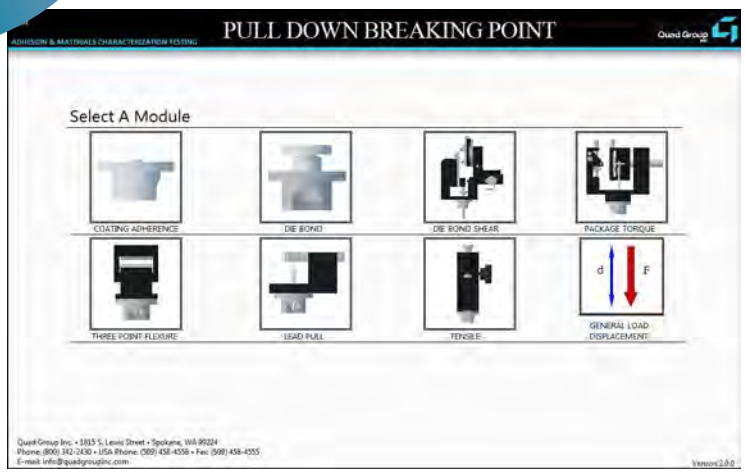
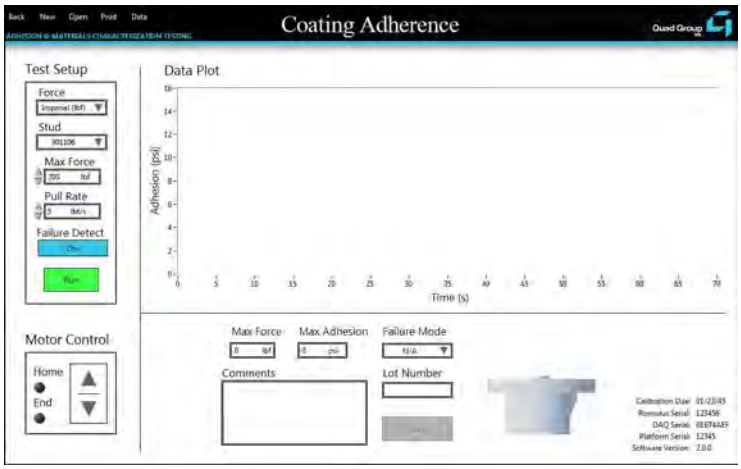
ROMULUS

WINZETA SOFTWARE

The Winzeta 2.0 software is easy to use and fulfills the potential of the Romulus System. Changing the Test Platform and Module in the software is as straightforward as the hardware. Once the correct hardware is in place for the test the user simply selects the Platform from the main menu, then the appropriate module or test.





CALIBRATION

The Metrolog enables customers to perform in-house calibrations without the need to send an instrument back to Quad Group. This option is ideal for customers who have multiple instruments or need to ensure that their testing capabilities are always on hand.

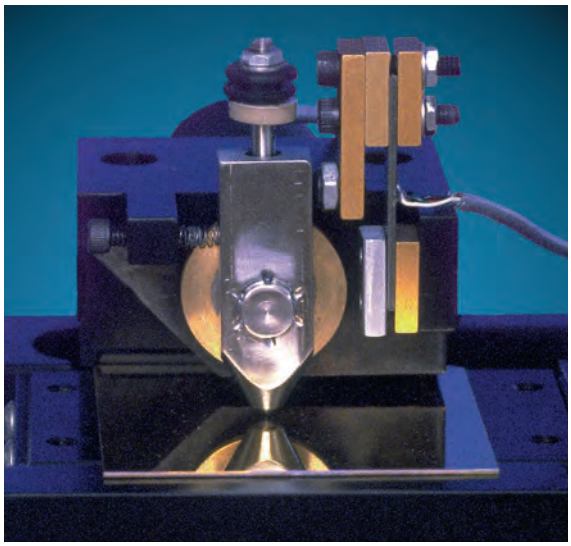
ROMULUS

DIAMOND SCRATCH COATING ADHERENCE TEST

THE STYLOMETER IS A SOFTWARE DRIVEN DIAMOND SCRATCH COATING ADHERENCE TESTER. IT IS INTENDED FOR THE TESTING OF THIN FILMS AND IS ESPECIALLY VALUABLE IN THE TESTING OF TRIBOLOGICAL OR WEAR COATINGS WHOSE ADHERENCE NORMALLY EXCEEDS THE MEASUREMENT RANGE OF ALL OTHER KNOWN ADHERENCE TEST INSTRUMENTS.

A spherical diamond is pressed against a coating surface at a constant rate of loading as the sample moves at a constant rate of travel. Force is increased until the coating catastrophically fails. The failure force is a measure of relative adherence for samples of similar character and thickness.

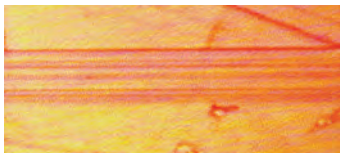
It is believed that techniques can be developed to measure coating tensile strength, elastic limit, scratch resistance, friction coefficient and other physical properties.



TOOLING

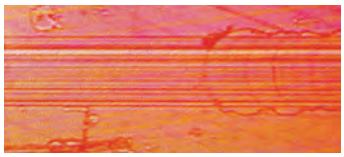
The scratch platform, in the photograph, contains the diamond stylus, constant rate of travel sample stage, and force measurement transducer which is mounted below the deck. An acoustic transducer, mounted on the stylus, is used to identify the point of initiation of sample micro-cracking and senses the coating or substrate failure. Acoustic energy, applied diamond force and coating removal force are plotted as a function of travel distance, as well as effective friction.

INCOHERENT SCRATCH



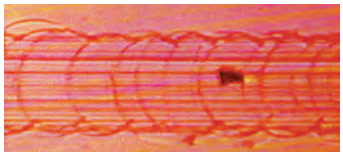
At very low diamond force the diamond creates an incoherent scratch consisting of striations in the travel direction. As the force increases, this track may widen. No coherent information is derived from this portion of the test.

MICRO-CRACKING



When the transverse, or diamond drag, stress reaches the tensile strength of a non-brittle coating, a micro-crack is created normal to the travel direction. Bursts of acoustic energy are released as the coating rebounds.

COATING FAILURE



If the coating is poorly adherent, the micro-crack fails catastrophically and large areas of coating are pulled away. For better adherent coatings (as above), there will be a substantial number of micro-cracks generated before coating failure.

SUBSTRATE FAILURE

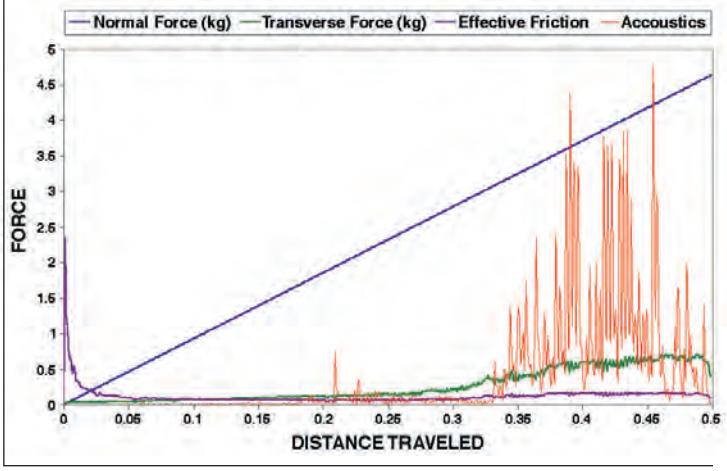
If the compression strength of the substrate is exceeded, portions of the substrate surface are crushed. This conditions results in high energy noise bursts and normally increases the transverse force and effective friction.

INTERPRETATION

From the force measurements the "effective friction" is calculated and plotted. When micro-cracking of the coating starts, the acoustic output increases. Abrupt increases in applied force, drag force, effective friction, or acoustic energy are called "events". The "critical event" is the earliest point at which coating removal is observed and its force level is the measure of adherence.

The Video Scope allows the user to make the visual observations of these events and line them up with the data points and save the data with the selected critical event.

SAMPLE STYLOMETER PLOT



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