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Definitions for Calculations of VA, VAh, VAR, and VARh for Electricity Meters

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Foreword

Foreword (This Foreword is not part of Technical Report NEMA C12.24 TR-2022.)

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Changes in technology and increasing computing power have resulted in a number of methods for determining reactive power and apparent power. In some cases, configuration of electrical service or connection metering elements introduces complications. This Technical Report documents methods that have been used, approximated, or conceived of, by the metering community.

This revision of the Technical Report includes:

- Edits to formulas and text for consistency and clarity.
- The concept of measuring Source VA.
- Two Annexes that show measurement results of different methods given different shapes of current and voltage waveforms.
- An Annex to document harmonic content of a number of waveforms, including waveforms initially used by the National Research Council Canada in the 1980s.

This Technical Report defines methods for calculations of VA, VAh, VAR, and VARh for electricity meters. It is intended to ease identification of algorithms used in electricity meters and to facilitate accurate testing. No evaluations of relative benefits or inconveniences of the methods are offered.

This Technical Report was processed and approved for submittal to ANSI by Accredited Standards Committee for Electricity Metering, C12. At the time the committee approved this Technical Report, the C12 Committee had the following members:

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1 Scope

This Technical Report establishes names and mathematical definitions for the Volt-Ampere (VA), Volt-Ampere hours (VAh), Volt-Amperes Reactive (VAR), and Volt-Ampere Reactive hours (VARh) formulae used by electricity meters. The mathematical definitions assume static waveforms.