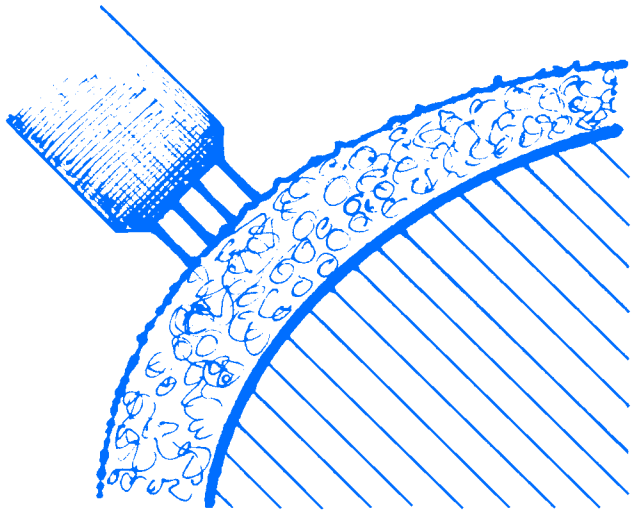
M100A Spray Coatings: Metal to Non-Metal Applications

Metal Inspector Model 100 uses resistivity, a basic principle of electronics, to quickly and accurately measure the thickness of conductive coatings prayed on nonmetallic surfaces. The nondestructive resistivity testing technique also helps you locate and "size-up" areas where hidden voids and inclusions may exist.



Eliminates Guesswork

The Model 100 is battery-operated, portable, and weighs only about 10 lbs., so it is ideal for "on-the-spot" inspection to determine if proper coating thickness has been achieved. And because it generates individual test readings in less than two seconds, it permits rapid inspection of large coated areas. The Metal Inspector helps reduce the guesswork involved in coating applications and helps eliminate the need for destructive quality checks.

How it Works

The Metal Inspector pulses a rapidly reversing direct current into conductive materials through a trigger-activated hand probe. If you place a probe tip squarely down on a section of dried coating and take a reading, you will get a resistivity measurement. If you take a reading in another area, you will get a different reading. These resistivity values can be correlated to coating thickness through destructive testing.

Developing a Correlation Curve

It may or may not be necessary to develop a correlation curve for each coating application on a non-conductive substrate. In some cases, the resistivity of the coating will not change appreciably as its thickness increases. On the other hand, resistivity changes may occur because of processing factors. We suggest that until you are completely confident in the resistivity testing technique, you should perform a correlation study for each application. This following sample procedure can be used:

(1) **Select the proper probe cartridge**. This is an important first step in any application. Probe pin spacing controls the depth of electrical current penetration. Penetration is about 1.5 times the pin spacing. We use this guide:

Probe Cartridge	Max. Coating Depth
.050 inch	.075 inch
.100 inch	.150 inch
.175 inch	.262 inch
.250 inch	.375 inch

(Typically, the .050 inch and .100 inch probe cartridges are best for most spray coating applications. For example, if an application calls for a coating specification of 50 mils, the "50" probe cartridge would be appropriate. However, if the application specification calls for a 75-mil thickness, there may be areas where coating thickness is greater than the current penetration. A "100" probe cartridge would be more appropriate in this case.)

(2) Turn the Model 100 on, and take readings on a coated sample. (The Model 100 can be in either the "Sheet" mode or the "Index and Test" mode, but use the same setting throughout a correlation study.)

(3) If you start getting lower readings, it means that the coating may be getting thicker.

(4) Record the readings and mark where each was taken on the sample.

(5) Cut the coated sample into sections and polish. Measure the coating thickness at each Model 100 test location.

(6) Plot the results on a graph – the Model 100 readings (resistivity) on the X-axis and the coating thicknesses on the Y-axis. Your graph should look like the one to the right. Note: Sheet Mode Theory states that resistivity is related to thickness by the following relationship:

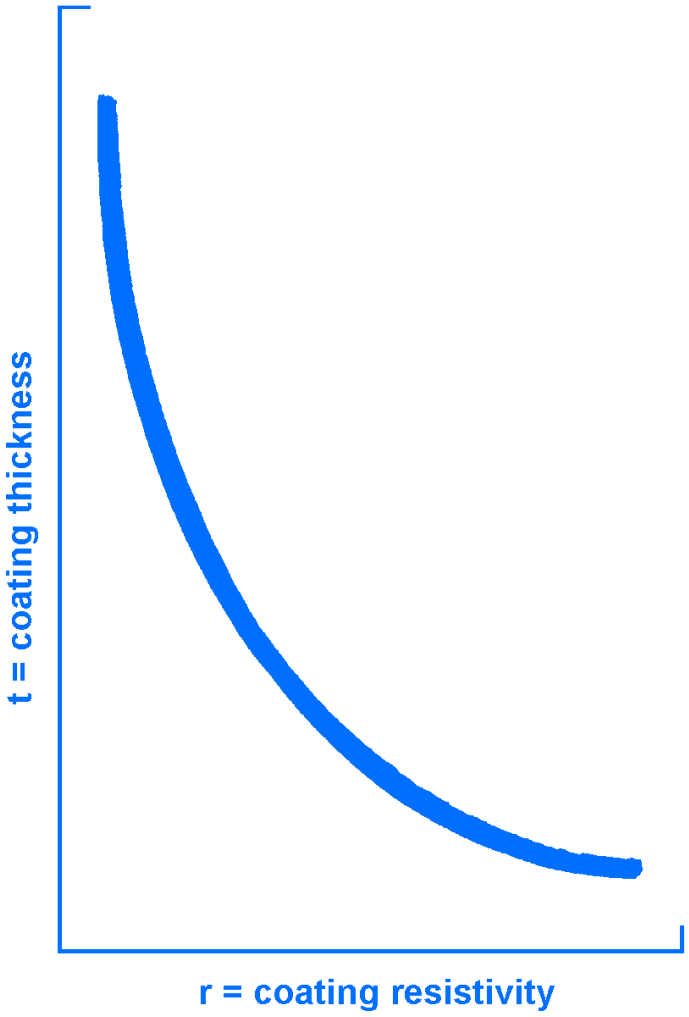
r = 4.53 vt/1 where t/s <.5

r = coating resistivity
v = voltage
t = coating thickness
I = measuring current of Metal Inspector

Since "r," 4.53 and "I" are constants, "vt" must also be equal constant. However, if "r" changes because of processing or other variables, you graph may differ.

(7) Test other coated samples. After establishing correlation values through experience, you should expect a Model 100 reading to be within .005 inch of the actual coating thickness.

If your results are erratic, perform another correlation study using a different probe cartridge, or call for assistance at 609-716-4000, fax: (609) 716-0706, or e-mail us at sales.systems@mistrasgroup.com.



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