HAGEN Batterie AG

Lead storage batteries for stationary installations

HAGEN *OPzS*

Quelle: DeTe Immobilien GmbH

HAGEN *OPzS*

Batteries in the *OPzS* line are supplied as individual cells (in accordance with DIN 40736, Section 1) from 200 - 3000 Ah (ampere-hour) in plastic containers and from 3500 - 12000 Ah (in accordance with DIN 40736, Section 2) in hard rubber containers.

For smaller capacities (37,5 to 300 Ah) block batteries in the HAGEN *compact PT* line are available. These are illustrated in a separate brochure.

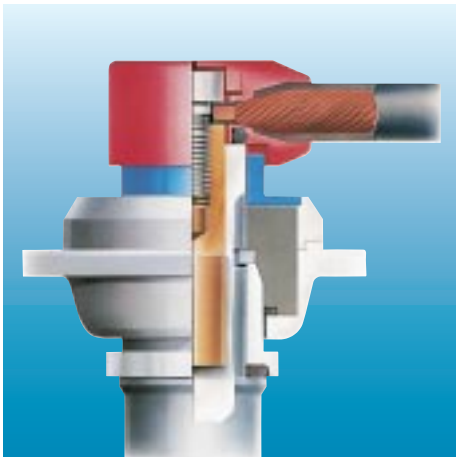
Usage areas

HAGEN *OPzS* batteries are mainly used where an outlasting time of more than one hour is required. In addition to the long service life of about 15 years in standby parallel operation the *OPzS* line also offers high cycle consistency.

Main usage areas:

- telecommunication equipment
- switchboard plants
- UPS systems
- OP-lighting and Additional Power Supply systems for Hospitals (acc. to DIN VDE 0107)
- storage of solar and wind energy

Battery construction



HAGEN *patent pole*

Plate material and separation

The grid of the tubular positive plate consists of 19 resp. 38 lead spines which are joined together by the upper frame. These thin lead spines, which are equipped with small concentric vanes, are covered with an acid permeable gauntlet. Between the lead spines and small tubes is the active positive material.

A special lead alloy which is exclusively used for the positive HAGEN *OPzS* grid, has an Sb portion of less than 3%. Therefore HAGEN *OPzS* batteries are classified as „LA“ in accordance with VDE 0510, Section 2. Thus the ventilation requirements can be reduced. A lead grid pasted with active material forms the negative plate.

Double separation is brought about by the use of microporous separators and corrugated separators.

Cell containers and lids

The cell containers in the 200 – 3000 Ah range are made of transparent plastic. The appropriate cell lid is made of grey-coloured SAN. The cell containers and lids for batteries with capacities from 3500 Ah to 12000 Ah are made of hard rubber.

Terminals and connectors

HAGEN *OPzS* batteries in plastic containers in the 200 – 3000 Ah capacity range are in general equipped with the well proven HAGEN *patent pole* for leak-proof insulation of the terminal construction. The terminals can be supplied in screwed or welded form, as required.

The connection of the individual batteries is in correspondance to the terminal construction by the use of either insulated flexible copper cableconnectors, or covered lead connectors, or lead connectors with copper inserts.

The terminals of *OPzS* batteries with hard rubber containers are sealed by a rubber gasket. Covered lead bars are used as cell connectors.

Battery plugs

In the standard version the OPzS batteries are equipped with hinge cap plugs. As a special accessory flame retardent ceramic plugs or ceramic funnel plugs according to DIN 40470 are available.

Hinge cap plug

Ceramic plugs / ceramic funnel plugs

Elektrolyt and water

Sulphuric acid with a density of 1.22 kg / l at 20° C is required for initial filling. The correct filling level can be seen from the electrolyte level indicator. When charged, the acid density is 1.24 ± 0.01 kg / l at 20° C. These particular conditions are best described by the term „nominal electrolyte density".

Water used to compensate the loss of water resulting from electrolysis should meet the requirements of DIN 43530, Section 4.

Charging

Any charging procedures which comply with DIN 41772 may be used for charging; *OPzS* batteries are operated in standby parallel mode and require a float charge voltage of 2.20 to 2.25 V / cell (recommanded value 2.23 V / cell).

At this voltage the fully charged condition is maintained. The water consumption caused by electrolyses at this voltage is very low.

Battery installation

Installation of *OPzS* batteries should be carried out according to DIN VDE 0510, Section 2.

The cells can be installed according to VDE 0510, part 2. in cabinet or on wood / steel racks depending on particular customer requirements or on local conditions.

Our steel racks are essentially composed of plug-in elements which ensures their easy construction and shortens installation time. The mode of installation should guarantee good visual checking. All elements are protected by an electrolyte-proof plastic coating.

The terminals of the batteries are provided with protective caps for transport.

The type of installation should be carefully chosen that the batteries are simple to install and good visual monitoring is possible.

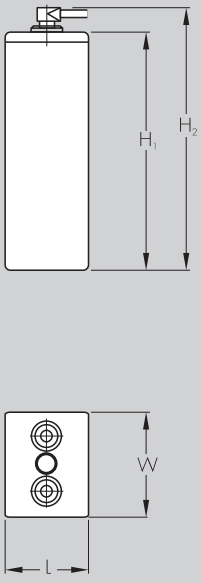
The connection leads should be laid short circuit proof up to the first fuse protection. (VDE 0100, Section 520).

Service access points must have a passage width of at least 50 cm. Conductive battery parts, with a potential of more than 120 V in between, must have a minimum distance of 1,50 m, if no other contact protection is made.

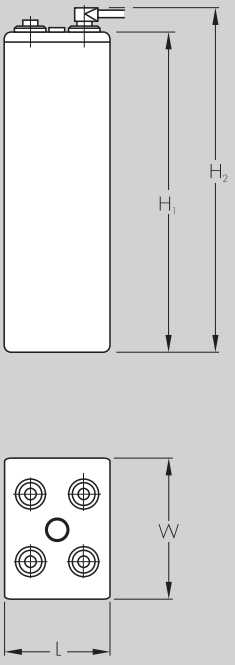
Measurements and weights of the *OPzS* batteries

Batteries in plastic cell containers

Type	Length L mm	Width W mm	Height H_1 mm	Height H_2 mm	No. of ter-minals	Weights		
						Dry cell kg	Cell with acid kg	Acid weight d = 1.24 kg/l kg
4 *OPzS* 200	103	206	353	420	1	13.2	17.2	4.0
5 *OPzS* 250	124	206	353	420	1	16.2	20.8	4.6
6 *OPzS* 300	145	206	353	420	1	19.2	24.3	5.1
5 *OPzS* 350	124	206	471	522	1	19.4	26.9	7.5
6 *OPzS* 420	145	206	471	522	1	23.4	31.5	8.1
7 *OPzS* 490	166	206	471	522	1	27.4	36.1	8.7
6 *OPzS* 600	145	206	647	698	1	33.9	44.8	10.9
8 *OPzS* 800	210	191	647	698	2	45.3	61.3	16.0
10 *OPzS*1000	210	233	647	698	2	55.5	74.6	19.1
12 *OPzS*1200	210	275	647	698	2	65.8	88.0	22.2
12 *OPzS*1500	210	275	797	848	2	87.0	114.3	27.3
16 *OPzS*2000	214	399	775	815	3	123.0	166.0	43.0
20 *OPzS*2500	214	489	775	815	4	152.0	204.0	52.0
24 *OPzS*3000	214	578	775	815	4	179.0	242.0	63.0



4 *OPzS* 200 – 6 *OPzS* 600



8 *OPzS* 800 – 12 *OPzS* 1500

16 *OPzS* 2000

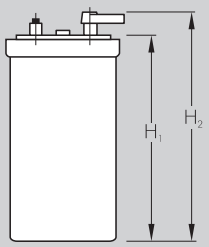
20 *OPzS* 2500
24 *OPzS* 3000

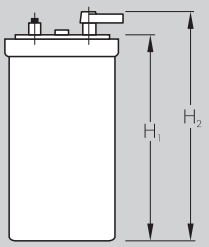
Poleterminal for bolted connectors: M8 female, torque 25 Nm ±1Nm

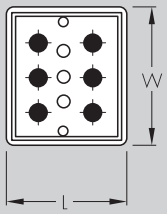
Measurements and weights of the *OPzS* batteries

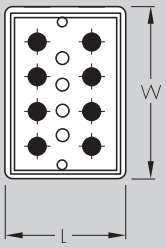
Batteries in hard rubber cell containers

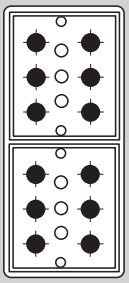
Type mm	Length L mm	Width W mm	Height H_1 mm	Height H_2	No. of ter-minals	Weights		
						Dry cell kg	Cell with acid kg	Acid weigth d = 1.24 kg/l kg
14 *OPzS* 3500	440	422	808	870	3	258	338	80
16 *OPzS* 4000	440	466	808	870	3	290	378	88
18 *OPzS* 4500	440	510	808	870	3	306	398	114
20 *OPzS* 5000	440	568	808	870	4	356	470	114
22 *OPzS* 5500	440	612	808	870	4	392	511	119
24 *OPzS* 6000	440	656	808	870	4	414	545	131
28 *OPzS* 7000	430	882	808	870	6	500	676	176
32 *OPzS* 8000	430	882	808	870	6	539	727	188
36 *OPzS* 9000	430	1078	808	870	8	620	843	223
40 *OPzS* 10000	430	1078	808	870	8	666	893	227
44 *OPzS* 11000	430	1254	808	870	8	737	1006	269
48 *OPzS* 12000	430	1254	808	870	8	790	1055	265

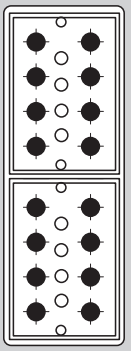












14 *OPzS* 3500
16 *OPzS* 4000
18 *OPzS* 4500

20 *OPzS* 5000
22 *OPzS* 5500
24 *OPzS* 6000

28 *OPzS* 7000
32 *OPzS* 8000

36 *OPzS* 9000
40 *OPzS* 10000
44 *OPzS* 11000
48 *OPzS* 12000

Poleterminal for welded connector (technical alterations reserved)

Capacities, discharging and charging rates for *OPzS* batteries with plastic container

	Capacity at 20° in Ah				Discharge rate in A				Charging current in A		
Discharge time (h)	10	5	3	1	10	5	3	1	to Gas-evolution	from Gas-evolution	
Final voltage V / C	1.80	1.77	1.75	1.67	1.80	1.77	1.75	1.67		falling from	falling to
Celltype											
4 *OPzS* 200	200.0	172.0	150.0	106.0	20.0	34.0	50.0	106.0	30.0	14.0	7.0
5 *OPzS* 250	250.0	215.0	187.5	132.5	25.0	43.0	62.5	132.5	38.0	17.0	8.5
6 *OPzS* 300	300.0	258.0	225.0	159.0	30.0	51.5	75.0	159.0	45.0	20.0	10.0
5 *OPzS* 350	350.0	300.0	262.5	185.0	35.0	60.0	87.5	185.0	53.0	24.0	12.0
6 *OPzS* 420	420.0	360.0	315.0	222.0	42.0	72.0	105.0	222.0	63.0	28.0	14.0
7 *OPzS* 490	490.0	420.0	367.5	259.0	49.0	84.0	122.5	259.0	74.0	32.0	16.0
6 *OPzS* 600	600.0	516.0	450.0	312.0	60.0	103.0	150.0	312.0	90.0	40.0	20.0
8 *OPzS* 800	800.0	688.0	600.0	416.0	80.0	137.5	200.0	416.0	120.0	54.0	27.0
10 *OPzS* 1000	1000.0	860.0	750.0	520.0	100.0	172.0	250.0	520.0	150.0	66.0	33.0
12 *OPzS* 1200	1200.0	1032.0	900.0	624.0	120.0	206.5	300.0	624.0	180.0	80.0	40.0
12 *OPzS* 1500	1500.0	1260.0	1116.0	744.0	150.0	252.0	372.0	744.0	225.0	100.0	50.0
16 *OPzS* 2000	2000.0	1680.0	1488.0	992.0	200.0	336.0	496.0	992.0	300.0	132.0	66.0
20 *OPzS* 2500	2500.0	2100.0	1860.0	1240.0	250.0	420.0	620.0	1240.0	375.0	166.0	83.0
24 *OPzS* 3000	3000.0	2520.0	2232.0	1488.0	300.0	504.0	744.0	1488.0	450.0	200.0	100.0

Capacities, discharging and charging rates for *OPzS* batteries with hard rubber container

	Capacity at 20° in Ah				Discharge rate in A				Charging current in A		
Discharge time (h)	10	5	3	1	10	5	3	1	to Gas-evolution	from Gas-evolution	
Final voltage V / C	1.80	1.77	1.75	1.67	1.80	1.77	1.75	1.67		falling from	falling to
Celltype											
14 *OPzS* 3500	3500.0	2940.0	2520.0	1680.0	350.0	588.0	840.0	1680.0	525.0	232.0	116.0
16 *OPzS* 4000	4000.0	3360.0	2880.0	1920.0	400.0	672.0	960.0	1920.0	600.0	266.0	133.0
18 *OPzS* 4500	4500.0	3780.0	3240.0	2160.0	450.0	756.0	1080.0	2160.0	675.0	300.0	150.0
20 *OPzS* 5000	5000.0	4200.0	3600.0	2400.0	500.0	840.0	1200.0	2400.0	750.0	332.0	166.0
22 *OPzS* 5500	5500.0	4620.0	3960.0	2640.0	550.0	924.0	1320.0	2640.0	825.0	366.0	183.0
24 *OPzS* 6000	6000.0	5040.0	4320.0	2880.0	600.0	1008.0	1440.0	2880.0	900.0	400.0	200.0
28 *OPzS* 7000	7000.0	5880.0	5040.0	3360.0	700.0	1176.0	1680.0	3360.0	1050.0	464.0	232.0
32 *OPzS* 8000	8000.0	6720.0	5760.0	3840.0	800.0	1344.0	1920.0	3840.0	1200.0	533.0	266.0
36 *OPzS* 9000	9000.0	7560.0	6480.0	4320.0	900.0	1512.0	2160.0	4320.0	1350.0	598.0	299.0
40 *OPzS* 10000	10000.0	8400.0	7200.0	4800.0	1000.0	1680.0	2400.0	4800.0	1500.0	666.0	333.0
44 *OPzS* 11000	11000.0	9240.0	7920.0	5280.0	1100.0	1848.0	2640.0	5280.0	1650.0	730.0	365.0
48 *OPzS* 12000	12000.0	10080.0	8640.0	5760.0	1200.0	2016.0	2880.0	5760.0	1800.0	800.0	400.0

OPzS individual batteries according to DIN 40 736

1 Complete battery cell
4 *OPzS* 200

2 Cell container made of transparent plastic

3 Prism

4 Ceramic funnel plug

5 Sealing washer

6 Terminal disks
blue = negative
red = positive

7 Cell lid

8 Baffle

9 Plate set

10 Negative plate set

10 a Negative terminal

11 Separator

12 Positive plate set

12 a Positive terminal

13 Negative grid plate

14 Microporous separator

15 Corrugated separator

16 Iron-clad tubular