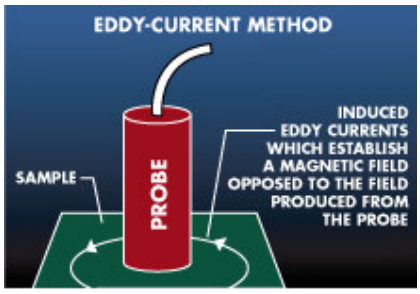
渦電流法量測原理



Eddy-Current non-destructive method of determining coating thickness used for measuring both non-magnetic, metallic coatings over steel and non-conductive coatings over non-ferrous metals.

The eddy-current technique is used for measuring both non-magnetic, metallic coatings (zinc, cadmium, copper, etc.) over steel as well as non-conductive coatings over non-ferrous metals such as anodize or paint over aluminum.

When a conductive material is subjected to an AC magnetic field from a probe, eddy-currents occur in the material in proportion to the frequency and resistivity. The induced eddy currents generate an opposing magnetic field which alters the circuit reactance and the output voltage of the probe. The change in output voltage is used to calculate the coating thickness. Electrical conductivity between the coating and substrate should differ by a ratio of 2:1 for optimum accuracy.

Non-conductive coatings introduce a gap (lift-off) between the probe and non-ferrous base material. This gap produces a loss in eddy current penetration which is compared to a measurement directly on the base material to determine coating thickness.

With conductive coatings over steel, eddy currents are generated in both the coating and ferrous base material. Eddy current loss in both materials is proportional to the coating and substrate material thickness and will range somewhere between readings taken directly on pure samples of each material. The eddy current loss differential is used to calculate coating thickness.