

DOUBLE SHEET DETECTION: METHODS OF SINGLE AND DUAL PROBES

This is a quick and simplified definition of how our three approaches to double metal detection operate. By understanding how they work, you should find selecting or narrowing your search for the right solution easy.

First analyze your application problem by considering these questions.

- What is the metal type?
- What is the thickness range?
- Can the metal pass through two opposing probes (dual probe, non-contact) or sensed only from one side (single probe, contact)?

Read the methods used to detect doubles and you will have a better understanding why the questions above are necessary.

METHODS FOR DETECTING DOUBLE SHEETS

- 1) Inductive with Dual Probes (Non-contact)
- 2) Eddy Current with Dual Probes (Non-contact)
- 3) Magnetic with Single Probes (Contact)

INDUCTIVE WITH DUAL PROBES

Dual Probe Detection (Non-contact) is a thickness measurement technique using a transmitter probe pointed in the direction of a receiver. The signal is measured at the receiver by a control amplifier. The received signal strength is inversely proportional to metal thickness.

Low frequencies signals are used to monitor ferrous metal like iron, steel and tinplate when the metal resists the signal reaching the receiver probe. Whereas high frequencies signals cause nonferrous metals like aluminum, copper, stainless steel and others to impede the signal to the receiver.

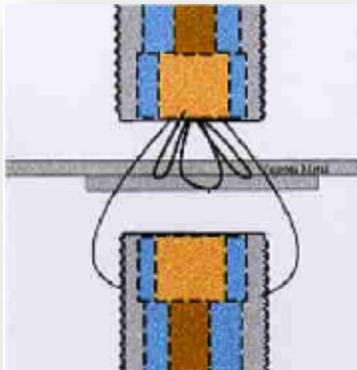
Prime probes will operate at both extremes. However, different probes are tuned to maximize sensitivity to different metal groups. By matching metal with an optimized signal permits the greatest signal difference between a single and a double thickness.

Sensitivity to all frequencies simplifies the number of choices necessary to find the right detector for a metal. Prime controls' amplifiers automatically switch to the optimum sensitivity after determining metal type, the probe type, probe distance from metal and best ratio between single and double thickness.

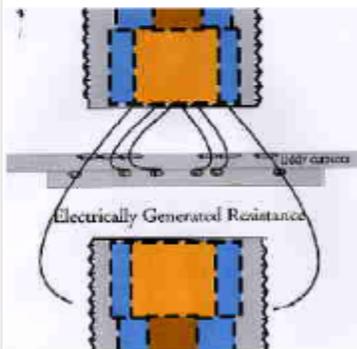
Prime probe model numbers are given a numeric value that indicates sensitivity to ferrous and nonferrous metal.

Probe values of 70 and 1000 operate best on ferrous metal like steel. Low probe values of 1 and 15 operate best on nonferrous stainless steel and aluminum.

All Prime probe models begin with a "P" and are followed by a number. For example P70CS, P1000B, P15CB represent different probes that are used in widely different metal applications. Letters following the numbers represent type of probe housing or some special function.



As the thickness increases, the received signal decreases.



Prime's detector will automatically choose the right method for the application.

Earlier Prime (Hyde Park) probe types do not show this, but are as follows. " Type "A" probe is a 70 value. (Good for light gauge ferrous) " Type "B" probes is a 1000 value. (Good for heavy gauge ferrous) " Type "CB" probes is a 15 value. (Good for light to heavy gauge nonferrous) " Type "AX" probe is a 1 value. (Good for ultra thin (foil) nonferrous & stainless steel)

Inductive (low frequencies) sensing occurs between a transmitter and receiver when the signal from the transmitter generates an electromagnetic field. The receiver in the field will capture part of the field and provide an electrical signal on its output. The electrical signal is proportional to the captured field strength. This is the signal that inputs our detectors.

Ferrous metal passing between the transmitter and receiver induces resistance to the field and reduces the signal to the receiver.

As the thickness increases, the received signal decreases.

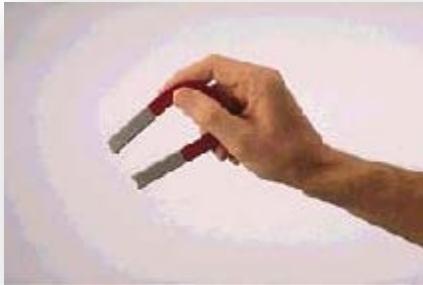
EDDY CURRENT WITH DUAL PROBES

Eddy Current thickness detection occurs when a high frequency field passes through metal. The signal creates eddy currents in the metal. The eddy current impedes the signal as it passes through metal. Thicker metal will increase eddy current action. The receiver will produce an electrical signal proportional to the received field strength. The received signal is decreased as the thickness increases. The eddy current method is used on nonferrous metal where inductive resistance will not impede the signal.

Prime's detector will automatically choose the right method for the application.

During startup (when initial power is applied) our detectors will test ten different signal options to determine the optimum signal for the application.

MAGNETIC WITH SINGLE PROBES



Magnetic thickness detection measures the shunting of a magnetic field across the north and south of a probe face. The magnetic shunt is proportional to the ferrous metal thickness. This method will not work on nonferrous metal.

This method is used on ferrous metal from one side. The metal must come in contact with the sensor face or within .001"-. 030".

The magnetic field is limited to a short distance from the face of the probe. The illustrated orange (dark) ring above is a nonferrous metal insulator. The magnetic field will cross the width of the ring through air to the opposite pole.

Ferrous metal provides less resistance than air to the magnetic flux field. When the metal comes in contact or near, the field shunts across to the opposite pole. The magnetic flux shunted across the poles is proportional to the metal thickness.

