



EDDY CURRENT TESTING

Eddy Current testing is a non-destructive inspection technique used for detecting potential defects in electrically conductive materials such as copper tubing. It is based on electromagnetic induction.

All industrial tubing manufactured at Cerro Flow Products is Eddy Current tested to ASTM E243 before being packed. As the tube is tested using an encircling coil, any anomaly that causes a signal equal to or greater than the specified calibration standard is identified as an imperfection. This activates a marking device which sprays a jet of black ink onto the tube OD surface. The timing of marking is precisely adjusted so that the marked area completely covers the location of the anomaly. The following points are relevant in this regard:

- 1 The tester interprets any condition on or in the tube that produces electrical characteristics that differ from those of the "normal" tube surface as an anomaly, although it may not be a detrimental to the quality or performance of the tube.
- 2 In the case of straight length products, all pieces that are marked are rejected during final inspection before packing.
- 3 In the case of level wound coil product, the purpose of ink marking is to let the end user know the existence of a potential defect in the marked area. It is the responsibility of the customer to ensure that the marked portion of the tube is removed and scrapped.
- 4 For level wound coils, there is no ASTM requirement for maximum allowable NDET indications. The industry wide practice is a maximum of 2 marked imperfections per 1000 feet of tube. Cerro Flow Products has targeted a much tighter acceptance criterion as shown in the following table:



Product Size (Example)	Coil Weight	Theoretical Footage	Industry Standard	Cerro Standard NDET Indications
0.250 X 0.028"	350 lbs.	4,624 ft	9 per coil	6 per coil
0.375 X 0.012"	350 lbs.	6,599 ft	13 per coil	4 per coil
0.375 X 0.012"	500 lbs.	9,427 ft	19 per coil	8 per coil

The maximum number of permissible Eddy Current test indications for sizes above 1/4" OD supplied in nominal coil weights up to 350 pounds is four and eight test indications for 500 pound nominal weight coils. For tube sizes of 1/4" OD and below, which are supplied in nominal coil weights up to 350 pounds, the number of Eddy Current test indications is limited to six.

- 5 In the copper tube industry, the Eddy Current testing technique normally employed is the "encircling" coil method. This method is ideal for defect detection in high speed continuous inspection applications.



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