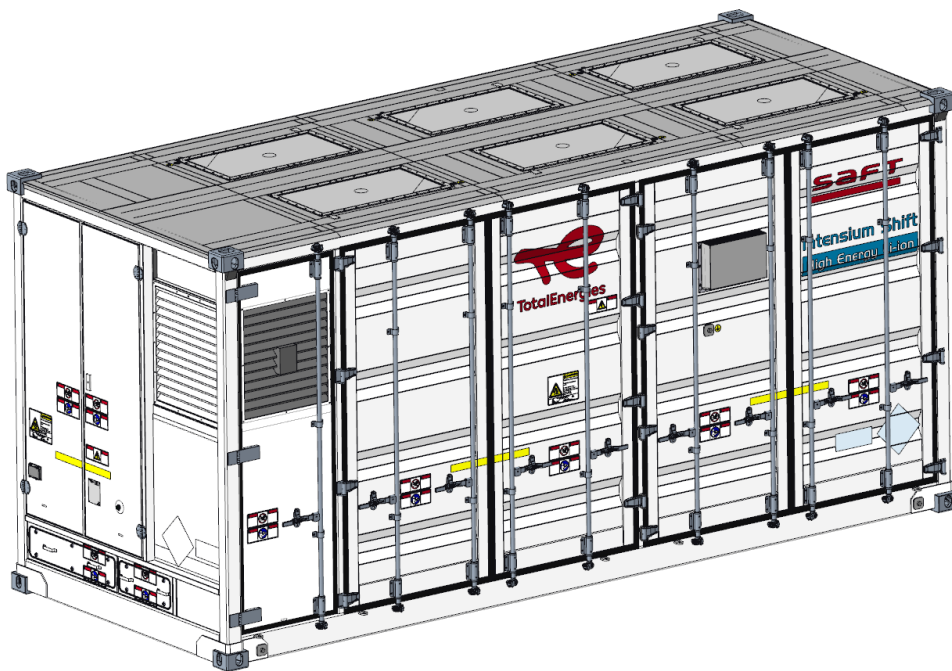


# DC Battery Energy Storage System



## Intensium® Shift



## COMPLIANCE TO STANDARDS

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This data shall not be disclosed outside of your company and shall not be duplicated, used, or disclosed, in whole or in part, for any purpose other than to evaluate the proposal; provided that if a contract is awarded to this offer, or as a result of or in connection with the submission of this data to the extent provided in the resultant contract. This restriction does not limit your company's right to use the information contained in the data if it is obtained from another source without restriction. The data subject to this restriction is contained in this document in its entirety.

	Status	Released	
	Date	December 15th 2023	
	Product	I-Shift	
	Document Ed.	V2.3	



## 1. COMPLIANCE TO STANDARDS OVERVIEW

ITEM	STANDARD	LEVEL	STATUS	EU Version	UL Version	COMMENT
Transport	UN38.3	Module	Compliant	✓	✓	Classification UN3480 Class9 Group II
		BESS	Compliant	✓	✓	Classification UN3536 Class9
	ISO 3874	BESS	Compliant	✓	✓	Handling and securing (for manutention and lifting)
	ISO 668:2020	Enclosure	Compliant	✓	✓	Classification CCC, dimension and ratings of containers
	ISO 1496-1:2013-07-01	Enclosure	Compliant	✓	✓	Specification and testing. CSC safety approval plate
Safety	ANSI/CAN/UL 9540A:2019 (4th Ed.)	Cell	Done	✓	✓	UL project #4790485985
		Module	Done	✓	✓	Intertek report #231000103SHA-001
		Unit	Done	✓	✓	Intertek report #230700261SHA-001
		Deflagration Analysis	Q1 2024	✓	✓	In progress
	IEC62619:2022	Cell	Done	✓	✓	SGS certificate #BE-44189
		Battery System	In progress Q4 2023	✓	✓	Samples under testing at third party laboratory
	ANSI/UL 60730-1:2021 CAN/CSA-60730-1:15 (R2020)	Safety SW for active protections	Compliant	✓	✓	Class B rated. Report #230700264SHA-001 EMI for Class B. Report #230700263SHA-001
	ANSI/CAN/UL1973:2022 (3rd Ed.)	Cell	Compliant	✓	✓	UL report MH64445
		Battery System	Compliant	✓	✓	ETL Listed (ATM and Report #30700265SHA-001)
	ANSI/CAN/UL9540:2020 (2nd Ed.)	ESS	Q2 2024	N/A	✓	Designed to meet the standard. Goal is to achieve UL9540 listed recognized DC BESS by third party.
	IEC62477-1:2016	BESS	Q1 2024	✓	✓	Scheduled Dec./Jan. 24
	NFPA 70E	BESS	Q1 2024	N/A	✓	Installation instructions & Arc Flash analysis
	NFPA 855	Installation	Q1 2024	N/A	✓	Designed to meet the code. Description can be provided to authorities on a project-by-project basis.
	NFPA2001: ANSI/CAN/ULC 2127 NFPA 72: UL864 NFPA70/72/76: UL268/UL2075/UL521	FSS (US version)	Compliant	N/A	✓	North America Standard for Safety for Inert Gas Clean Agent Extinguishing System Units Control panel Sensors for smoke/CO/heat
	EN 54-2:1997 + A1:2006 EN 54-4:1997 + A1:2002 + A2:2006 EN 12094-1:2003	FSS (UE and worldwide version, exept US)	Compliant	✓	N/A	European Standard for Fire Suppression System and Sensors.
	CE Mark	BESS	Q1 2024	✓	N/A	Based on European Directives 2014/35/EU (Low Voltage) and 2014/30/EU (EMC)
Electrical Development Components	IEC62620	BESS	Compliant	✓	✓	Internal impedance and energy profile with adaptations
	IEC62443-4-2	BESS	Compliant	✓	✓	Cybersecurity - SL-2 compliance
	UL94	Parts	Compliant	✓	✓	Per UL9540 §7.4
	UL50E:2020	Enclosure	Q1 2024	✓	✓	Certification to Type 3R by third party (with Gasket/Corrosion/Rain)
Environment	NEMA 250-2020	Enclosure	Q1 2024	✓	✓	Declaration of compliance by Saft to Type 3R
	IEC60529	Enclosure	Q1 2024	✓	✓	Declaration of compliance by Saft to IP54
EMC	IEC61000-6-2	BESS	Compliant	✓	✓	Done Nov. 23. Report in progress
	IEC61000-6-4	BESS	Compliant	✓	✓	Done Nov. 23. Report in progress
	IEC61000-6-5	BESS	Compliant	✓	✓	§ Substation - Done Nov. 23. Report in progress
Mechanical	ISO 12944	Enclosure	Compliant	✓	✓	C5H enclosure
	IEEE 693 / Eurocode 8	BESS	Compliant	✓	✓	Seismic, High level / zone 5 (anchoring kit needed for zones 4 & 5)
	Saffir-Simpson scale	BESS	Compliant	✓	✓	Cyclonic scale to level 4, with anchoring kit from level 2
	IEC 60721-3-4	BESS	Compliant	✓	✓	Snow Class 4Z18 240kg/m² max Wind Class 4Z11 67m/s, with anchoring kit

Compliant: standard considered in product design, or demonstrated by test

Evaluated: investigated by NRTL organization (Nationally Recognized Test Laboratory) to UL standard

Listed: product design compliant to UL standard by NRTL organization with periodic inspection of production

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## 2. DESIGN & QUALIFICATION TO UL STANDARDS

Intensium®-Shift (I-Shift) is evaluated to UL standards by OSHA NRTL 3<sup>rd</sup> party laboratory (Nationally Recognized Test Laboratory from U.S. department of labor / Occupational Safety & Health Administration).

### A. UL60730-1 Annex H evaluation for BMS active controls related to safety

Saft follows IEC61508 development process for solid state circuit and software controls. To complete, evaluation to UL60730-1 Annex H has been performed by a 3<sup>rd</sup> party laboratory to assess functional safety. It concludes conformity to Class B for active protections related to battery system safety.

### B. UL1973 Battery for Use in Stationary, Vehicle Auxiliary Power and Light Electric Rail (LER) Applications

Saft achieved UL1973:2022 ETL listing of the battery system (Modules & Battery Management System).

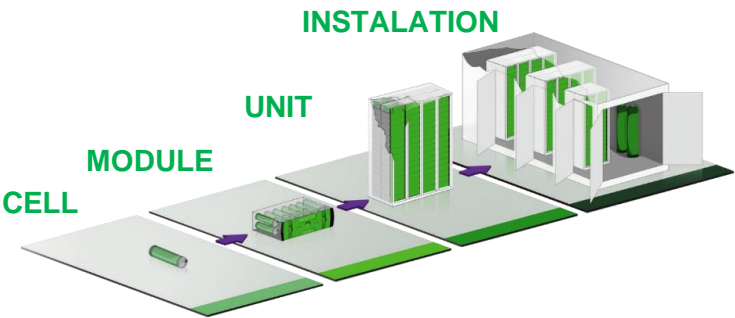
ETL mark is set on each delivered container following factory inspection process by third party.



*Note: HVAC, FSS, and control room are not in the scope of this certification.*



### C. UL9540A Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems

This standard is a testing method from cell to installation level to assess safety hazard associated with cell thermal runaway within battery system. In this context, I-Shift is an outdoor non-residential BESS.



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Throughout the evaluation to UL9540A, behaviour of the li-ion modules the DC BESS is evaluated in case of single cell failure, in a standardized setup, to measure gas volume and composition, and state about thermal propagation hazard and flammability.

Cells, module and unit (rack assembly) tests have been conducted and did not show propagation or fire hazard. Then an CFD analysis is in progress to demonstrate no deflagration hazard of the battery system within the enclosure.

#### D. UL9540 Energy Storage System (ESS) requirements

This standard aims to evaluate the whole Energy Storage System (PCS+BESS), so the end-product certification shall be led by the ESS owner. Saft will provide certification at DC BESS level to help the ESS owner to comply at end-product level.

It mainly concerns:

- Functional safety Class B rating according to UL9540:2020 §15.4
- Sub-components evaluation to UL/CSA standards according to UL9540:2020 §2
- Compliance to NFPA standards requirements as NFPA 70/70E
- EMI test according to UL9540:2020 §32 and UL60730 §H.24
- Enclosure rated UL50E type 3R according to UL9540:2020 §8 §9
- UL1973 compliance pre-requirement for electrochemical ESS according to UL9540:2020 §25.1

### 3. DESIGN & QUALIFICATION TO EU STANDARDS

The BESS will be designed and qualified to meet European Union directives with relation to the product type.

Saft applies IEC62477-1 for electrical safety, IEC62619 for battery system safety and EMC 61000 series to comply to European Union directives below:

**2014/35/UE** Low Voltage Directive

**2014/30/UE** EMC Directive

**2011/65/EU RoHS 2**



Declaration of compliance with relation to the directives above will be provided by Saft, following a strong internal testing campaign of the battery system.