

■ Screw Vendor Auditing Process: Full Waveform Signature Analysis

**Overview:**

A major household appliance manufacturer is utilizing one of the many SigMETER® abilities, performing full waveform Signature Analysis to monitor the amount of torque required when fastening sheet metal panels together.

**Highlights:**

- High speed data acquisition
- Full waveform viewing
- Full waveform analysis
- Waveform storage
- Multiple signature checks per test
- Determine starting torque
- Energy required to insert screw
- Amount of time to fully insert screw
- Final insertion (seat) torque
- Break-away torque

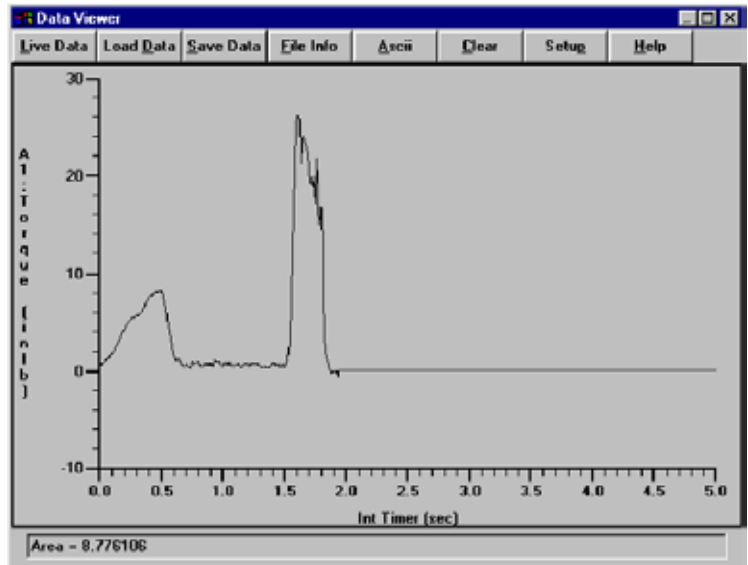
Clearly, there are a number of screw manufacturers capable of meeting the engineering specifications, such as screw length, number of threads, and thread pitch. However, factors such as material composition will dramatically affect performance. The manufacturing engineer must be aware of these factors when selecting an appropriate vendor.

During the insertion process, the SigMETER® is used to monitor torque against an internal timer. Data collected will determine the amount of energy required to insert the screw (the area under the curve), the amount of time required to seat the screw, and the amount of "holding", or "seat" torque, achieved with each insertion.



Pneumatic drives are used during the insertion process, thus the amount of energy required to insert each screw is easily translated into energy costs, and the amount of time required to seat each screw can be directly related to production capacity. The longer it takes to fully insert a screw, the lower the production capacity. Finally, the breakaway torque is determined by monitoring the torque necessary to remove a screw from the seated position. The higher the breakaway torque the better, because it is less likely the product will fall apart due to vibration when shipping, or during operation.

Using Signature Analysis methods, an engineer is able to simultaneously perform multiple checks. This allows the engineer to select the best screw for the application. The archived data is also used to compare data on a per screw basis. This provides an engineer with virtually instant access to the necessary information required during the qualification process.



RDU Screen showing Screw Insertion Torque versus Time Waveform