Why Eddy Current Testing in Condenser Tubes & Coolers is required?

Eddy Current Testing is a basic requirement for tubes condition assessment in surface condenser & coolers as a preventive health check-up. Cost effective operation of all equipments with best efficiency is first priority of each & every company & it's management and staff.

We are trying to provide the reliable technical facts to choose Eddy current testing over the routine Hydraulic testing to increase reliability and productivity of plant.

The surface condenser at a power plant has a significant effect on power generation and plant efficiency. Any degradation in condenser performance leads to elevated operating back pressures, heat rate penalties, and in some cases, a total power plant trip.

Condenser's tube on time testing is a great value to the power plant because of reduced shutdown times as well as the cost of damage that a leaking condenser can cause to other plant equipment, increase corrosion, hydrogen damage in the boiler etc.

Routine Health Check-up by Hydraulic Test

As a routine health checkup, Plant's personnel conduct hydraulic test on condenser tubes to detect tube failures & leakages only.

A condenser tube leak can be detected by regular checking for contamination of the boiler feed water as leakage will increase in conductivity of the condensate. If the condenser leak is severe enough, a continual rise in the water level of the hot-well will be observed.

To perform the hydrostatic test remove the water-box covers and flood the condenser shell side with DM water. Examine the face of tube sheet for any leaks. Water running out of a tube end indicates that the tube is ruptured / failed inside the condenser. Now it is vey well clear that Hydraulic test only provide the tube failure condition.

Hydraulic test method is not providing any real condition of tubes thickness and remaining life of tubes, while it is necessary as a preventive measure to avoid unexpected breakdowns.

Preventive Health Check-up by Eddy Current Test

"Find the trouble tubes before they find you"

Our condenser tube inspection method is based on Eddy Current Technology which detect and quantify flaws in tubing made of non-ferrous materials. Probes are propelled into each tube and then retracted. Each set of data is discreetly numbered and collected with a location on a tube sheet map.

Data analysis is performed, while on site, to provide instant preliminary field test report. When a questionable signal or a flaw indication occurs, the tube can be re-tested to ensure an accurate analysis. After completion of condenser tube testing, on generation of final test report in the office, a full colour tube sheet map is added in final test report. Final test reports take around 3-4 weeks time after the inspection was completed at site.

The advantages of service is the detailed preliminary field test report is provided on-site, immediately after completion of tube testing. This allows for immediate plugging for a quick return to service with increased reliability.

As a temporary measure, leaking tubes can be plugged. An appropriate tube plug must be placed in both ends of the tube to stop the leak. If the water is leaking out between the tube and tube sheet joint, it can usually be stopped by re-expanding the tube.

Advantages of Eddy Current testing over Hydraulic testing

1. Eliminate the unexpected and future possibility of condenser tube leaks
2. Find tubes with holes / leaks that don't show up on hydraulic test checks due to clogging, rusting, foreign particles
3. Reduce or eliminate back pressure in condenser due to in-leakage
4. Justify a tube replacement by performing a full or random tube inspection
5. Know exactly what condition the condenser tubes are in so that you can forecast condenser tube remaining life, tube replacement, shield installations, etc
6. Reduce/eliminate cost for additional water treatment chemicals and make-up water and energy loss
7. Reduced Power plant shutdown times as well as the cost of damage that a leaking condenser can cause to other plant equipment like corrosion, hydrogen damage in the boiler etc.
8. Increase reliability of plant

Input required for Eddy Current testing

The basic inputs required to conduct Eddy Current Testing in condenser & coolers etc

1. Tube Material
2. Tube Size i.e. Tube Diameter, Tube Thickness
3. Total Number of tubes to be tested
4. Tube Length

Prerequisite to start Eddy Current testing

The following inputs required before start Eddy Current Testing in condenser & coolers etc

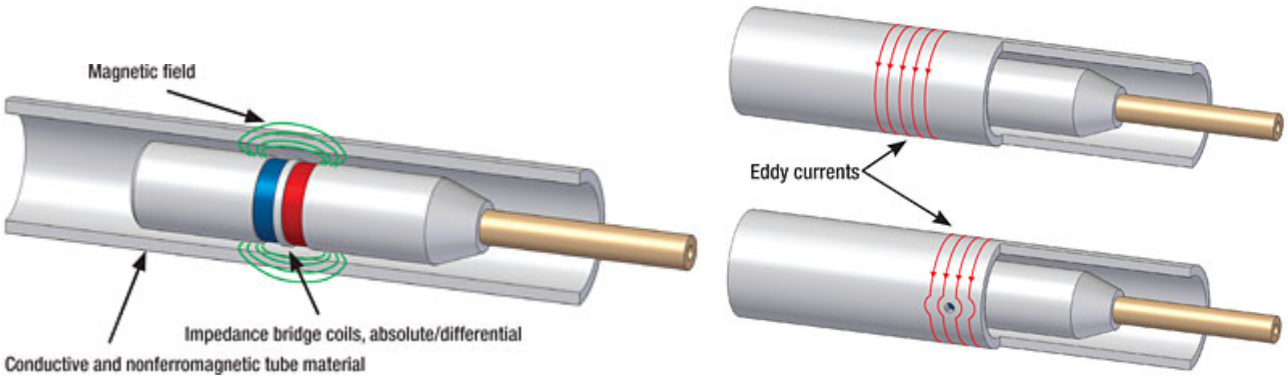
1. All Tubes internal cleaning by Hydro Jet Cleaning to get accurate results
2. Tube Sheet Cleaning, Scaffolding to start work, Proper Illumination
3. Any hard scaling removal from ID of tube, if left after cleaning, otherwise test probe will not go inside
4. Technical details & Drawing required
5. Unskilled manpower
6. Spare tubes, if required replacement
7. If internal scaling in tube is too hard, chemical cleaning may be required

Test Machine for Eddy Current testing

The given model no. test machine may be used during eddy current test at site, however the model of machine may be changed during actual execution of work. The basic principal of the test machine is describe below:-

Test Machine - MultiScan MS5800 for Tube Inspection - Olympus

Eddy current testing is a non-contact method used to inspect non-ferro magnetic tubing. This technique is suitable for detecting and sizing metal discontinuities such as corrosion, erosion, wear, pitting, baffle cuts, wall loss, and cracks in nonferrous materials.



Two coils are excited with an electrical current, producing a magnetic field around them. The magnetic fields penetrate the tube material and generate opposing alternating currents in the material. These currents are called eddy currents.

Any defects that change the eddy current flow also change the impedance of the coils in the probe. These changes in the impedance of the coils are measured and used to detect defects in the tube.

Unite Energy Corporation LLP is keen to provide our best after sales, spare and services support to you to mitigate the irregularities in the plant, best technical services to mitigate breakdown, minimize downtime, improvise design and system performance through inspection, operational recommendations, genuine analysis, training and skill enhancement etc to improve the overall plant's health and performance.

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