



How to test bonds

By this section of our website we aim to spread knowledge about bond testing in the industry. We currently offer how-to's on **Cold Bump Pull (CBP)**, **Wire Pull (WP)** and **Tweezer Pull (TP)** and we intend to expand it into other test types as well in the future. Additionally, you can find here the text of the relevant MIL-STD-883 standards in accessible HTML format. Please feel free to use these guides to bond testing and we invite you to **let us know if you have any comments or specific questions** regarding the application of it to your samples, whether you use our equipment or not.

How to: Wire Pull (WP)

1. Introduction
2. What is wire pull?
3. What kind of wires can be tested?
4. Objectives
5. Tool design
6. Tool quality
 - i. Material and damage
 - ii. Hook concentricity
7. Alignment
 - i. Quick manual testing of thin wire
 - ii. Auto hook
 - iii. DVS 2811
 - iv. Triangulation
 - v. Automation and wire detect
8. Loop height measurement
9. Work holder and clamping
10. Variants on wire pull
 - i. Vector pull
 - ii. SMD gull wing leads
11. Test method settings
 - i. Test definition
 - ii. Statistical Process Control (SPC)
 - iii. Data analysis
 - iv. Data export
12. Failure modes
 - i. Gold wire
 - ii. Aluminium wire
13. Appendices
 - i. Force calculations

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Bond testers

- Condor *Sigma*
- Condor *Sigma Lite*
- Condor *Sigma W12*
- Condor *150HF*

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- ii. MIL-STD-883 2011.9 destructive
- iii. MIL-STD-883 2023.7 non-destructive
- iv. MIL-STD-883 2023.7 Appendix A

This how-to is also available via www.wirepull.how

Test type: Stud pull

MIL-STD-883 2031.1 Flip-chip pull-off test

How to: Cold Bump Pull (CBP)

1. Introduction
2. What is CBP?
3. What types of balls can be tested?
4. Objectives
5. Jaw size
6. Jaw quality
7. Setting up and doing a test
 - i. Alignment jaw opening and back relief
 - ii. Jaw alignment in X, Y and Z
 - iii. Grip force and getting used to X and Y alignment
 - iv. Closing time
 - v. Landing force and alignment height
 - vi. Optimizing the test
 - vii. Test speed
8. USB Tweezers
9. Test sequence recap
10. What test force should I expect?
11. Cleaning the jaws
12. JEDEC failure mode standards
13. Automatic grading

This how-to is also available via www.coldbumpull.how

Test type: Lead integrity (micro torsion)

MIL-STD-883 method 2004.7 lead integrity

1. Lead integrity
2. A - Tension
3. A1 - Lead braze integrity
4. B1 - Bending stress

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5. B2 - Lead fatigue
6. C1 - Lead torque
7. C2 - Stud torque
8. D - Solder pad adhesion for leadless chip carrier and similar devices
9. E - Lead plating integrity

How to: Tweezer Pull (TP)

1. Introduction
2. What are tweezer pull and peel?
3. Tweezer design
 - i. Manual and automatic
 - ii. Types of jaws
 - iii. Closing function
 - iv. Material
 - v. Quality
 - vi. Force control
 - vii. Handle tips with care
4. Alignment
5. Failure modes
6. Ribbon pull
7. Peel test
 - i. Perpendicular
 - ii. Angled peels
 - iii. Results
8. Copper Pillar
 - i. Solder to copper
 - ii. Copper to pad
9. Stud pull / pick and place

This how-to is also available via www.tweezerpull.how

Test type: Lid torque for glass frit sealed packages

MIL-STD-883 2024.2 Lid torque for glass frit sealed packages

Test type: Die shear

MIL-STD-883 2019.9 Die shear strength

External sources

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