

M100A Metal Inspector: Brazing

The **Model 100A Metal Inspector** uses resistivity, a basic principle of electronics, to quickly and accurately help you measure brazing quality in pipe joints and fittings. The nondestructive resistivity testing technique can be used to determine the uniformity of filler materials and helps detect areas where voids may exist.

An On-Site. Device that Eliminates the Guesswork

Because the Model 100A is battery-operated, portable, and weighs only about 10 lbs., it is ideal for on-site inspection of pipe joints and fittings. And because it generates individual test readings in less than two seconds, even large joints and fittings may be thoroughly inspected for brazing quality in minutes.

The Model Inspector helps reduce the guesswork involved in brazing applications and helps eliminate the need for other more expensive and time-consuming nondestructive inspection techniques.

How it Works

Using the Metal Inspectors trigger-activated hand probe, pulse a rapidly reversing direct current into a joint or fitting before brazing. Note the resistivity reading. This is called a base reading. After brazing, take another reading. A different resistivity will be measured. This is called the braze reading. The difference in resistivity between the base reading and the braze reading can be correlated to brazing quality through destructive testing.

Performing a Correlation Study

Because each application is unique, (i.e. pipe-wall thickness, type of filler material used, etc) it is necessary to perform a simple correlation study for each application to insure accurate results

(1) **Select the proper probe cartridge.** This is an important first step in any application. Probe pin spacing controls the depth of the Metal Inspectors current penetration. Penetration is about 1.5 times the pin spacing

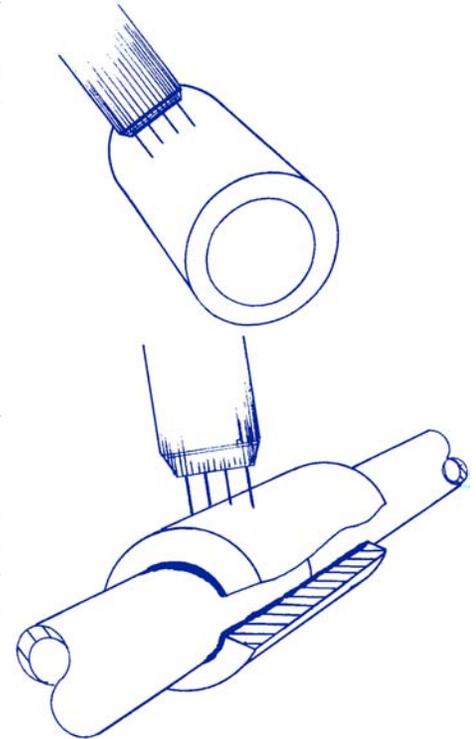
The current must fully penetrate the outer pipe or the sleeve on which the base reading is taken, or testing after brazing won't produce the proper results. Use this guide to selecting the proper probe cartridge for your application:

Probe Cartridge	Outer Pipe/Sleeve Thickness
.050 inch	Less than .075 inch
.100 inch	Less than .150 inch
.175 inch	Less than .262 inch
.250 inch	Less than .375 inch

(Note: The probe cartridges listed are standard sizes available with the Model 100. Custom probes are available.)

2) After selecting the proper probe tip, turn the Model 100 on and press the index and test button on the devices faceplate.

(3) Press the four pins of the probe cartridge squarely down on the joint to be brazed and take a "base reading". You may use this resistivity number as your base for testing, or you may adjust the Model 100 to a relative base setting that is easier to remember (i.e., 10, 50, or 100 are commonly used relative base settings). To adjust the Model 100 to a relative setting, take another base reading. This time, however, hold the probe in place on the metal with the trigger depressed. While doing this, use your free hand to turn the knob beneath the Index button on the face plate until the display reads the adjusted base setting you desire.



(4) **Braze the joint,** let it cool to ambient temperature, and take readings up and down the joint. Your readings **should be significantly lower than the base reading.** This is because the brazing has increased the thickness of the area penetrated by the Metal Inspector current, which causes a reduction in measured voltage, and thus a reduction in resistivity.

(5) **Note: If you get a higher reading (closer to the base reading than the other readings you've taken).** This means you may have found a void, or air space, in the filler material. This is because air space is not electrically conductive. Lack of conductivity increases resistivity.

(6) Record your readings and then cut the joint to visually examine the quality of the brazing.

(7) Repeat the procedure on another similar joint and compare the results to the initial study.