Low voltage capacitance bridge vs. AWAIV Meg-ohm test

Question:
I have been using a low voltage capacitance bridge to track certain motors in my facility. I have been only seeing very tiny changes and am growing concerned that I may be on a wild goose chase. I heard from a co-worker the AWA IV Meg-Ohm test is better for this type of application... What is going on?

Answer:
Capacitance changes are sometimes very difficult to trend, especially if the motors are kept clean and are not subjected to conditions outside of their design ratings. In other words, there may not be much to trend. Without trending the results the effectiveness is further reduced. Because of this reality many authorities suggest using the same make and model of bridge for all readings, and use other technologies to verify any detected changes. One technology that readily detects water contamination is the Meg-Ohm test.

To illustrate what capacitance can and cannot do: A factory new 3 phase, 3 horsepower motor in a drip proof enclosure was first baseline tested with the AWA IV and a highly accurate FLUKE PM6304 capacitance meter. The tests formed the baseline trend data.

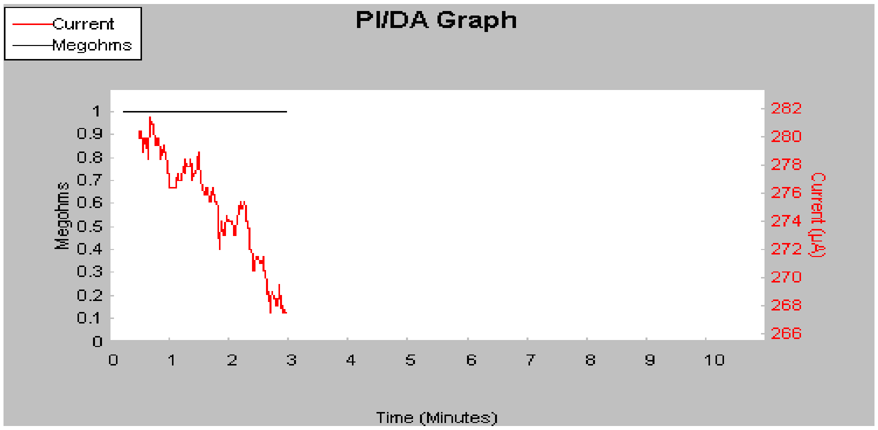
The motor was then completely submerged in a bucket of tap water for 7 days. This motor design is not rated for immersion and was therefore completely contaminated with water. The water contamination also resulted in a very noticeable amount of rust, both external and internal to the motor. The water was then drained off and the motor was tested within 5 minutes with the AWA IV and the FLUKE PM6304.

The AWA IV test results showed clear and unmistakable evidence the motor was severely compromised by contamination. Also, the AWA IV required no baseline data to identify the problem, a CRITICAL difference between the Baker Instrument Company AWA IV technology and other types of motor diagnostic equipment.

Test	**Pre-flood**	**Post-flood**	**% of difference**
Resistance	2.16 Ohm	2.16 ohm	Less than 0.69%
Meg-ohm	50,000 Meg	1.811 Meg	Greater than 25,000%
Stepped DC	Pass	Fail	see graph
Capacitance	2.685 nano-farads	6.778 nano-farads	2.52%

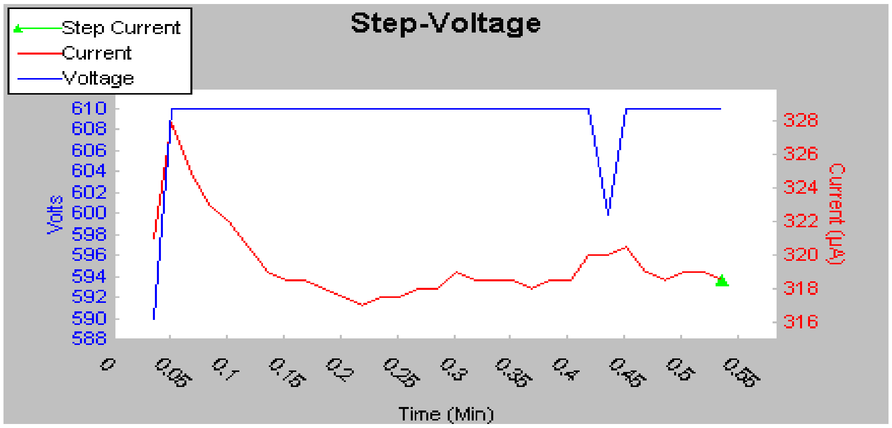
It is striking when you realize the change detected by the AWA IV was many, many times larger than that detected by the capacitance bridge. There is obviously a change detected by the capacitance, but it is certainly less than the other methods available through the AWA IV technology.

Here are some of the graphs the AWA IV shows of the data that it gathered with its test protocols:



Time (Min)	Current µA	Meg-ohms
0:15	280.20	1
0:30	280.20	1
0:45	279.60	1
1:00	277.50	1
1:30	277.30	1
2:00	274.40	1
2:30	270.90	1
3:00	267.10	1

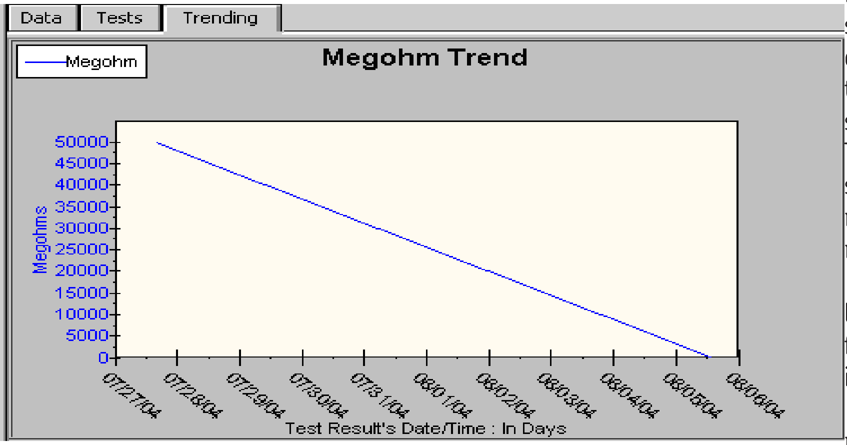
The above Dielectric Absorption graph shows clear evidence of contamination and is a tip off that the motor or its feeds are compromised. The next step should be to isolate the cause.



Step Length (Sec)	Volts	Current µA	Meg ohms
30	610	318.50	2

This Stepped DC graph above shows further evidence of a problem in the motor or its feeds, again – plan on isolating the cause before continuing.

Here is the final piece of data needed to allow a conclusion, the trending line for the meg-ohm test:



It does not take a very long look at the data to see that the AWA IV has clearly and unmistakably detected a serious problem exists, and corrective action should take place before returning the motor to service.

The AWA IV employs a different approach and suite of technologies than that taken by various manufacturers and marketers of low voltage electric motor "testing" equipment.

The AWA IV does not require a pre-existing baseline test to determine if a motor is fit for service. It offers enhanced trending capabilities that allow searching diagnosis of a wide variety of motor problems.

Be aware that other manufacturers equipment and marketers of low voltage "testing" technology may be completely incapable of detecting severe or potentially hazardous problems without pre-existing baseline data.