

The INRIM Role of Inter-laboratory Comparison Provider for Electrical Power and Energy at Industrial Frequency: A Two-Year Activity Report

F. Galliana^{1*} and D. Serazio²

¹Department of Innovation and Metrology Services, National Institute of Metrological Research, Strada delle Cacce 91, 10135 Turin, Italy

²Nanosciences and Materials Department, National Institute of Metrological Research, Strada delle Cacce 91, 10135 Turin, Italy

*Corresponding author, E-mail: f.galliana@irim.it

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Abstract: The technical surveillance of secondary calibration laboratories accredited according to the ISO/IEC 17025 standard for electrical power and energy at industrial frequency is very important, as these measurements are the basis of the commercial relations between an electricity supplier and a user. An effective technical surveillance requires the execution of inter-laboratory comparisons (ILCs). With them, it is possible to verify the competence of the laboratories and the correctness of the dissemination process from the national standards of power and energy, usually maintained at national metrology institutes, to these laboratories. The paper deals with the ILCs that the National Institute of Metrological Research (INRIM) provided and carried out as reference measurements provider for Italian accredited laboratories for power and energy (active and reactive) at industrial frequency. The ILCs were carried out involving various instrument types and at different uncertainty levels. The 2σ relative uncertainties of the INRIM calibrations ranged from 1.0×10^{-4} to 1.5×10^{-3} . The ILCs had satisfactory results confirming the correctness of both the dissemination from INRIM and the accreditation process by the Italian accreditation body for calibration laboratories.

Keywords: Inter-laboratory comparison; Active and reactive power and energy; Wattmeter; Energy converter; Energy counter; Measurement compatibility; Measurement uncertainty; Normalized error