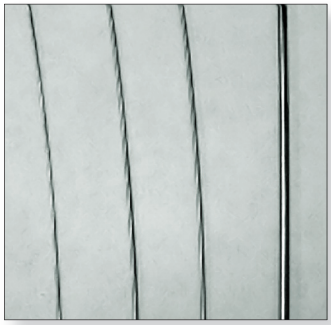
Crack Inspection of Hypodermic Needles

Scope

Hypodermic syringe needles must be 100% safe to use. Cracks in the needles must be detected prior to shipping and visual inspection of the needles is impossible. An alternative, reliable test is therefore required.

Challenge

The customer has a variety of needle sizes and wanted to detect cracks 0.100" long X .004" wide, though the medical grade tube wall. The needles are inspected after cold drawing before being cut to length and finished.



Due to the continuous process of testing, the coils are subject to wear and tear reducing sensitivity and causing premature failure. In order to achieve the desired result, as well as ensure the detection of defects, there was a need to design a better probe for improved durability and longer life.

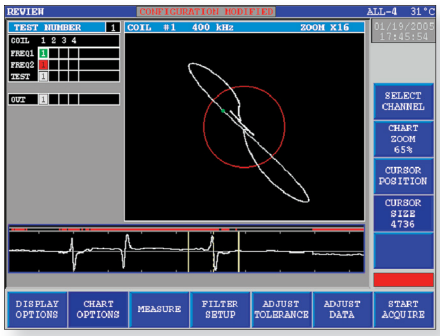
Needle sizes

0.011"
0.019"
0.024"
0.028"
0.041"
0.049"
0.070"

The Solution

To protect the windings, the coil was redesigned using a TTZ (Trans-Toughened Zirconia) Ceramic coil housing insert. The TTZ is exceptionally hard, protecting the coil windings from wear and damage which might be caused by burrs and snags in the tubing.

This application has been so successful that the customer is now using another larger coil to inspect the needle stock prior to cold drawing.



By placing the new coil just after the laser welding operation, the eddy current equipment is capable of detecting bad welds or non-welded areas on the tubing in addition to cracks.

The InSite CT is one of the instruments that can handle this test.

The re-designed differential coil continuously compares readings from one differential winding to the other as the wire is passed through. Disruptions in the signal are caused by physical differences from the norm encountered in the needle stock. These differences disrupt the eddy currents and the resulting change in signal exceeds the established alarm threshold to signify a fault.

Other Uses

This test can be adapted to test other kinds of non-ferrous tubing, wire, rod and bar stock.

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Printed in the USA