

- 2507 Duplex Stainless Steel Tube
- 80 FT Cut Lengths
- 3/4" OD with .083" Wall Thickness
- Detects Sigma Phase as Small as 2.6% of Tube Wall Cross Section
- 2 Channel MultiMac® Eddy Current Tester- Offline
- 2 Varimac® Comparator Coils

Description:

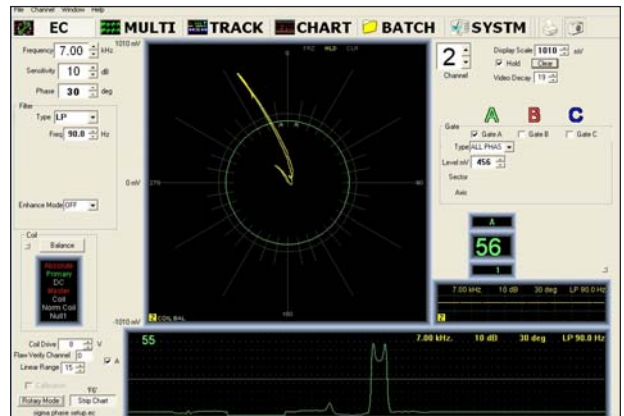
Sigma Phase is a brittle, nonmagnetic phase of tetragonal structure occurring in many transition metal alloys; frequently encountered in high chromium stainless steels. It results from a transformation of Delta ferrite in the alloy, creating carbides at the grain boundaries, which reduces the carbon and chromium content that normally provides strength and corrosion resistance in the metal matrix. Because the condition has significant length and is not a single point type defect, the standard, which is provided by the customer, is measured as a percent of the cross section of the tube wall or bar, using micrographic techniques.

Some metallurgists believe that sigma phase commonly occurs at temperatures between 600°C and 900°C. Another cause of sigma phase is due to a malfunction of the high temperature furnace; causing the material to undergo an extended length of time in heat treatment.

For the 2507 grade of duplex stainless steel, sigma phase may be resolved at temperatures above 1050°C through a corresponding annealing.

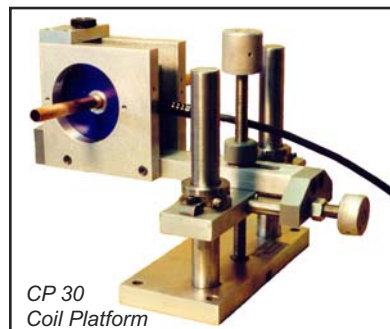


Coil Platform 352 on the left for defects and coil platform 30 towards the right for Sigma Phase.



The MultiMac eddy current tester accurately detecting the presence of Sigma Phase

System:



CP 30
Coil Platform

The test consists of a 2 channel MultiMac® coil eddy current tester. 1 channel is used for the detection of typical defects, while the other channel is used for finding sigma phase; a condition

caused from improper or extensive heat treatment.

The second channel on the MultiMac is an absolute tester using two Varimac® coils. One coil is balanced on air and used to calibrate the equipment with a reference standard. The other is the actual test coil installed on a CP 30 (Coil Platform).

The system is mounted on a Dual Pinch Stand test bench and is comprised of a CP 352 for defect detection, followed by CP 30 for sigma phase. This system operates offline on cut length of 2507 duplex stainless steel tubes up to 80 feet in length, 3/4" OD, with a wall thickness of 0.083".



MultiMac Electronics



Microscopic images of
Sigma Phase

