



Herewith we certify for our OPzS batteries:

	OPzS cells 100Ah to 3000Ah	OPzS blocks 12V 50Ah to 6V 300Ah
Expected service life at 20 to 25°C in standby operation	20 years	18 years
Cycle life IEC 60 896-11 75% C4	1500 cycles	1200 cycles

Expected service life is proven by an accelerated life time test at 60°C in float conditions.
 Result 473 days
 Acceleration factor 60°C to 20°C = 21,8
 Calculated operational life = $473/365 * 21,8 = 28,2$ years
 Test report attached

Cycle life is proven according to IEC 60896-11 : discharge 75% C4, recharge 2,40V 21h
 Result 1520 cycles
 Type Test Report attached

Quality Manager
HECTOR

Development Manager
A. DIMITRY

Quality Features of Sunlight OPzS batteries

1. DIN design

Cells are made according to DIN 40736 part 1, blocks are made according to DIN 40737 part 3. Sunlight is using original moulds for container and lids to have the optimized height of mud space and the optimized dimension of the water refilling interval.

The lid-box joint is glued with proven material and high experience. The pressure test is done at 200mbar with a maximum pressure drop of $<0,5\text{Pa}$ over $> 1\text{min}$.

2. Low corrosion of the positive grid

For high operational life and high cycle life a low corrosion of the positive grid is very important. Sunlight is using the most modern pressure casting machines with 200bar pressure and optimized moulds. Sunlight is using only 1,65% antimony and specified small contributions of selected metals to get small grains and a crack-free casting. The low antimony gives low corrosion, but also over life a low water consumption and stable float voltages. Low corrosion gives also lower growth of the positive plates. But after 10 years we have to accept some growth. To avoid damages of lid and container we use a special pole bushing (see point 5).

3. Tubular plate with red lead filling and fine-poric gauntlets

The tubular plate design versus flat plate design has several advantages:

Lower mass shedding, because gauntlets keep the active material (especially PbO_2) back and avoid mass shedding. Sunlight uses special gauntlets with pores $<30\mu\text{m}$.

The gauntlet is pressing the active material onto the grid spine. It gives a better capacity, because the electron transfer over the mass/grid connection is better. Also the corrosion is reduced.

The filling with red lead is the best method to get a defined density and porosity of the active material over the whole height of the plate.

4. Active negative plate

The negative grid is made out of a low antimony alloy of 3% to reduce the water loss further. Full automatic gravity caster ensure a high and stable quality level.

The negative mass has a tendency to agglomerate over life and cycles. To keep the high internal surface and the high capacity over life Sunlight is using long time expander.

5. Pole bushing as sliding pole, 100% acid- and gas-tight

The pole bushing of sunlight OPzS cells consists of a leadpole with a brass insert of 16mm diameter. The connectors are bolted with plastic covered pole screws onto the pole. Measurement of voltages can be made on a lead coated measuring point of the pole screw. Further Measurements can be made on the lead pole below the connector. The geometry makes sure, that IP25 is assured. It means, that with a finger the voltage cannot be touched.

For the sealing we machine in the pole a labyrinth, cover it with a primer and injection-mould the pole with a plastic jacket (green color). The sealing between the so prepared pole to the lid is done by a robust rubber ring. The rubber ring allows a sliding of the pole by more than 12mm and provides a 100% acid- and gas-tight seal.

