

# Upgrade to the EX-Q for fail-safe detection of dark and/or thin wafers.

If you process dark and/or thin wafers and you have old HAMA sensors (DD, WX) in your fab, the EX-Q is an easy upgrade that will deliver the fail-safe detection you need.

## EX-Q Advantages

- Detects dark and thin wafers with overall detection performance comparable to through beam.
- Detection headroom (sensitivity) sufficient to accommodate future generations of wafer coatings and edge geometries.
- Straightforward upgrade process.

## How do we know that the EX-Q will continue to sense dark and thin wafers as the technology evolves?

Because of the magnitude of the advancement in reflective wafer technology. First, the EX-Q decisively enables more reliable detection than previously possible with legacy HAMA DD and WX sensors. Apparent wafer thickness data shows that the EX-Q will detect wafer reflectivity from 0.01 to 100% reflectivity (refer to Figure 1). WX sensors with the gain set to High experience detection drop off at a reflectivity that is consistent with some current dark nitride wafers. DD sensors share similar drop off rates for dark wafers.

Secondly, the EX-Q has the sensitivity and the detection headroom to detect wafers with extreme characteristics - bright, dark, thin – or a combination of these characteristics.

The data in Figure 2 has been normalized to the sensor's detection threshold level that has been arbitrarily given a value of 1. A value of 1 in the data indicates the signal level at which the detect out line from the sensor is first turned on. By normalizing the signal values, a measure of signal headroom can be achieved. Headroom is defined as the amount of signal present above the detection threshold.

The maximum sensitivity for EX-Q sensors is found when the sensor is directly on axis with the wafer. In this use case, the sensor measures over 100X more signal than is needed to just trip the detection threshold for a dark Titanium Nitride (TiN) test wafer. Similarly a thin wafer only 150um thick measures close to the same headroom factor. Even a hypothetical worst-case wafer that is both thin and dark still maintains a 10X factor of headroom. The sensitivity of the EX-43Q allows the sensor to detect wafers of all known coatings and edge geometries. The substantial detection headroom means the sensor will be able to detect wafers with extreme coatings and/or edge geometries that are yet to be developed.

## Upgrading is easy.

With the same mechanical footprint, electrical interface and digital output, we have experienced near 100% success rate upgrading DD and WX sensors to the EX-Q. Our dedicated technical support team knows what questions to ask to assure that your upgrade is as simple as:

1. Adding the appropriate connector to the EX-Q sensor.
2. Installing the EX-Q on the robot - we now offer a free Alignment Card to make proper setup of the EX-Q even easier.
3. Re-teaching the robot for Z, Radius and Theta.
4. Mapping wafers.
5. Making minor software adjustments as needed.

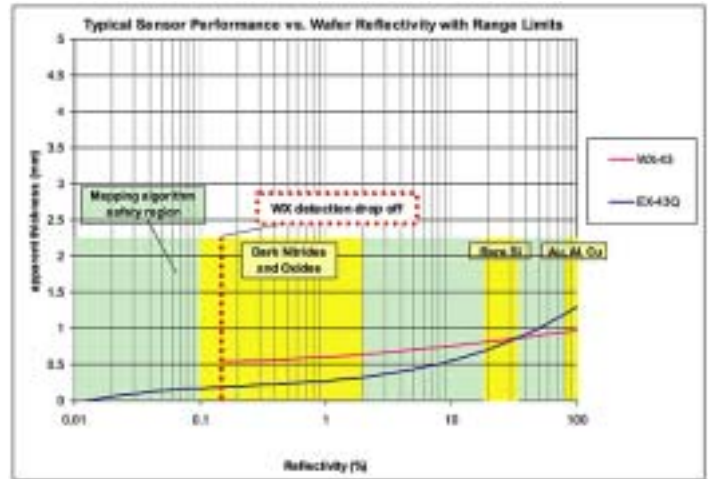


Figure 1. Detection performance based on wafer reflectivity

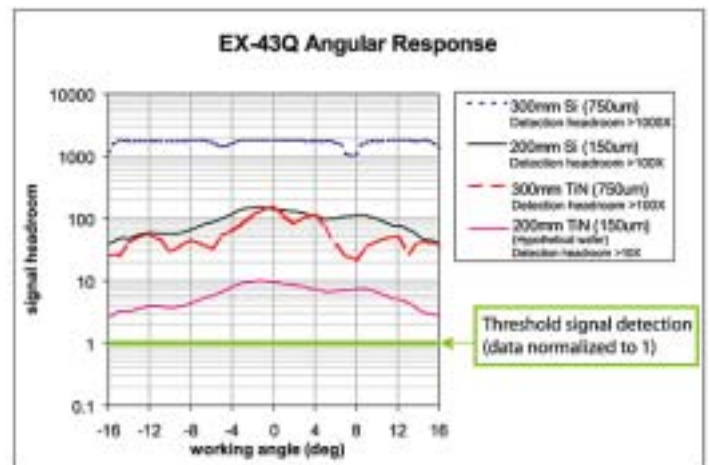


Figure 2. EX-Q detection headroom for working angles



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