

# Case Study



## Unovis Solutions Advanced Research for Electronic Assemblies Consortium

Founded in the early 1990's, the Advanced Research for Electronic Assemblies (AREA) Consortium is now part of Unovis Solutions, the knowledge-based solutions provider of custom electronic assemblies, a division of Universal Instruments. The goal of the AREA Consortium is to develop a fundamental, mechanistic understanding of the materials and processes utilized in electronics assembly - with special focus on maximizing assembly yields and long-term reliability. Recent research topics include solder pad fragility, lead-free solder and flip chip assembly and reliability, and PCB (printed circuit board) and component damage.

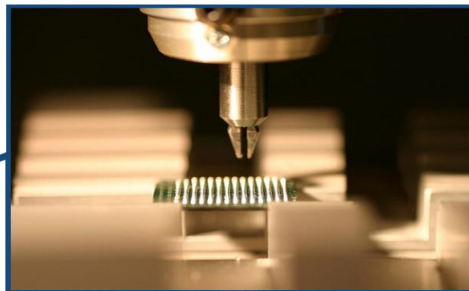
### Dage in Action

In order to gain a better understanding of the mechanical handling or robustness of PCBs when in service, the AREA Consortium perform shear and pull tests using the Dage 4000 and 4000HS (high speed) machines.

One particular research project which utilized the Dage machines, assessed the cracking of the laminate under solder connect pads ('pad cratering') on PCBs. As Brian Roggeman, Process Research Engineer in the AREA Consortium explains: "Although interconnect failure is generally seen as a solder joint reliability issue, pad cratering is gaining significant focus as a critical failure mode of PCB technology."

“ Dage provide a fantastic turnkey solution for bond testing. Having the Dage machines in our laboratory provides us with the ability to accomplish research that would otherwise be out of reach. ”

Brian Roggeman, Process Research Engineer,  
Unovis Solutions AREA Consortium



Dage 4000 bond tester performing a cold bump pull test.

For further information please contact:  
Tel: +44(0)1296 317800 Fax: +44(0)1296 435408  
Email: [dpi-specialproducts@dage-group.com](mailto:dpi-specialproducts@dage-group.com)  
[www.dage-group.com](http://www.dage-group.com)



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The initial stage of the project involved performing cyclic tests on the pads using a Dage 4000 machine to measure the resistance to the cyclic loading, indicating the lifetime of the pads. The Consortium went on to acquire a Dage 4000HS machine to extend the research to issues associated with overstress as opposed to wear-out in cyclic loading. This is a critical concern for a range of different products and applications. The 4000HS machine will play a major role in the next phase of the research by measuring fracture energy and force as a complement to cyclic loading.

“Dage provide powerful tools which enable us to understand circuit board integrity” said Roggeman. “Using the Dage machines enabled us to speed up our research - no assembly was required as the testing was done on raw PCBs.

#### **Why Dage?**

The AREA Consortium wanted a machine that would improve efficiency while offering maximum integrity. The Dage machines offered this and much more. Additionally, the Consortium recognized Dage as a key player in bond testing technology. “Dage provide a fantastic turnkey solution for bond testing” enthused Roggeman. “The Dage 4000 system is easily configurable with a wide range of fixtures and accessories to perform pull and shear applications through to more complex bump and pull tests.”

“ We have great interaction with the team at Dage. The nature of our research means we are continually pushing the boundaries of bond testing technology and the technical support that we receive from Dage is second to none. ”

Brian Roggeman, Process Research Engineer,  
Unovis Solutions AREA Consortium

*To obtain the ‘Assessment of PCB Pad Cratering Resistance by Joint Level Testing’ paper published in 2008 by the Electronic Components and Technology Conference (ECTC) contact the ECTC (<http://ectc.net>).*

For further information please contact:  
Tel: +44(0)1296 317800 Fax: +44(0)1296 435408  
Email: [dpi-specialproducts@dage-group.com](mailto:dpi-specialproducts@dage-group.com)  
[www.dage-group.com](http://www.dage-group.com)