

## Technical Specification for Vented Lead-Acid Cells (VLA)

### 1. Application

BAE *SECURA PVSM solar* batteries need only low maintenance and are used to store electric energy in small solar photovoltaic installations.

Due to the robust tubular plate design BAE PVSM batteries are excellent suited for highest requirements regarding cycling ability and long life-time.



### 2. Technical data (Reference temperature 20 °C)

Type	$C_{1h}$ Ah	$C_{10h}$ Ah	$C_{20h}$ Ah	$C_{72h}$ Ah	$C_{100h}$ Ah	$C_{120h}$ Ah	$C_{240h}$ Ah	$R_i$ 1) mΩ	$I_k$ 2) kA	Length (L) mm	Width (W) mm	Height (H) mm	Weight dry kg	Weight filled kg
2 PVSM 220	82	137	151	173	178	180	187	1.19	1.74	47	198	486	8.5	11.2
3 PVSM 330	123	207	226	261	268	272	283	0.83	2.50	65	198	486	11.8	15.7
4 PVSM 440	164	277	304	349	359	363	379	0.65	3.20	83	198	486	15.0	20.1
5 PVSM 550	206	347	380	438	450	456	475	0.54	3.85	101	198	486	18.2	24.6
6 PVSM 660	247	417	456	526	540	547	571	0.47	4.43	119	198	486	21.5	29.1
7 PVSM 770	288	486	534	614	631	639	667	0.41	5.09	137	198	486	24.8	33.6
8 PVSM 880	330	556	610	702	722	730	763	0.37	5.60	155	198	486	28.0	38.1
9 PVSM 990	370	625	686	784	812	823	859	0.34	6.07	173	198	486	31.2	42.5
10 PVSM 1100	411	694	762	878	902	915	955	0.32	6.50	192	198	486	34.5	47.0

1, 2) Internal resistance  $R_i$  and short circuit current  $I_k$  according to IEC 60896-11

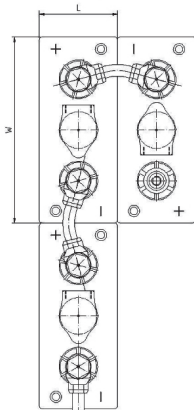
Height (H) is the maximum height between container bottom and top of the bolts in assembled condition.

Please observe needed headroom for installation and maintenance.

BAE PVSM cells are also available as dry pre-charged version. They are titled with additional „TG“, e.g. 2 PVSM 220 TG.

All values given in the table correspond to 100 % DOD without voltage drop of connectors. Please consider item 7.

### 3. Terminal positions



Terminals are designed as female poles with brass inlay M10 for flexible insulated copper cables with cross-section 25, 35, 50, 70, 95 or 120 mm<sup>2</sup>.

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## 4. Design

Positive electrode	tubular-plate with woven polyester gauntlet and solid grid in a corrosion-resistant PbSbSnSe-low antimony alloy
Negative electrode	grid-plate in a low antimony alloy with long-life expander material
Separation	microporous separator
Electrolyte	sulphuric acid with a density of 1.24 kg/l at 20 °C (68 °F)
Container and lid	impact-resistant polypropylene, UL-94 rating: HB
Plugs	with integrated min and max level marking of electrolyte
Pole-bushing	100 % gas- and electrolyte-tight
Kind of protection	IP 25 regarding EN 60529, touch protected according to VBG 4

## 5. Installation

BAE PVSM cells have to be installed in racks or trays with lateral force on the sidewalls in order to avoid an excessive bulging of the battery cell containers.

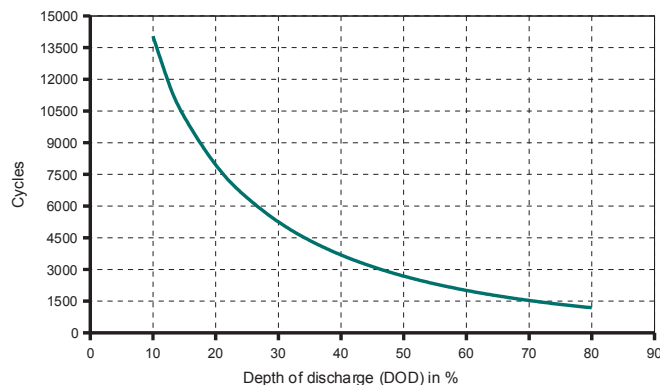
## 6. Maintenance

Every 6 months	check battery voltage, pilot cell voltages and temperatures, average water-refilling interval (depending on utilization and ambient temperature)
Every 12 months	check of mechanical and electrical connections, record battery voltage, cell voltages and temperatures Please refer to the operational instruction for details.

## 7. Operational data

Depth of discharge (DOD)	restricted to 80 % according to final voltage per cell and discharge time as per item 2, deep discharges of more than 80 % DOD have to be avoided
Initial charge current (I or bulk phase)	unlimited, the minimal charge current has to be 5 A/100 Ah C <sub>10</sub>
Charge voltage	restricted from 2.30 V to 2.40 V per cell, operating instruction is to be observed
• DOD per day < 20 % C <sub>10</sub>	2.30 V – 2.35 V per cell
• DOD per day 20 % - 30 % C <sub>10</sub>	2.35 V – 2.40 V per cell
• DOD per day > 30 % C <sub>10</sub>	to prevent electrolyte stratification, a gassing recharge must be carried out according to BAE operating instructions
Adjustment of charge voltage	no adjustment necessary if battery temperature is between 10 °C and 30 °C (50 °F and 86 °F) in the monthly average, otherwise $\Delta U/\Delta T = -0.003 \text{ V/cell per K}$
Recharge to 100 %	within a period of 1 up to 4 weeks
Operational temperature	-20 °C to 55 °C (-4 °F to 131 °F), recommended temperature range 10 °C to 30 °C (50 °F to 86 °F)
Self-discharge	approx. 3 % per month at 20 °C (68 °F)

## 8. Number of cycles as function of Depth of discharge



## 9. Transport

Batteries are not subject to ADR (road transport), if the conditions of Special Provision 598 (Chapter 3.3) are observed. These cells/batteries are dangerous goods on sea transport. Declaration and packaging must comply with the requirements of IMDG-Codes.

## 10. Standards

Test standards	IEC 60896-11, IEC 61427
Safety standard, ventilation	EN 50272-2