

Formula 1

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Formula 2

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Formula 3

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Detailed Explanation

IEC 62747:2023 addresses the critical need for harmonized performance assessment of thermal energy storage systems, which are increasingly vital for grid flexibility, industrial process decarbonization, and renewable energy integration. Unlike design or sizing guidelines, this standard focuses exclusively on **empirical verification**: it prescribes how to measure key performance indicators—including charge/discharge efficiency, energy capacity retention, power delivery capability, cycle stability, and thermal losses—under defined boundary conditions (e.g., inlet/outlet temperatures, mass flow rates, ambient conditions). The protocol mandates rigorous instrumentation calibration, data acquisition timing, steady-state and dynamic test sequences, and statistical treatment of measurement uncertainty using ISO/IEC Guide 98-3 (GUM). Crucially, it distinguishes between 'reference' (laboratory-controlled) and 'field' (real-world operational) testing modes, allowing for both certification-grade validation and site-specific performance monitoring. By establishing traceable, technology-agnostic test methods, IEC 62747:2023 enables fair benchmarking, supports performance guarantees in procurement contracts, and facilitates regulatory compliance and incentive qualification (e.g., for EU Green Deal funding or U.S. DOE validation programs).

Key Components

#	Component
1	Test Boundary Conditions Specification
2	Instrumentation and Measurement Uncertainty Protocol
3	Charge/Discharge Cycle Test Sequences
4	Performance Indicator Calculation Framework
5	Standardized Reporting Template

Applications

#	Application
1	Third-party certification of TES system performance claims
2	Validation of TES integration into industrial heat recovery systems
3	Benchmarking of competing TES technologies for grid-scale applications

Related Concepts

#	Concept
1	ISO 50001 Energy Management Systems
2	IEC 62885 Electric Household Appliances Test Methods
3	ASHRAE Guideline 36-2021 HVAC Control Sequences
4	Thermodynamic Cycle Analysis
5	Uncertainty Quantification in Thermal Measurements

Tags

thermal-energy-storage, performance-testing, IEC-standard, industrial-decarbonization, renewable-integration

IEC 62747:2023 — Thermal Energy Storage Systems – Performance Testing Protocol

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