

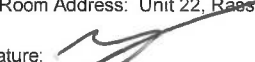
## IEC 60896-21/22:2004 - Product Range Test Report

### 1) General product type information

Product manufacturer	GS Yuasa Battery Manufacturing UK Ltd		
Manufacturing site	Unit 22, Rassau Ind Estate, Ebbw Vale NP23 5SD		
Product Tested (Results below only relate to this product)	SWL+2000		
Product model range	SWL+		
Product comprising the above model range	SWL+800, 850,1200,1850-6, 2000,1950, 2250, 2450, 2800-6, 2900-12FT, 3000, 3500, 4000, 4300 (and FR)		
Test Selection date & Start Date	Sep-23	Jan-25	

### 2) Product test performance information

Product safe operation in service	IEC 60896-21 test clause result				*Product complies for all applications						
6.1 Gas emission (at the float voltage and at 2,40 Vpc) <small>(ml gas per cell, hr, and Ah)</small>	Float Charge 2.275vpc		At 2.40vpc overcharge voltage conditions			Yes					
	0.0403		0.0232								
6.2 High current tolerance (A)	$I_{disc} = 567A$		13.009V	13.009V	13.001V	Yes					
6.3 Short circuit and d.c. internal resistance	$I_{sc}$ (A)	17597A	2194A	1958A	$R_i$ ( $\Omega$ )	0.008	0.006	0.007	Yes		
6.4 Internal ignition from external spark sources	Optional design feature - Pass test				Test performed at an off site IEC61430 explosion test chamber at 15-30°C		Yes				
6.5 Protection against ground short propensity	Pass				Pass		Yes				
6.6 Content and durability of required markings	Pass				Pass		Yes				
6.7 Material identification	Case	Pass		Cover	Pass		Yes				
6.8 Valve operation	Before	Pass		After	Pass		Yes				
6.9 Flammability rating of materials	Case	HB / VO		Cover	HB / VO		Yes				
6.10 Intercell connector performance (°C)	IBB1800 Connector - 26°C				Pass		Yes				
Product performance in service	IEC 60896-21 test clause result										
6.11 Discharge capacity (%)	$C_{10}$	116%	$C_8$	107%	$C_3$	112%	$C$	115%	$C_{0.25}$	129%	Yes
		117%		108%		109%		110%		121%	
		115%		114%		115%		115%		127%	
		116%		112%		112%		113%		130%	
		114%		116%		112%		115%		122%	
	112%		112%		112%		115%		129%		
6.12 Charge retention during storage (%)	$C_{rf}$	89.76%		90.15%	90.80%		82.87%		90.24%	89.39%	Yes
6.13 Float service with daily discharges (Cycles)	574				Pass		Pass		Pass		Yes
6.14 Recharge behaviour (%)	24 h	95.45%		168 h	100.0%		Pass		Pass		Yes
Product durability in service	IEC 60896-21 test clause result										
6.15 Float service life at 40°C	840		724	862	Days with $C_3$ rate test at 40 °C		Pass		Pass		Yes
6.16 Impact of stress temperature of 55°C or 60°C	357		370	390	Days with $C_3$ rate test at 55 °C		Pass		Pass		
	121		123	123	Days with $C_{0.25}$ rate test at 55 °C		Pass		Pass		
6.17 Abusive over-discharge (Ah/Ah)	$C_{aod}$	1.01		$C_{aoc}$	0.99		Pass		Pass		Yes
6.18 Thermal runaway sensitivity (°C)	$T_{2.45Vpc}$	A	28.25		$T_{2.60Vpc}$	A	46.88		Pass		Yes
		B	28.25			B	46.88		Pass		
		C	28.25			C	46.88		Pass		
6.19 Low temperature sensitivity (Ah/Ah)	$C_{als}$	1.11		No Damage		Pass		Pass		Yes	
		1.12		No Damage		Pass		Pass			
		1.15		No Damage		Pass		Pass			
6.20 Dimensional stability at elevated internal pressure and temperature	%		mm		Pass		Pass		Pass		Yes
	A	0.43		0.93		Pass		Pass			
B	0.009		0.02		Pass		Pass		Pass		
6.21 Stability against mechanical abuse of units during installation	Pass				Pass				Yes		

Company name: GS Yuasa Battery Manufacturing UK Ltd  
 Company officer: Mike Taylor  
 Test Room Address: Unit 22, Rassau Industrial Estate NP23 5SD  
 Signature: 

Report No. 25-010

Issue Date: 30/6/25



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When a decision is in place IEC60896-22 is used  
 Unless otherwise stated all tests are performed at 20°C

End of Results