

Micro Adhesion Testing

Application Note

THE CHALLENGE

The use of adhesives to bond components together is widespread and equally there are a wide range of methods for assessing the quality of the bond produced. If one or more of the adherents are flexible, some form of peel test is common. If both are flexible a 'T' peel test can be used. If one of the adherents is rigid, a 90° peel is generally employed.

To maintain the angle, the rigid adherent is often placed on a sliding stage which moves as the flexible tape is pulled. For micro materials, where the peel force is small, friction can introduce significant error in this measurement and an alternative test method is required.

THE SOLUTION

The 4000*Plus* micro test system with Paragon™ software employs active stage control to maintain peel angle. Together with a range of low force cartridges, it provides the ideal solution for assessing the peel strength of small samples, including PCB copper tracks. Tracks, tape and ribbon are securely gripped using air actuated tweezers that work in conjunction with our load cartridges.

From the simple measurement of the force required to peel a film, to a more detailed understanding of the properties of the adhesive layer, the 4000*Plus* provides the necessary measurement capability.

THE METHOD

The 4000*Plus* enables peel testing with the aid of multi-axis stages and a range of dedicated load cells which can measure from less than a gram up to 100kg. The Paragon™ software enables quick set up of test parameters and collection of force-displacement data. Peel rates from microns up to 5mm/s can be set, allowing the time dependent properties of the adhesive to be studied.

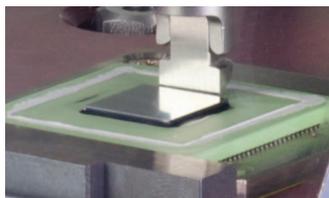
Test data can be exported to various formats for detailed analysis via third party packages. A range of standard work holders are available including a heated stage enabling tests to be performed at up to 400°C.

Peel testing is just one measure of adhesion that can be performed on the 4000*Plus*. If both adherents are rigid, shear testing provides a flexible and simple method of measuring bond strength. Alternatively, a stud can be glued to the sample and used to apply tensile loading to the attached part. Hot Probe Attach (HPA) is a variation of stud pull, where a pin is automatically soldered to one of the adherents and the tensile load applied to the pin.

this test is used for comparative measurements. For instance different adhesives can be compared for their ability to bond a given substrate and tape. Results are very dependent on the mechanical properties of the tape and the thickness of the glue layer, in order to obtain reliable data these need to be fixed. Peel rates, temperature and environmental conditions greatly influence the adhesive properties. The peel test can be executed with the sample submerged in a liquid, such as water to assess the impact of any ingress.

The shear test method measures peak force required to separate two rigid surfaces bonded together. A wide standard range of tools from 25µm face width up to a few centimetres coupled with self aligning technology enable force to be uniformly applied to a range of samples. The surface detection capabilities of the shear cartridge enables micron level precision of shear heights.

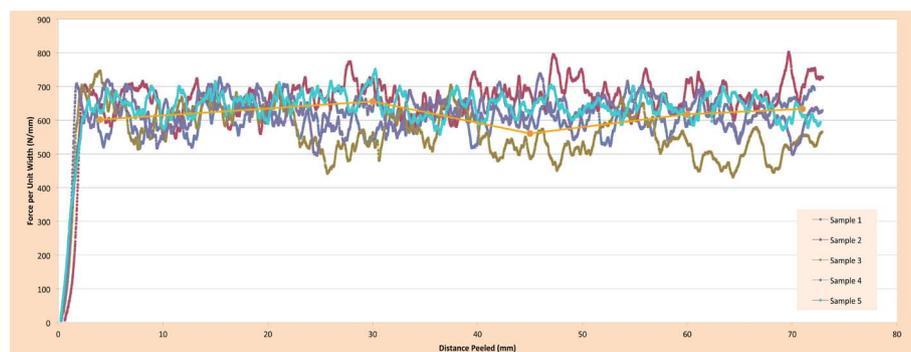
For metallic surfaces hard to grip, Hot Probe Attach is a unique method of bonding enabling static or cyclic tensile forces to be applied.



Shear test at elevated temperature

THE RESULT

The standard peel test measures the force per unit tape width to separate the tape from a rigid adherent. Usually



Force per unit width vs. Distance peeled for five samples of an adhesive tape of the same batch

For more information,
please contact your
Nordson DAGE regional office
or speak with your
Nordson DAGE representative,
all of which are listed on
www.nordsondage.com.

Americas

+1 510 683 3930 **Phone**
sales@nordsondage.com **Email**

China

+86 512 6665 2008 **Phone**
sales.ch@nordsondage.com **Email**

Germany

+49 7021 950690 **Phone**
sales.de@nordsondage.com **Email**

Japan

+81 432 995851 **Phone**
sales.jp@nordsondage.com **Email**

South East Asia

+65 6796 9500 **Phone**
sales.sg@nordsondage.com **Email**

United Kingdom

+44 1296 317800 **Phone**
globalsales@nordsondage.com **Email**