

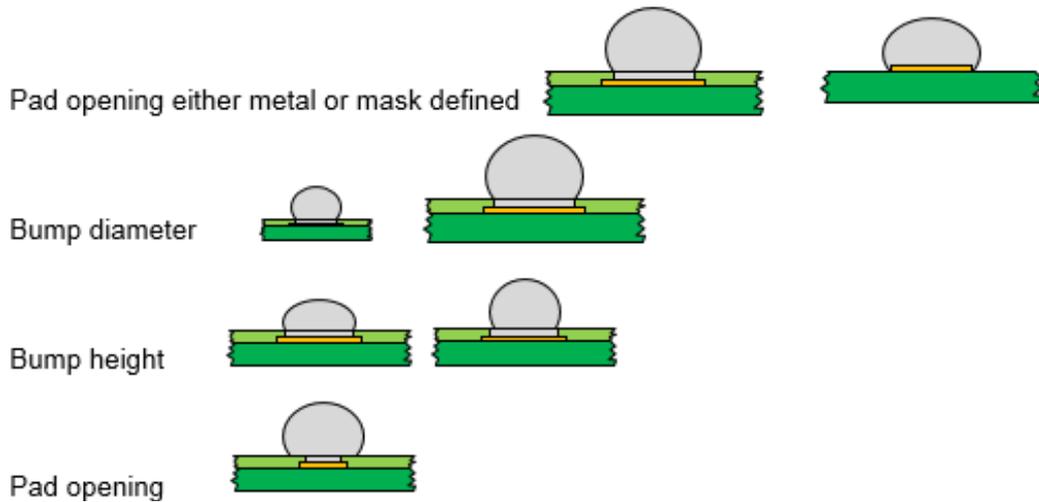


How to test bonds » Cold Bump Pull (CBP) » forces, jaw cleaning, JEDEC

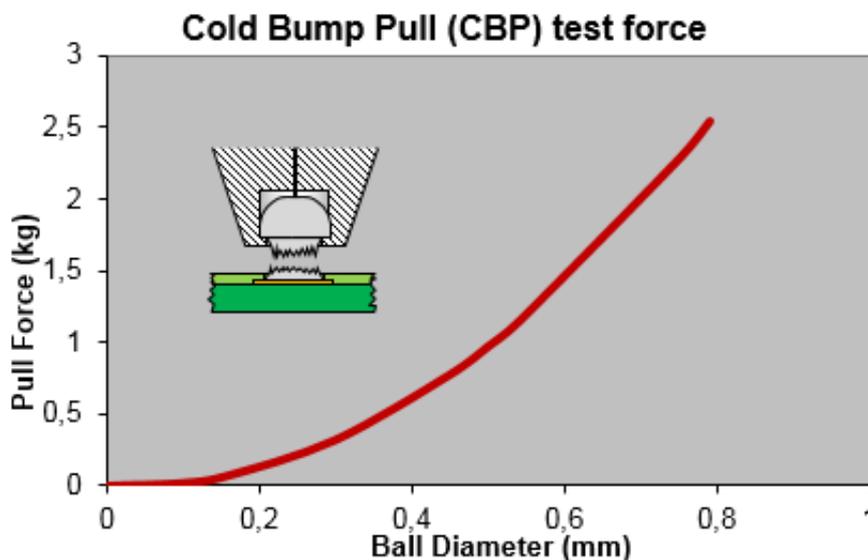
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10. What test force should I expect?

The construction of solder balls varies a lot. Variables include;



The construction of solder balls varies a lot.



Cold Bump Pull (CBP) test force versus solder ball diameter

There are also many different bump alloys, pad alloys, pad surface finishes, reflow processes and

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Bond testers

- Condor *Sigma*
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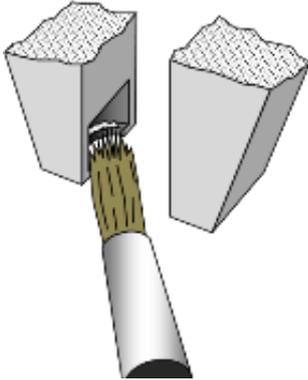
aging.

Because of this variety there are no industrial standards for bond strength.

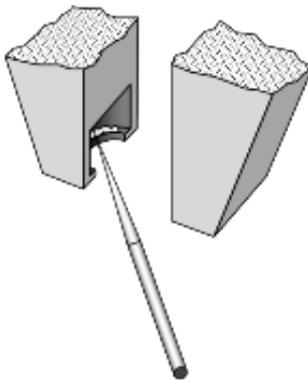
As a general guide based on ductile failure and the strength of solder the maximum test force will be in the region shown in this graph.

11. Cleaning the jaws

The cavities of the jaws will become contaminated by debris from the bump. To maintain good and consistent testing this must be cleaned away.



Attempt to clean cavity with a brush



Attempt to clean cavity with a chisel

It can be done manually, but be very careful not to damage the jaws and their cavities. Solder can be automatically cleaned off using XYZTEC's **patented contactless cleaning system** ([click here to view a video](#)). Contact **your local representative** for details.

12. JEDEC failure mode standards, JEITA, IPC

The following five failure mode definitions, that can be further divided into eight types, have been set by **JEDEC**. In this how-to we already mentioned most of them. We refer to the **JEDEC website** for full details.

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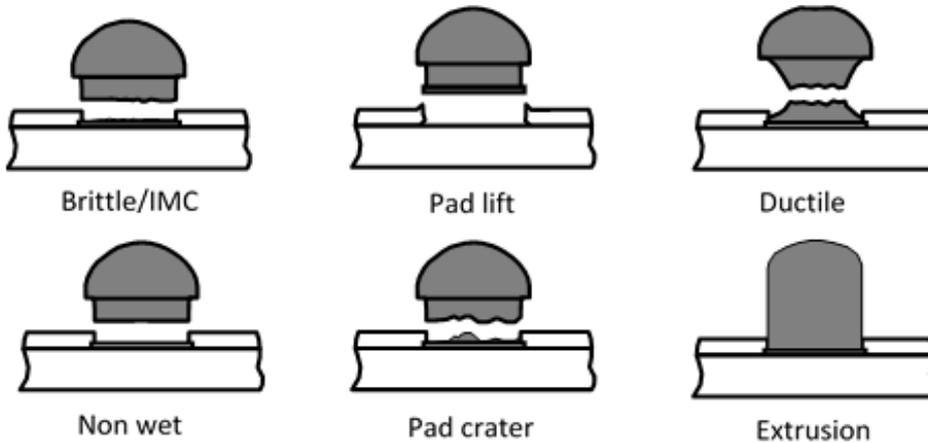


- Mode 1, Type A: Ductile



JEDEC Standard No. 22-B115A

- Mode 1, Type B: Quasi-ductile
- Mode 2, Type A: Pad lift
- Mode 2, Type B: Pad Crater
- Mode 3, Non wet
- Mode 4, Type A: Brittle
- Mode 4, Type B: Quasi-brittle
- Mode 5: Ball extrusion



Cold Bump Pull Failure Modes

The standards **JEDEC** JESD22-B115, **JEITA** EIAJ ET-7407 and **IPC**-9708 apply to Cold Bump Pull testing.

13. Automatic grading

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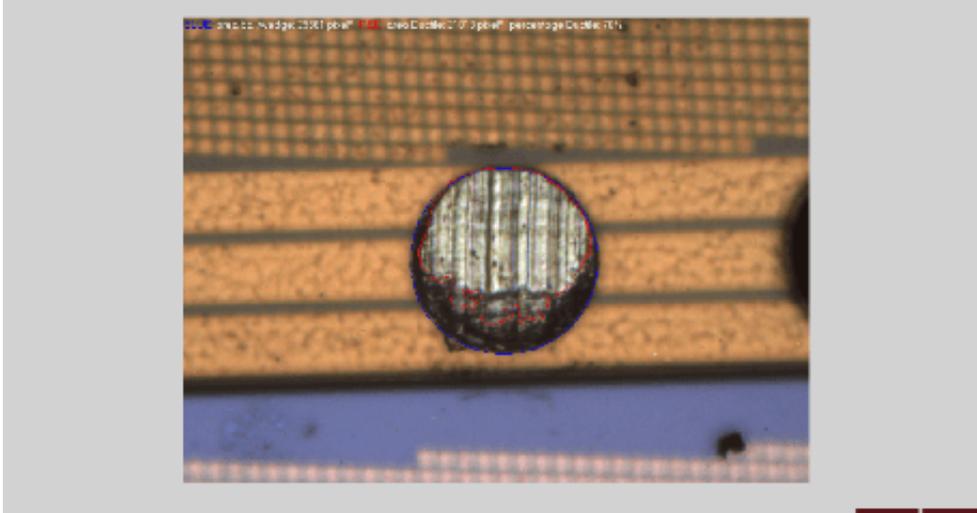
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Auto-pedigreecolor (Condor Sigma) missasman

x



The Condor Sigma determined this failure mode (after a shear test) to be 70% ductile, 30% brittle

The determination of failure modes is also called grading. As vision technology progresses, it is expected that machines will be able to grade failure modes even more effectively than humans.

With its advanced Halcon vision library and high resolution perpendicular cameras with smart lighting systems, several customers already use the Condor Sigma to accurately determine failure modes in solder bumps.



XYZTEC USB Tweezers inside the CBP Jaw Cleaner

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The Condor Sigma is the most advanced bond tester on the market. Whether you need a dedicated or multipurpose bond tester, the Condor Sigma is the best choice featuring unparalleled 0.075% accuracy, the best ergonomics, highest throughput, maximum flexibility and the lowest cost of ownership.

Condor Sigma

[Click here](#) for more information about the **Condor Sigma** bond tester and its unique properties.

Bond testing seminars

If you are looking to **increase your knowledge about bond testing**, consider attending a **bond testing seminar**.

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