

This Technical Bulletin provides general guidelines regarding "Crystal Activity Data" seen on thickness monitors, specifically, what "Activity" means and how it should be interpreted. Operators use Activity Data as an indicator if a new quartz crystal sensor is "good or bad". However, as explained below, Activity Data is a more useful tool for showing problems with crystal hardware.

### ***What Does Crystal Activity Mean?***

The true Activity of a quartz crystal is its amplitude of oscillation. The amplitude of oscillation is correlated to the resistance at resonance measurement that we use at Fil-Tech to determine if a crystal works properly.

The Activity specified on thin film monitors is the ability of the crystal measurement circuit to conduct current. The crystal measurement circuit includes the quartz crystal, sensor head, feedthrough, and cables. If there is poor contact between any of these components the Activity reading will be low. The Activity can range from the best value of 650 to a minimum of 0 which would indicate a dead crystal. Typically, a new crystal will register from 400 - 550, depending on the state of the sensor head and other associated hardware.

### ***Diagnosing and Solving Activity Problems***

The use of the Activity reading as an indicator of whether a new crystal is defective is marginal. Activity is a more useful tool for showing problems with crystal hardware. If you are replacing multiple crystals in order to get a high Activity reading, the odds are that the crystal is not the problem, but rather something else in the "circuit" is faulty. Because the Activity is related to current flow, and based on Ohm's Law, any additional resistance to the circuit would adversely impact the Activity value. A short list of culprits includes heavily coated sensor heads, damaged cables, electrical shorts of the feedthrough, dirty contacts, and contact misalignment.

The two most troublesome and most common culprits causing low Activity readings are contact misalignment of the double anchor electrode pattern with the contact spring and flattened crystal contacts springs from normal wear and tear, causing high contact resistance. It has been our experience that crystal Activity can vary from crystal failure to 500 with a twist of the sensor head cap (rotating the crystal around the spring contact) even with very low resistance crystal of 10 Ohms. This behavior suggests that the contacts were not mating properly with the electrode pattern of the crystal.

To determine if contact misalignment or flattened contact springs, any of the other aforementioned components are the source of your Activity problems, follow Fil-Tech's Flowchart, Technical Bulletin 15.

## ***Technical Bulletin No. 14***

# Interpretation of Crystal Activity Data from Thickness Monitors

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