MISTRAS
A World of NDT Solutions
Products & Systems Division

Product Bulletin

GranuPAC™: Acoustic Emission Technology Package for Granulation Studies & Monitoring

For years, experienced granulation operators have been able to predict if the granulation process is complete by feeling the mixing tank. The mixing emits energy in the form of mechanical vibrations (acoustic emission), as a result of change. This is due to related phenomena, such as particle size change, compound mixing, wetting or copping of the wetted compound. These acoustic emissions propagate from these sources throughout the granulator. Electronic “listening” to these acoustic emissions is in use worldwide to detect process transitions.

In process analytical technology for granulation, an ideal method would be noninvasive, nondestructive, relatively inexpensive, have a short measurement time and be intrinsically safe. Acoustic Emission (AE) has all these attributes. An Acoustic Emission sensor is attached to the outside wall of a reaction vessel and the acoustic information collected and processed. AE can also be used in two methods, passive (where the process is the source of the acoustic wave) or active (where the acoustic wave is put into the process and the change in velocity or attenuation is monitored). In an example of demonstrative monitoring of a mixing process, AE measurement was shown to give similar results to the established near infrared methods.

The µDiSP is a small, truly portable and notebook operated, AE system

Previous work has been performed to show the potential of using Acoustic Emission for monitoring the granulation process for the purpose of estimating grain size and determining process end points using a noninvasive technique. These studies emphasize the fact that several AE sources are present during the granulation process.

Multi-channel Acoustic Emission Systems

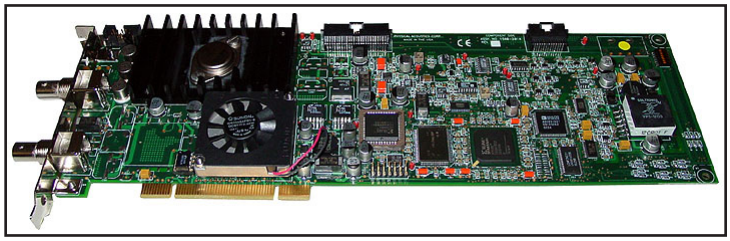
Physical Acoustics Corporation (PAC), a member of MISTRAS Products & Systems, is the only company in the world that manufactures a complete multi-channel product line. The PCI/DSP-4 is ideal for granulation applications because of its flexibility in research and production. The heart of the DiSP System, the PCI/DSP-4 is a PCI card with 4 complete high-speed channels of Digital Signal Processing (DSP) based AE data acquisition, up to 8 parametric input channels (on the first card) and optional waveform module. Once parameters are established, the DiSP is used for the actual process monitoring and control.

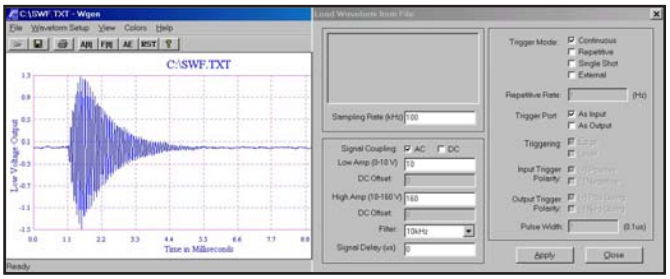
Sensors

One of the most important factors in performing granulation studies is the AE sensor (transducer). PAC continually designs and manufactures a diverse line of quality high sensitivity /low noise sensors. This capability is based on our solid tradition and expertise in the field of AE applications, which began in 1968. Our sensors actually "listen" to processes to detect AE activity. In all applications, AE sensors are vital links between the test and the analysis instrumentation. Their performance is critical to the success of every test. They are available in various sizes, shapes, frequency and temperature ranges, and packaging styles to meet the diverse needs of the application and environment.

Active Acoustics and Arbitrary Waveform Generator and WaveGen-1410 Software

For active acoustics in granulation research, our Acousto-Ultrasonic (AU) technology consists of sending low frequency acoustic pulses at a predetermined angle of incidence into the compound under test. These acoustic pulses travel through the material and are reflected by the different interfaces inside the sample. WaveGen1410 is an Arbitrary Waveform Generator Subsystem that consists of a single-channel waveform synthesizer board and software. It generates all types of waveforms and is used as an AU signal generator and AE simulator. Coupled with our AE system and associated system software, the WaveGen option can be used as a complete Acousto-Ultrasonic and pattern recognition system.





Research and Process Control Software

PAC develops the most powerful, comprehensive and efficient software for acoustic emission granulation studies. Our software product line covers all the AE testing and analysis methods including the most advanced AE signal processing methods, e.g. FFT, neural networks, pattern recognition and wavelet analysis.

The Neural network software, called NOESISTM, is a data visualization handling (e.g. select, delete, filter) software. In addition, NOESIS is available for data classification and processing during acquisition in real time.

Training

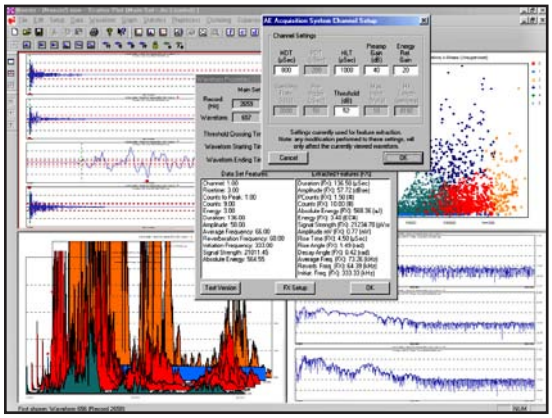
Through the Education & Certification program, PAC offers a wide range of AE seminars and short courses designed to meet the specific needs of the AE practitioner. Our courses include a biannual, five-day school of AE and a two-day short course on general AE for engineers and managers; application-specific courses for AE research.

Company Overview

The company designs and manufactures its own sensors, software and instrumentation and has been providing world-wide installations since 1968. PAC supplies complete turnkey systems and are experienced OEM System suppliers to major nuclear systems suppliers and facilities.

MISTRAS Products & Systems division, is a team of skilled researchers, engineers, technicians and manufacturing personnel dedicated to the development on practical and cost saving solutions to your challenging inspection needs.

For a demonstration or additional information, please contact our Princeton Junction headquarters at 609-716-4000.



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