

Lille, March 17th 2021

Supplier Statement: Compliance to IEC 60896-11

Exide Technologies hereby certifies that *Classic OPzS* and *Classic OPzS Solar* “2 volts” “tubular” stationary cells produced in the Lille plant (France) fulfill the IEC 60896-11 requirements. The following tables give a summary of the obtained results.

Test	Clause #	Requirements	Test results			
Capacity test	14	<ul style="list-style-type: none"> Actual capacity \geq 95% rated capacity (at the 1st cycle). Actual capacity \geq 100% rated capacity (at the 5th cycle). 	Cell	C10 ^a	Cycle	
			4 OPzS 200	117%	4 th	
			6 OPzS 420	104%	1 st	
			7 OPzS 490	106%	1 st	
			7 OPzS 490	112%	5 th	
			6 OPzS 600	106%	1 st	
			6 OPzS 600	108%	5 th	
			7 OPzS 700 ^s	101%	1 st	
			7 OPzS 700 ^s	105%	5 th	
			8 OPzS 800	101%	1 st	
			12 OPzS 1500	99%	1 st	
			12 OPzS 1500	105%	5 th	
			14 OPzS 1750	103%	1 st	
16 OPzS 2000	101%	1 st				
Test of suitability for battery floating application	15	After 6 months: <ul style="list-style-type: none"> Actual capacity \geq 100% rated capacity; Limited variation of individual voltage; Loss of electrolyte \leq 50% 	Cell	C10 ^a	Voltage (V)	Loss of electrolyte
			7 OPzS 490	114%	2.239 to 2.245	11%
			6 OPzS 600	>100%	2.233 to 2.224	11%
			12 OPzS 1500	106%	2.224 to 2.233	17%
Endurance test in charge-discharge cycles	16	<ul style="list-style-type: none"> Actual C10^a capacity \geq 95% rated capacity, after 100 cycles For information only: max. number of cycles til the actual capacity reaches 80% of the rated capacity 	Cell	After 100 cycles	80% of the rated C10 ^a reached after	
			6 OPzS 420	106% of the rated C10 ^a	2000 cycles	
Endurance test in overcharge	17	Actual C1 ^b capacity \geq 80% rated capacity, after 6 periods	Cell	C1 ^b	Overcharge current (A)	
			7 OPzS 490	106% after 7 periods	10.6	
			12 OPzS 1500	82% after 7 periods	34.0	

^a 10 hours discharge actual capacity in % of the rated one (Exide brochure, at 20°C, stop voltage = 1.8 V).

^b 1 hour discharge actual capacity in % of the rated one (Exide brochure, at 20°C, stop voltage = 1.6 V).

^s Solar cell “1080 Ah”.

Test	Clause #	Requirements	Test results						
Charge retention test	18	-	Cell	Initial C10 ^a	C10 ^a after 3 months	Charge retention factor			
			7 OPzS 490	113%	108%	95.3%			
			8 OPzS 800	106%	102%	96.2%			
			12 OPzS 1500	105%	100%	95.2%			
Short-circuit current and internal resistance determination	19	-	Cell ^c	I ₁ (A)	U ₁ (V)	I ₂ (A)	U ₂ (V)	R (μΩ)	I _{sc} (kA)
			200	84	1.905	422	1.650	750	2.61
			420	186	1.882	912	1.510	520	3.86
			490	214	1.867	1066	1.514	415	4.71
			600	272	1.860	1360	1.397	425	4.64
			700 ⁵	323	1.839	1605	1.333	402	4.90
			800	366	1.869	1830	1.463	280	7.11
			1500	680	1.820	2598	1.390	220	8.80

Characteristic	Clause #	Requirement	Status for all cells
Cell marking	21	a) voltage	Yes, printed on the cell
		b) manufacturer's or supplier's type reference	Yes, partly printed on the cell (product range) and partly engraved on the lid (reference name and part number)
		c) capacity, with an indication of the rating expressed as a current or as time of discharge, at the chosen reference temperature	Yes, engraved on the lid
		d) manufacturer's or supplier's name	Yes, printed on the cell
		e) electrolyte density (fully charged at the chosen reference temperature)	Yes, printed on the cell
		f) date of manufacture (month and year)	Yes, engraved on the lid
Marking of polarity	24	Polarity marking (at least of the positive terminal)	Yes, for positive and negative terminals
		"+" and "-" symbols indented or in relief on the lid adjacent to the terminal(s)	Yes, in relief
		Symbols in accordance with IEC 60417 (5005 and 5006 symbols, a ≥ 5 mm)	Yes

^a 10 hours discharge actual capacity in % of the rated one (Exide brochure, at 20°C, stop voltage = 1.8 V).

^c Please refer to the clause #14 line in the previous table to find the full name.

⁵ Solar cell "1080 Ah".