



D17 The Strange Case of the Magnet on the Electricity Meter: When Wrongly Executed Tests Show a Non-Existent Tampering Effect

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Learning Overview: After attending this presentation, attendees will better understand the problems that arise when wrongly collected evidence may result in people being unrightfully prosecuted for aggravated theft. Attendees will learn how to critically analyze all available data to assess whether a magnet laid on the top side of an electronic electricity meter can force the meter to measure less energy than that flowing through the metering section.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by providing insight on an incorrect practice for collecting evidence adopted by the Italian Distribution System Operators (DSOs) in an effort to counteract illegal attempts to steal electrical energy by placing electricity meters inside a strong magnetic field in the belief that this may alter the measurement error in favor of the consumer.

In Italy, the task of metering electrical energy at the delivering section for billing purposes is assigned exclusively to the DSOs. At the beginning of this century, they started to replace the old, electromechanical energy meters with more modern electronic meters, which can be read and controlled remotely and allow for implementing customized billing policies.

The very first model, installed before the transposition of the Directive 2004/22/EC of the European Parliament and of the Council on measuring instruments in the national law, exhibited a poor design of the current transducers whose magnetic core could be saturated by a strong DC magnetic field.¹ For this reason, unethical customers placed a strong magnet on the top side of the meter in the hope that this could reduce their energy bill.

After the Measuring Instruments (MID) directive was transposed in the national law in 2007, the DSOs started to replace the very first-generation meters with a new version that complied with the MID requirements.¹ Since the MID requires that in the presence of a magnetic field, the maximum permissible error is not exceeded by more than an additional 2%, the new meters are immune to the effects of external magnets.

However, some customers, generally the owners of small pubs, restaurants, and pizza parlors for whom the electricity cost represents a relevant share in the total costs of their business, still believe that magnets laid on the meters can force the meters to measure lower energy values and the DSO's verification teams still find such situations.

When this happens, the DSO makes a report to the judicial police and the consumer is prosecuted for aggravated theft and quantification of the amount of stolen energy, also determined by the DSO. However, in most cases, the quantification, based on verification tests performed only by the DSO technicians without providing the customer the right to have his/her own technical experts attending the test operations, are incorrect and a strict analysis of the available data, the historical data, and the test report shows that no additional measurement error can be attributed to the presence of the magnet.

This presentation will discuss how those data must be analyzed to state, in a scientifically and technically sound way, whether the electricity meter was tampered with or not and presents the result of some actual cases that led to release of the defendant for not having committed theft.

Reference(s):

¹ Directive 2004/22/EU of the European Parliament and of the Council of 31 March 2004 on measuring instruments (MID) (2004).

Tampering, Illegal Practice, Evidence Collection