LEXSECO

Electromagnetic Test Equipment

"We Set the Standard"

THE WOUND ROTOR AND ARMATURE CORE TEST

The Lexseco Core Loss Tester employs a toroidal transformer test similar to that described in EASA Tech Note 17. In any core stack, including wound rotors or armatures, the condition of the core steel may be assessed. Our Core Loss Tester uses a single-turn, variable-voltage loop test to provide the necessary excitation level with or without the shaft in place.

Except during startup or in the instance of variable speed applications such as wound rotor or inverter duty motors, the frequency in a squirrel cage rotor approaches zero as the machine approaches synchronous speed. Provided the rotor is operating at nearly full speed and does not experience frequent start/stops, rotor losses caused solely by steel degradation can usually be ignored. When testing wound rotors and armatures not exempted above, the following test method should be employed. If the shaft is removed or adequate space exists for the main current cable to pass comfortably through the rotor, the rotor test should be implemented in the same manner that the stator test would be performed. Otherwise, use the Lexseco rotor shaft clamps to clamp onto the rotor shaft and use it as the current path through the rotor. Perform the core loss test as specified in the test instructions and compare the results of the test to any tests performed on nearly identical rotors when possible.

DEMYSTIFYING THE SQUIRREL CAGE ROTOR

Your kids ever have a guinea pig or a hamster? Remember the wheel in the corner that never stopped squeaking while you were trying to sleep? Well, now you know where the AC induction rotor got its name. If you look at that wheel you'll note a marked resemblance to the bars and endrings of a typical ac rotor. Leave out the shaft and laminations and presto, the hamster wheel.

Now that we have a picture in our mind let's discuss the rotating members this article does not address. First we're not discussing armatures, those laminated cores that use commutators. Nor will we discuss a wound rotor, as the qualification procedures for these devices are not the same as what I'm about to present.

Key to our discussion is the recognition that we're not trying to qualify the condition of the core in the case of a squirrel cage rotor. Rather, we're attempting to determine the integrity of the cage. By this I mean that we want another tool to determine if the rotor is open. With armature or wound rotor cores we're in the more traditional application of the core loss tester, i.e., the qualifying of laminations.

For years our industry has sought a better method to identify the open rotor. The Core Loss Tester is yet another tool to use in this determination. We're now in the process of rewriting our software and user's manual to make this application difference more apparent. From salt and pepper tests to a growler to a single phase rotor test we've not yet found a real positive vehicle for qualifying the cage winding of a squirrel cage induction rotor. Perhaps the core loss tester can give us a little better approach.

As an informed Lexseco user, you're already aware of the significant advantages to testing laminated cores. Testing rotor cages accords you yet another application for an already valuable tool. So let's take a look at the *how to's*.

Squirrel cage rotor testing is a two part process. First we'll excite the cage winding by directly applying voltage through the shaft clamps. If all is well each path or circuit should be equally excited. We use a magnetic paper to make this determination. Many of you use iron filings, which is fine. The magnetic paper is just a little neater. Placing the paper on top of the rotor produces a clear representation of the rotor circuit while excited by the Core Loss Tester's voltage. Our results with this method have been excellent. Failed cage windings have consistently evidenced a void, gap, in the particle alignment of the paper.

Sometimes, the second phase of this qualification also helps. We'll warm the rotor by increasing the applied voltage. This tends to demonstrate *hot spots* indicative of problems. Remember, since you're not attempting to determine the condition of the laminations, you need to look for uneven heating of the bars. We find the majority of problems occur at the connection of the bar and the endring. Depending on the specific nature of the problem, the fault area may also spark as the voltage attempts

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to cross the gap. As always, the applied test voltage should be a factor of circuit impedance, and safety considerations.

The Lexseco Core Loss Tester was designed to help you identify problems in laminated core steel. Though using our machine to qualify cage integrity is possible, it is not the principal intent.

Hopefully, you'll spend some time in your shop using the CLT for rotor testing. As a coordinator for our user's group, I am always interested in hearing your experiences. Hey, did you hear about the guy in Canada that's using the core loss tester as a welder?

A sample image of the Magnetic Paper used with a Lexseco Core Loss Tester to identify faulty bars on a Squirrel Cage Rotor

Information on the Magnetic Paper

The magnetic paper is a micro-encapsulated film which enables the user to view a static magnetic field. Simply by placing the film directly on a surface of the magnetized material can instantly reveal a magnetic field of any shape or pattern.

Color: Green.

Dimensions: 12” by 12”
12” by Specified Length
18” by Specified Length

Functionality: Minimum of 2000 cycles (dark to light switches) – is normally reset with a common magnet. We sell magnetic wands for this purpose.

Thickness : 0.006 inches.

Storage Stability: One (1) year at 25 degrees Celcius.

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