

The construction of the cell/block OPzV and its dimensions



1. General

Upower OPzV cells are made according to DIN 40 742. This includes the dimensions and minimum capacities of all cells made out of 4 plate pairs:

4 OPzV 200 to 6 OPzV 300	out	of	the	50Ah	plate	pairs
5 OPzV 350 to 7 OPzV 490	out	of	the	70Ah	plate	pairs
6 OPzV 600 to 12 OPzV 1200	out	of	the	100Ah	plate	pairs
12 OPzV 1500 to 24 OPzV 3000	out	of	the	125Ah	plate	pairs

The cover is glued to the container with a proven polyurethane material. The cells are made for screwed connectors.

The cell opening is equipped with a valve, which opens at a defined pressure to avoid damages. Inside the cell an oxygen recombination takes place. The alloy of the positive electrodes is free of antimony. The label contains all requirements of DIN 40 742.

Upower OPzV block batteries are made according to DIN 40744. This includes dimensions and minimum capacities of all blocks made out of the plate pairs 50Ah. 12V 1 OPzV 50 to 12V 3 OPzS 150 and 6V 4 OPzV 200 to 6V 6 OPzV 300. The electrolyte is fixed in GEL. Cover and container are glued together with a proven polyurethane. End poles are made to connect screwed connectors.

Every cell opening is equipped with a valve, which opens at a defined pressure to avoid damages. Inside every cell an oxygen recombination takes place. The alloy of the positive grid is free of antimony.

2. Cell dimensions

The table gives the measures a (perpendicular to the plates), b (parallel to the plates) and the heights up to cover and overall height.

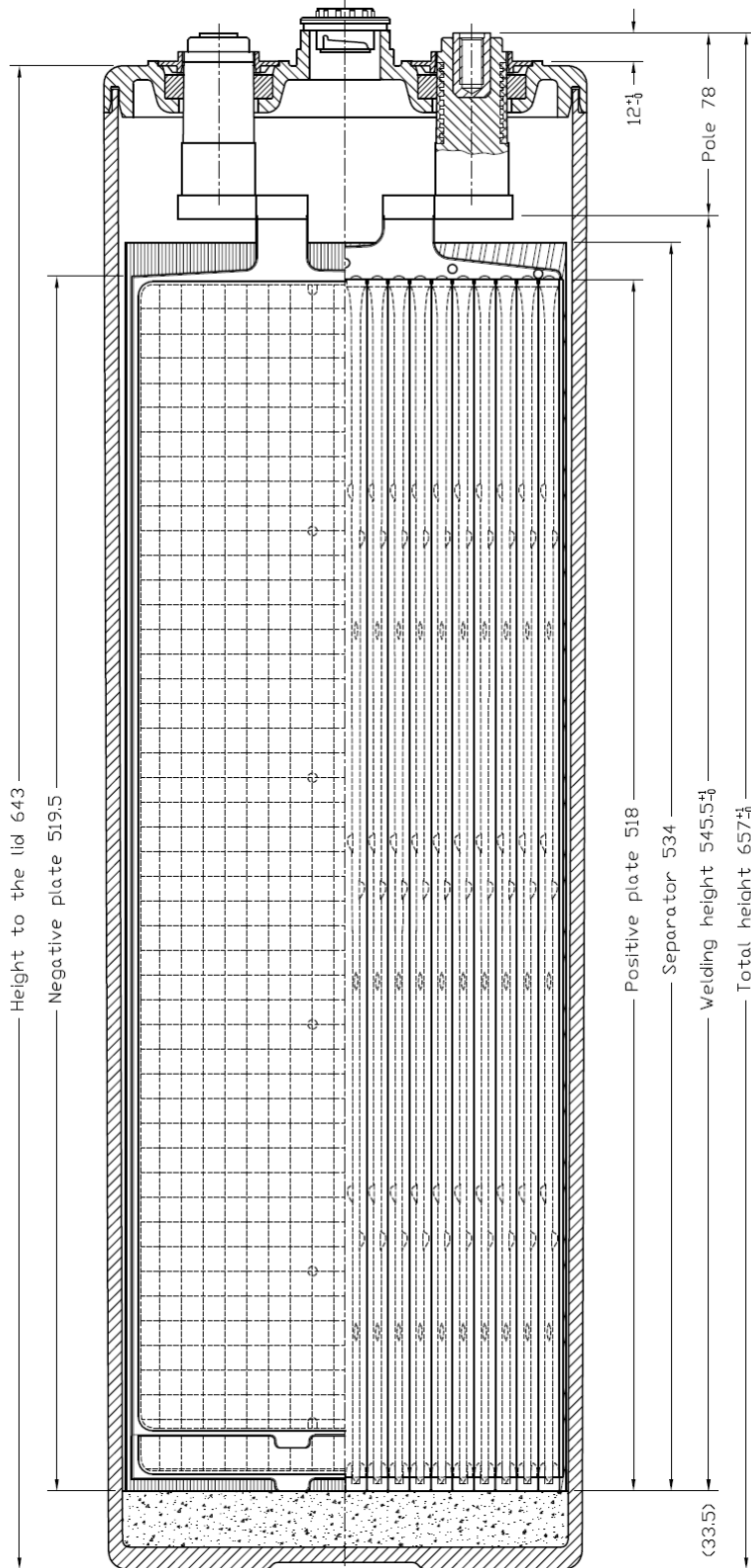
OPzV cells

Type	Positive plate	Capacity (Ah) C ₁₀ V/Cell (1.80 Vpc at 20°C)	Maximum cell dimensions (mm)					Weight (kg)	Short Circuit current (A)
	Size (Ah)		a	b	h1	h2	e		
4 OPzV 200	50	224	103	206	355	382	-	20	2300
5 OPzV 250		280	124	206	355	382	-	24	2860
6 OPzV 300		336	145	206	355	382	-	28	3380
5 OPzV 350	70	405	124	206	471	498	-	31	3380
6 OPzV 420		486	145	206	471	498	-	37	3980
7 OPzV 490		567	166	206	471	498	-	42	4520
6 OPzV 600	100	690	145	206	646	673	-	50	4360
8 OPzV 800		920	191	210	646	673	80	68	5980
10 OPzV 1000		1150	233	210	646	673	110	82	7380
12 OPzV 1200		1380	275	210	646	673	140	97	8640
12 OPzV 1500	125	1620	275	210	797	824	140	120	9440
16 OPzV 2000		2160	399	214	772	799	2 x 110	165	12680
20 OPzV 2500		2700	487	212	772	799	3 x 110	200	16240
24 OPzV 3000		3240	576	212	772	799	3 x 140	240	18460

OPzV Monoblocks

Type	Positive plate	Capacity (Ah) C ₁₀ V/Cell (1.80 Vpc at 20°C)	Maximum cell dimensions (mm)				Weight (kg)
	Size (Ah)		a	b	h1	h2	With electrolyte
6V 4 OPzV 200	50	206	272	205	332	371	48
6V 5 OPzV 250		257	380	205	332	371	63
6V 6 OPzV 300		309	380	205	332	371	70
12V 1 OPzV 50		51	272	205	332	371	43
12V 2 OPzV 100		102	272	205	332	371	52
12V 3 OPzV 150		153	380	205	332	371	72

3. Construction of OPzV cells



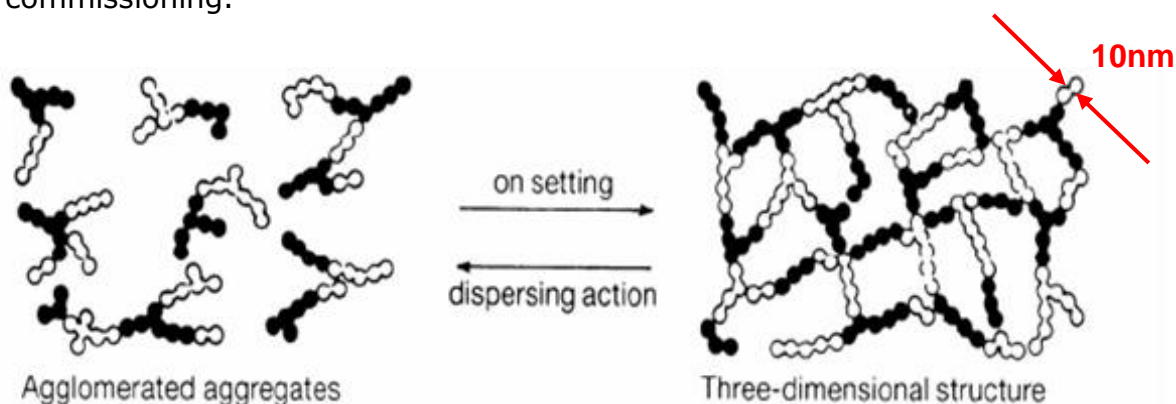
The container and the cover made out of grey ABS are glued together by a proven polyurethane material. Regular test of the material, the mixing conditions and the tightness control (200mbar over in average 1min) make sure that no acid leakage can occur.

As an option we can provide at extra cost covers and containers in ABS V0 quality. The wall thickness of the container is chosen relative to the cell's height in a way, that bulging is minimized.

Each cell is closed by a valve, which closes at 50mbar, remains closed at negative pressures and opens at 150mbar \pm 30mbar. Each valve is checked for this pressure characteristic. So the ingress of air and the release of gases at elevated pressures is realized.

The pole bushing with the sliding pole concept is explained in annex af).

Labels on the cell provide the type of the cell, its nominal voltage, its nominal capacity C10 at 20°C, the float voltage, the manufacturer and the date of commissioning.



The electrolyte consists of sulphuric acid with a density of 1,26kg/l immobilized with pyrogenic silica. After the mixing and gelling we get a three-dimensional structure, formed by the silica chains. The chains have a diameter of 10nm. This is by a factor 100 larger than the microfibers, used in AGM cells. This explains why GEL has no problem with acid stratification, with large high cells, with dry out and high increase of cell's resistance near the end of life.



To use the existing OPzV container and to avoid too long poles, we insert high density polystyrene blocks below the plate block.

All positive tubular plates are welded together with a strap, which is welded carefully to the pole's foot. Regular tests make sure, that the connection is fully made. All negative flat plates are welded together with a strap, which is welded to the pole's foot. The pitch (distance between two positive plates) is 21mm for all OPzV cell types.

UPOWER OPzV batteries need no watering during whole service life. Prerequisite for that is an internal oxygen recombination and a very low self-discharge. It is assured by a special lead alloy system for the grids of the electrodes and very pure lead for the active material (see attachment ag).

4. Construction of OPzV blocks

The container and the monoblock cover made out of grey ABS are glued together by a proven polyurethane material. Regular test of the material, the mixing conditions and the tightness control 200mbar over in average 1min make sure, that no acid leakage can occur. Container and cover made out of V0 material are available on request at higher cost.

The pole bushing with the sliding pole concept is used for the end poles and the intercell poles. (See attachment af). For the intercell connectors we use copper connectors on top of the cover.

Label on the block provide the type of the block, its nominal capacity C10 at 20°C, the nominal block voltage, the float voltage, the manufacturer and the date of commissioning.

As electrolyte we use sulphuric acid with 1,26kg/l density immobilized by pyrogenic silica. For OPzV block batteries we use the same GEL as for OPzV cells. All positive plates are welded together with a strap, which is welded carefully to the pole's foot. Regular tests make sure, that the connection is fully made. All negative plates are welded together with a strap, which is welded to the pole's foot. The pitch (distance between two positive plates) is 18mm for all OPzV block types. It gives a lower resistance, but lower capacities for C10 and longer in comparison to the cell types.

For OPzV block batteries we use the standard OPzV 50 plates, insofar the alloy system and its consequences are the same. The intercell connectors on top of the lid provide voltage measurements on each cell. Against touching the connectors are protected with a plastic cover with a hole above the poles.

