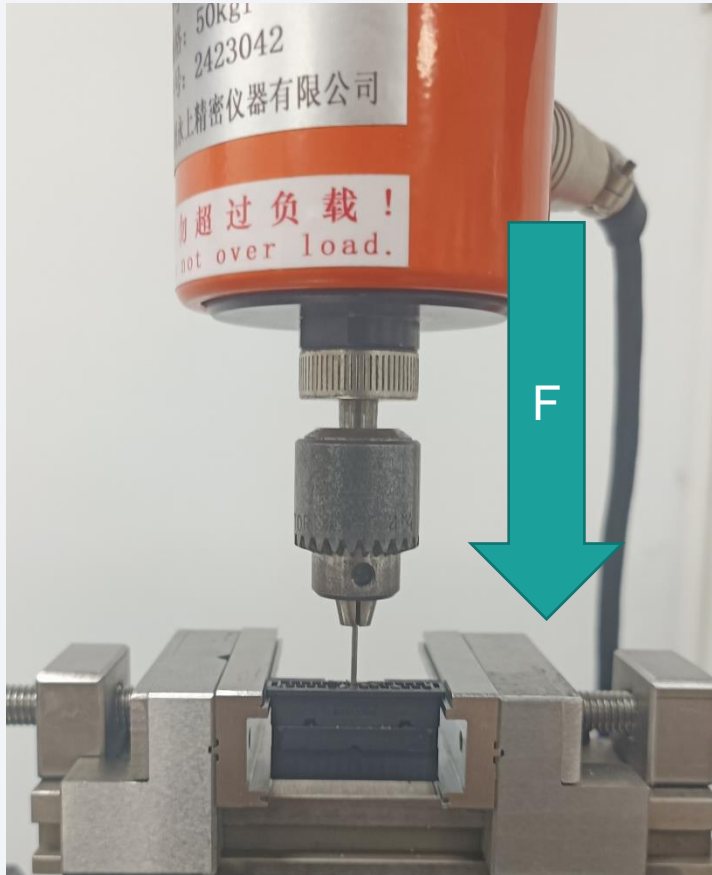
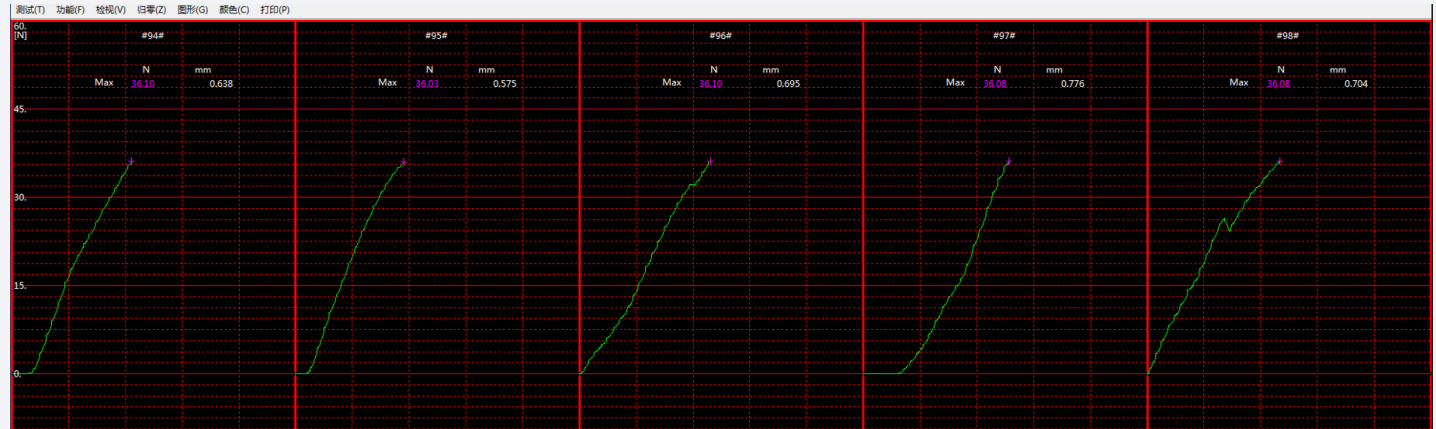
Sample	F1(N)
1	1.77
2	1.00
3	1.13
4	1.35
5	1.57
MAX	1.77
MIN	1.00
AVG	1.364

F2: Forward Stop Force 35N Min

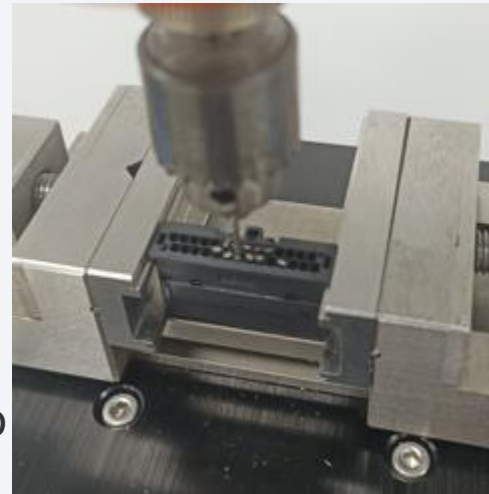


When the force reaches 25N, the line's bearing capacity reaches the upper limit and collapses first

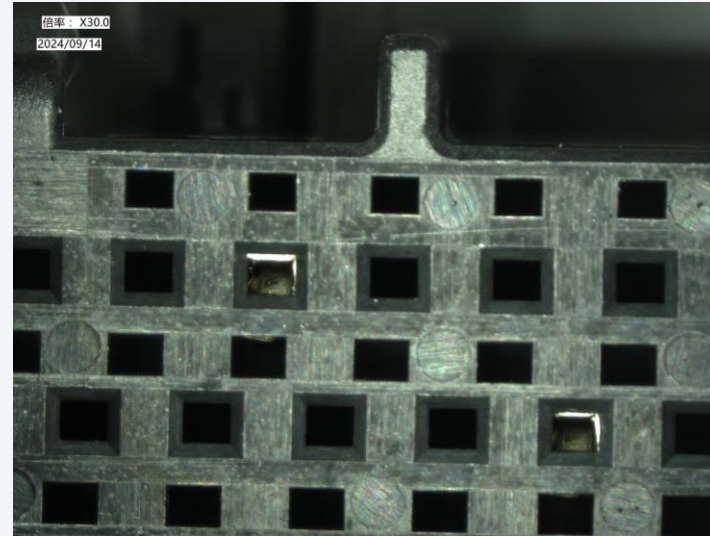
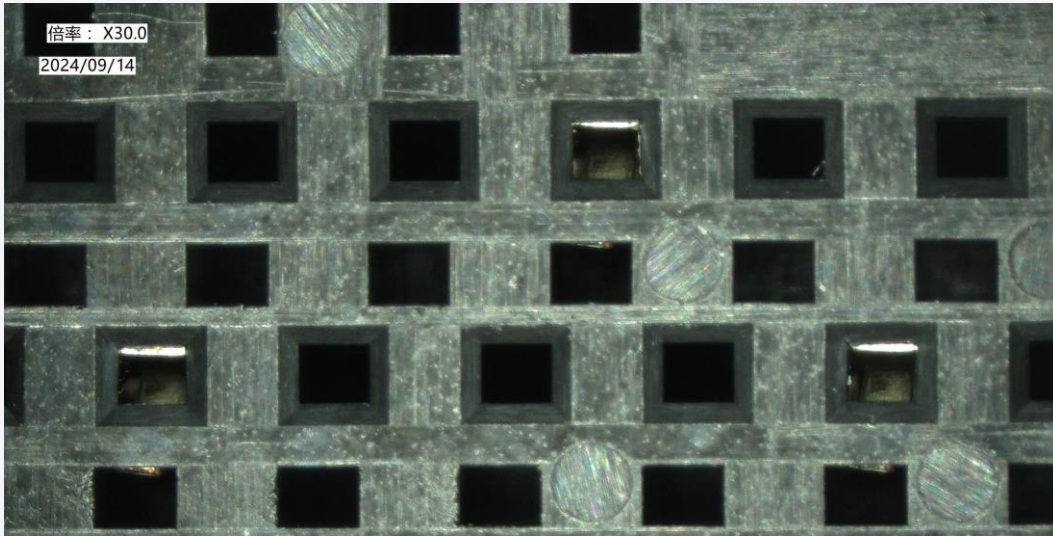
F2: Forward Stop Force 35N Min



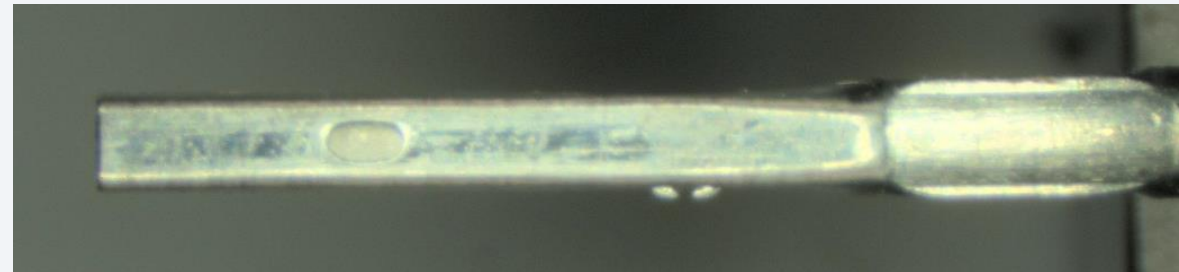
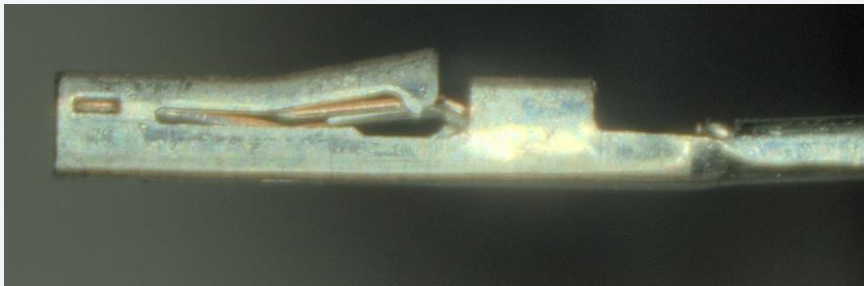
Use a steel needle instead of a thread to press down



Sample	F2(N)
1	36.10
2	36.03
3	36.10
4	36.08
5	36.08
MAX	36.10
MIN	36.03
AVG	36.078

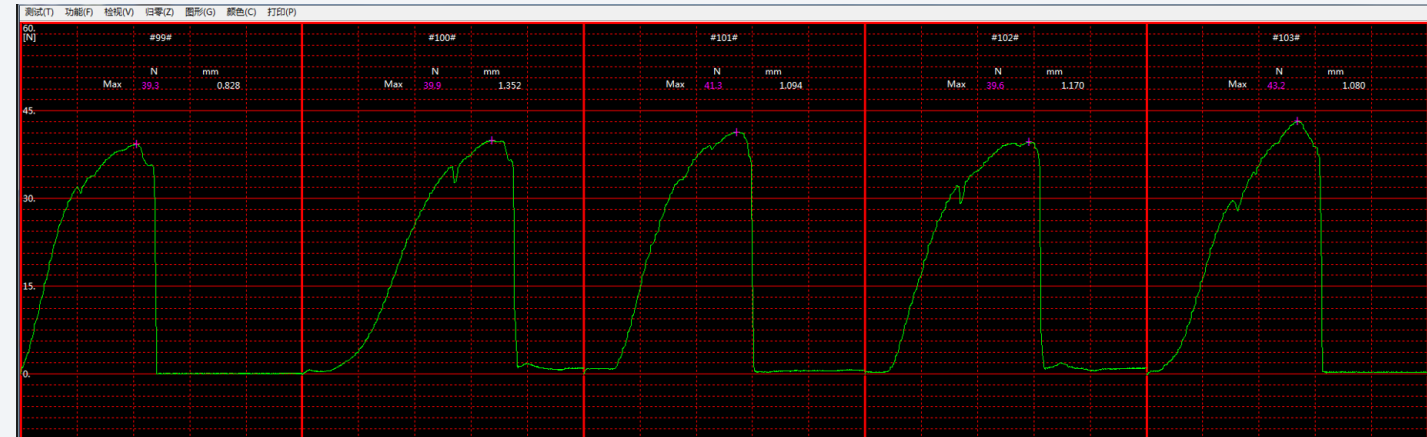
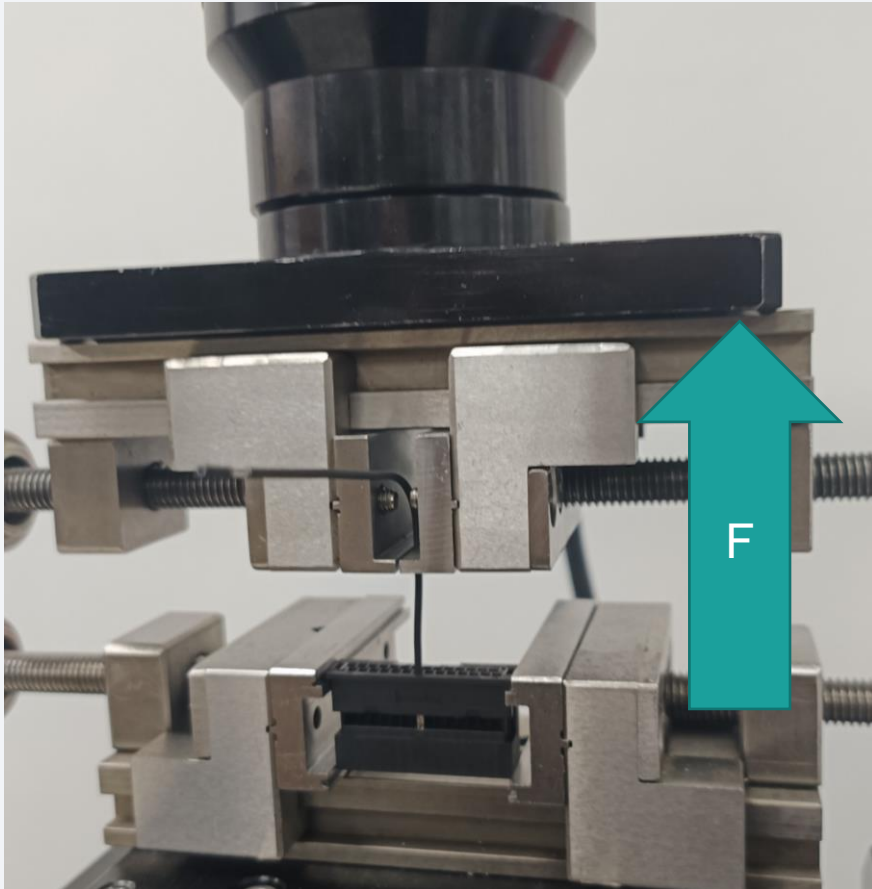


Plastic non-damage



Terminal non-damage

F3:Primary Lock Retention 20N Min.



Sample	F3(N)
1	39.30
2	39.90
3	41.30
4	39.6
5	43.2
MAX	43.2
MIN	39.30
AVG	40.66

THANK YOU