

### Scope

Create an eddy current test to reliably verify correct heat treatment in a variety of pump rings.

### Application

Pump rings are subject to friction and are a maintenance item designed to protect the pump shaft from wear. In order to function correctly, and provide protection over a long period, they must be correctly heat treated.

### The Challenge

The customer for this application produces a number of different sized rings in over 20 different size variations. Production is high-volume and can switch from one part variant to another frequently, sometimes hourly. The challenge is to be able to create a test which would require no fixture or part change-out regardless of which pump ring was being produced.



### The Solution/Setup

To effectively solve this challenge, it was necessary to select a coil size which would accommodate the largest ring size and yet have an adequate fill factor to discriminate faults amongst the smallest size.

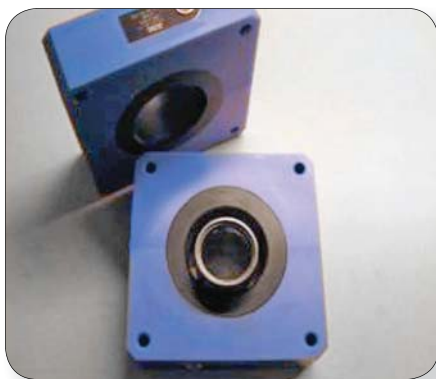
*Note: The fill factor is the ratio of the occupied diameter of the coil to the unoccupied diameter.*

Clearly as the fill factor changed from

size to size, one universal selection of frequencies and associated part buffer would not work for this application.

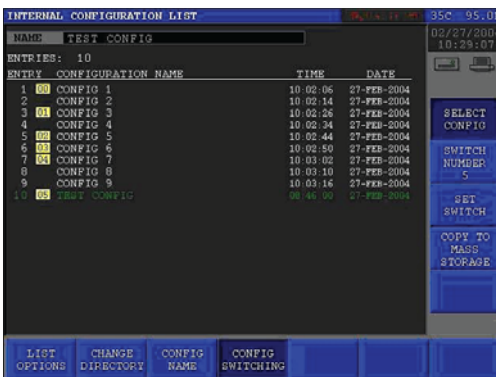
*Note: The part buffer is a collection of results taken from known good parts and stored in the tester. Test parts are compared against these results.*

The solution is to create individual test



configurations for each part or size, using the single coil. To get the greatest sensitivity from the test, given that the fill factor would not be optimum for any but the largest rings, an external reference test technique was selected. In this type of test a second coil known as the reference coil is used and a known good part is placed in the coil.

Distinct configuration files were created for each of the ring sizes and each file was "tagged" with a binary code "switch".



Depending on which size was being run in production, the PLC would "switch" from one configuration to another by sending a binary code instruction to the tester.

### Test Results

Excellent test results were obtained with a high degree of differentiation.

### Implementation

The customer had never used eddy current equipment at the plant, so it was necessary to send a Uson application engineer and a trained representative to create the part buffers for each test and set up the various configuration files. It was important to do this on site since part placement within the coil would not be the same in the laboratory as in the production environment.

Within a month, two production lines were operating with the new equipment and the customer was so pleased with the results and support provided that a third unit was ordered for another line.

### Benefits

The eddy current test is extremely fast and parts need only to pass through the encircling coil. A diverter beneath the coil segregates good parts from bad according to the tester output at the conclusion of the test.

Because of the sensitivity of the test the customer identified several other undesirable conditions such as grinder burns, flat spots and parts within parts which had previously been undetected.

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