



OP<sub>z</sub>S STANDBY batteries

 **SUNLIGHT**  
creating energy



[ Energy is what we do ]

# OPzS batteries introduction

OPzS batteries are robust energy storage solutions, with a proven technology that has been used for decades in applications that require a safe and reliable battery with long service life. SUNLIGHT OPzS batteries are distinguished by their high tolerance to cycling and long life in standby parallel mode. They are designed and manufactured according to DIN Standards. They cover a wide field of applications some of which are telecommunication centers, control and monitoring systems in power plants and distribution stations, railway stations, signaling, control and regulating systems, data processing systems, airports, emergency lighting, alarm systems, energy supply and several others.

## Advantages

- Compliant to DIN 40736 and DIN 40737.
- The optimized plate design results in increased capacities over DIN standards.
- Minimum maintenance due to reduced antimony content and large electrolyte reserve volume.
- Ideal for cycling applications due to the tubular plate technique.
- Long designed life time: more than 15 years in floating applications.
- Recommended temperature range of operation (-10°C up to +50°C, preferred value 20°C).
- Available in 2V cells, 6V and 12V monoblocks.
- Delivery in dry charged or wet charged conditions.
- Long storage time for cells delivered in dry charged condition.
- Suitable for all standard types of installation.



# OPzS batteries cell construction



## Positive Plates

SUNLIGHT OPzS cells are manufactured with tubular positive plates. The tubular plate design is well proven and known for its high reliability and long service life in float charging operation. The plate composition of a special low-Antimony (<1.6% Sb) and Selenium alloy, results in a fine-grain structure and low corrosion rate, a basic property for obtaining a long service life and high reliability of the cell.

## Negative Plates

SUNLIGHT negative plates are manufactured with grid design. In this case a lead alloy with a 5% antimony content is used. In order for the plates to maintain the porosity of the active mass, certain special ingredients are added to the paste, allowing the plates to retain their "spongy" consistency.

## Separators

The separators are manufactured from microporous PVC, a material of high porosity, low electrical resistance and high acid resistance. The separators are permeable and allow the migration of ions during the charging and discharging process of the battery. Thus the solid particle migration between the plates is prevented and any short circuit avoided. The design of the separators also allows the presence of more acid in the surrounding area of the plates.

## Connectors

Plastic coated copper cables are used for intercell and inter-row connection of the battery cells.

## Vent Plugs

The Vent Plugs are flame retardant made of ceramic material, improving the safety of the cell.

## The Electrolyte

The Electrolyte Specific Gravity of a fully charged cell is  $1.240 \pm 0.010$  kg/l at 20°C at maximum and 1.260 at 20°C at minimum level. In different temperatures, outside the range of +10°C to +30°C the temperature compensation which should be introduced is - 0.0007 kg/l per each °C variance.

The Electrolyte Freezing Point of:

- A fully charged cell is -45°C (reference acid specific gravity 1.240 kg/l).
- A fully discharged cell is -5°C to -10°C (reference acid specific gravity 1.100 kg/l).

## Cell Containers and Covers

Styrene Acrylonitrile (SAN) is used on the containers of SUNLIGHT OPzS cells. SAN is transparent allowing the user an easy reading of the electrolyte level and visual inspection of the cell. The covers of the cells are made of Acrylonitrile-butadiene-styrene copolymer (ABS).

## Poles

Specially designed poles, effectively prevent acid leakage and pillar corrosion thus increasing the lifetime of the battery.

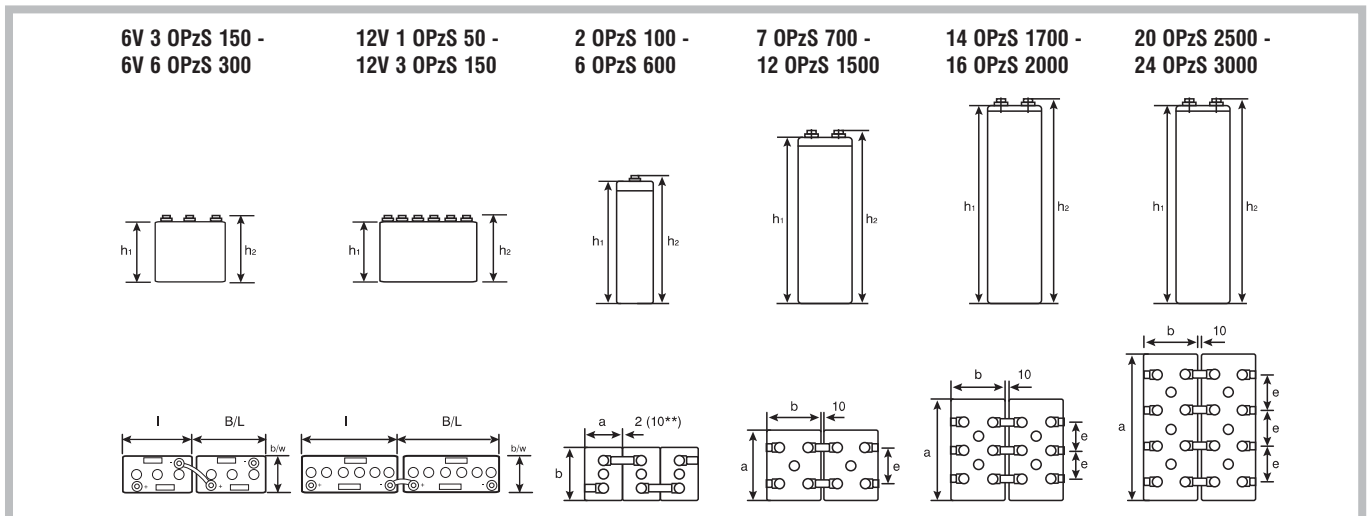
## Applications

- Telecommunications.
- Control and monitoring systems in power plants and distribution stations.
- Railway stations.
- Signaling, Control and Regulating systems.
- Data processing systems.
- UPS.
- Airports.

# Technical Characteristics

Type Designation	Positive plate		Capacity (Ah) C <sub>10</sub> V/cell 1,80	Cell Dimensions (mm)					Weight (kg)		Volume of separate electrolyte (lt)
	No	Size (Ah)		a	b	h1	h2	e	with electrolyte	without electrolyte	
<b>Monoblocks</b>	No	Size (Ah)		a	b	h1	h2	e	with electrolyte	without electrolyte	
6V 3 OPzS 150	3 x 3	50	150	233	224	345	378	-	41.2	29.8	9.2
6V 4 OPzS 200	3 x 4	50	200	272	205	350	363	-	47.1	35.2	9.6
6V 5 OPzS 250	3 x 5	50	250	380	205	350	363	-	60.9	43.5	14.0
6V 6 OPzS 300	3 x 6	50	300	380	205	350	363	-	67.1	50.5	13.4
12V 1 OPzS 50	6 x 1	50	50	272	205	350	363	-	37.7	24.4	10.7
12V 2 OPzS 100	6 x 2	50	100	272	205	350	363	-	49.4	37.7	9.4
12V 3 OPzS 150	6 x 3	50	150	380	205	350	363	-	69.8	53.0	13.5
<b>2V cells</b>	No	Size (Ah)		a	b	h1	h2	e	with electrolyte	without electrolyte	
2 OPzS 100*	2	50	100	103	206	355	380	-	13.8	8.4	4.4
3 OPzS 150*	3	50	150	103	206	355	380	-	15.7	10.7	4.0
4 OPzS 200	4	50	200	103	206	355	380	-	17.5	13.0	3.6
5 OPzS 250	5	50	250	124	206	355	380	-	21.4	15.4	4.8
6 OPzS 300	6	50	300	145	206	355	380	-	25.7	18.5	5.8
5 OPzS 350	5	70	350	124	206	471	496	-	28.4	20.7	6.2
6 OPzS 420	6	70	420	145	206	471	496	-	33.5	24.3	7.4
7 OPzS 490	7	70	490	166	206	471	496	-	38.6	27.9	8.6
5 OPzS 500*	5	100	500	145	206	646	671	-	42.0	28.8	10.6
6 OPzS 600	6	100	600	145	206	646	671	-	45.8	33.0	10.3
7 OPzS 700*	7	100	700	191	210	646	671	80	60.0	42.7	14.0
8 OPzS 800	8	100	800	191	210	646	671	80	63.8	46.8	13.7
9 OPzS 900*	9	100	900	233	210	646	671	110	73.0	53.0	16.1
10 OPzS 1000	10	100	1000	233	210	646	671	110	78.2	57.3	16.9
12 OPzS 1200	12	100	1200	275	210	646	671	140	91.3	66.2	20.2
11 OPzS 1400*	11	125	1400	275	210	796	821	140	110.5	76.0	27.8
12 OPzS 1500	12	125	1500	275	210	796	821	140	115.1	81.1	27.4
14 OPzS 1700*	14	125	1700	397	212	772	797	2 x 110	143.3	96.3	37.9
15 OPzS 1875	15	125	1875	397	212	772	797	2 x 110	148.9	102.6	37.3
16 OPzS 2000	16	125	2000	397	212	772	797	2 x 110	154.5	108.8	36.9
20 OPzS 2500	20	125	2500	487	212	772	797	3 x 110	201.0	135.0	53.2
24 OPzS 3000	24	125	3000	576	212	772	797	3 x 140	230.0	158.0	58.1

\* Over DIN standard product range



# Discharge Table in Amperes

End voltage 1.90 V/per cell

	<b>Monoblocks</b>	<b>30 min</b>	<b>45 min</b>	<b>1 h</b>	<b>1,5 h</b>	<b>2 h</b>	<b>3 h</b>	<b>5 h</b>	<b>8 h</b>	<b>10 h</b>	<b>20 h</b>
	6V 3 OPzS 150	62.2	54.3	48.3	40.0	34.4	27.2	19.7	14.4	12.3	7.2
	6V 4 OPzS 200	80.4	70.1	62.4	51.6	44.3	35.1	25.3	18.3	15.8	9.1
	6V 5 OPzS 250	98.8	86.7	77.5	64.4	55.5	44.1	32.0	23.3	20.1	11.7
	6V 6 OPzS 300	115.6	101.6	90.9	75.6	65.3	51.8	37.6	27.3	23.6	13.7
	12V 1 OPzS 50	21.8	19.0	16.9	14.0	12.0	9.6	6.9	5.1	4.3	2.6
	12V 2 OPzS 100	42.2	36.5	32.2	26.4	22.6	17.8	12.8	9.2	7.9	4.6
	12V 3 OPzS 150	61.3	53.3	47.3	39.0	33.4	26.4	19.0	13.8	11.9	6.9
	<b>2V cells</b>	<b>30 min</b>	<b>45 min</b>	<b>1 h</b>	<b>1,5 h</b>	<b>2 h</b>	<b>3 h</b>	<b>5 h</b>	<b>8 h</b>	<b>10 h</b>	<b>20 h</b>
	2V 2 OPzS 100	42.5	37.3	33.4	27.8	24.0	19.1	13.9	10.3	8.7	5.2
	2V 3 OPzS 150	63.3	55.7	49.8	41.5	35.8	28.5	20.7	15.3	13.0	7.7
	2V 4 OPzS 200	81.3	71.3	63.7	52.9	45.6	36.2	26.2	19.2	16.4	9.6
	2V 5 OPzS 250	102.7	90.2	80.6	67.0	57.8	45.9	33.3	24.4	20.8	12.2
	2V 6 OPzS 300	121.0	106.5	95.3	79.4	68.6	54.6	39.7	29.1	24.9	14.6
<b>Type</b>	2V 5 OPzS 350	125.2	111.8	101.1	85.3	74.2	59.5	43.7	31.8	27.6	16.1
	2V 6 OPzS 420	148.3	132.7	120.2	101.6	88.4	71.0	52.2	38.0	33.0	19.3
	2V 7 OPzS 490	170.9	153.2	138.9	117.6	102.5	82.3	60.7	44.2	38.4	22.4
	2V 5 OPzS 500	170.1	154.4	141.2	121.1	106.5	86.5	64.3	47.9	41.3	24.6
	2V 6 OPzS 600	192.4	175.2	160.5	137.9	121.2	98.6	73.6	54.0	47.0	27.6
	2V 7 OPzS 700	228.0	208.0	190.9	164.4	144.8	118.0	88.0	65.4	56.7	33.7
	2V 8 OPzS 800	254.0	231.0	212.0	182.4	160.6	130.8	97.8	71.8	62.4	36.7
	2V 9 OPzS 900	293.0	266.0	244.0	210.0	184.1	149.8	111.6	82.0	71.3	42.0
	2V 10 OPzS 1000	318.0	290.0	266.0	229.0	202.0	164.4	122.9	90.2	78.6	46.3
	2V 12 OPzS 1200	371.0	339.0	312.0	269.0	237.0	193.7	145.4	106.8	92.8	54.8
	2V 11 OPzS 1400	388.0	362.0	338.0	298.0	266.0	222.0	169.7	126.2	110.6	66.4
	2V 12 OPzS 1500	401.0	375.0	351.0	310.0	277.0	231.0	177.7	132.3	115.4	68.9
	2V 14 OPzS 1700	467.0	437.0	409.0	361.0	324.0	270.0	207.0	154.8	135.7	81.9
	2V 15 OPzS 1875	508.0	475.0	444.0	393.0	352.0	293.0	226.0	168.0	147.2	88.4
	2V 16 OPzS 2000	552.0	514.0	480.0	422.0	377.0	313.0	239.0	177.7	155.1	92.4
	2V 20 OPzS 2500	679.0	635.0	595.0	527.0	472.0	395.0	303.0	226.0	198.6	119.8
2V 24 OPzS 3000	803.0	752.0	704.0	623.0	559.0	466.0	359.0	267.0	234.0	140.2	

Design and/or specifications are subject to change without prior notice. For clarifications and updated information, please contact your local SUNLIGHT sales representative.

# Discharge Table in Amperes

End voltage 1.87 V/per cell

	<b>Monoblocks</b>	<b>30 min</b>	<b>45 min</b>	<b>1 h</b>	<b>1,5 h</b>	<b>2 h</b>	<b>3 h</b>	<b>5 h</b>	<b>8 h</b>	<b>10 h</b>	<b>20 h</b>
	6V 3 OPzS 150	73.1	63.1	55.8	45.8	39.2	30.8	22.2	16.3	13.7	8.1
	6V 4 OPzS 200	94.5	81.6	72.1	59.1	50.5	39.8	28.6	20.9	17.6	10.4
	6V 5 OPzS 250	116.5	101.1	89.7	73.9	63.4	50.1	36.2	26.6	22.3	13.2
	6V 6 OPzS 300	136.4	118.6	105.3	86.8	74.5	58.9	42.5	31.2	26.3	15.6
	12V 1 OPzS 50	25.5	22.0	19.5	16.0	13.7	10.8	7.8	5.7	4.9	2.9
	12V 2 OPzS 100	49.4	42.2	37.1	30.2	25.7	20.1	14.4	10.5	8.8	5.2
	12V 3 OPzS 150	71.9	61.8	54.5	44.6	38.1	29.9	21.5	15.7	13.2	7.8
	<b>2V cells</b>	<b>30 min</b>	<b>45 min</b>	<b>1 h</b>	<b>1,5 h</b>	<b>2 h</b>	<b>3 h</b>	<b>5 h</b>	<b>8 h</b>	<b>10 h</b>	<b>20 h</b>
	2V 2 OPzS 100	50.1	43.5	38.7	31.9	27.4	21.7	15.7	11.5	9.8	5.8
	2V 3 OPzS 150	74.7	64.9	57.6	47.6	40.9	32.4	23.4	17.2	14.6	8.7
	2V 4 OPzS 200	95.9	83.2	73.8	60.8	52.1	41.1	29.6	21.8	18.2	10.9
	2V 5 OPzS 250	121.2	105.2	93.4	77.0	66.0	52.2	37.6	27.6	23.2	13.8
	2V 6 OPzS 300	142.8	124.3	110.5	91.3	78.4	62.0	44.9	33.0	27.8	16.5
<b>Type</b>	2V 5 OPzS 350	150.0	132.3	118.7	99.1	85.7	68.3	49.7	36.7	30.9	18.5
	2V 6 OPzS 420	177.9	157.2	141.2	118.1	102.2	81.6	59.4	43.9	37.0	22.1
	2V 7 OPzS 490	205.0	181.7	163.4	136.9	118.6	94.8	69.1	51.1	43.1	25.7
	2V 5 OPzS 500	205.0	183.9	166.7	141.4	123.4	99.7	73.6	55.0	46.5	28.1
	2V 6 OPzS 600	233.0	209.0	190.0	161.4	141.2	113.9	83.8	62.5	52.9	31.8
	2V 7 OPzS 700	276.0	248.0	226.0	192.3	168.5	136.4	100.9	75.4	63.6	38.6
	2V 8 OPzS 800	307.0	276.0	251.0	214.0	187.1	151.1	111.3	83.1	70.3	42.3
	2V 9 OPzS 900	354.0	318.0	289.0	245.0	215.0	173.0	127.4	95.0	80.2	48.3
	2V 10 OPzS 1000	384.0	346.0	315.0	268.0	235.0	190.0	140.1	104.6	88.5	53.3
	2V 12 OPzS 1200	449.0	406.0	370.0	315.0	277.0	224.0	165.4	123.5	104.8	63.0
	2V 11 OPzS 1400	474.0	437.0	404.0	352.0	313.0	258.0	194.0	147.0	124.9	76.5
	2V 12 OPzS 1500	491.0	453.0	420.0	367.0	326.0	269.0	203.0	153.4	130.9	79.6
	2V 14 OPzS 1700	571.0	527.0	489.0	427.0	380.0	314.0	237.0	180.3	152.9	94.1
	2V 15 OPzS 1875	621.0	574.0	532.0	464.0	414.0	342.0	258.0	195.6	166.4	101.9
	2V 16 OPzS 2000	674.0	620.0	574.0	499.0	443.0	364.0	273.0	206.0	175.6	106.8
	2V 20 OPzS 2500	830.0	768.0	712.0	623.0	555.0	459.0	347.0	264.0	224.0	137.9
2V 24 OPzS 3000	982.0	909.0	844.0	738.0	657.0	543.0	410.0	311.0	265.0	161.9	

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# Discharge Table in Amperes

End voltage 1.85 V/per cell

	<b>Monoblocks</b>	<b>30 min</b>	<b>45 min</b>	<b>1 h</b>	<b>1,5 h</b>	<b>2 h</b>	<b>3 h</b>	<b>5 h</b>	<b>8 h</b>	<b>10 h</b>	<b>20 h</b>
	6V 3 OPzS 150	79.8	68.4	60.2	49.2	42.0	32.9	23.6	17.2	14.5	8.5
	6V 4 OPzS 200	103.3	88.5	78.0	63.6	54.2	42.5	30.3	22.1	18.5	10.9
	6V 5 OPzS 250	127.5	109.9	97.1	79.6	68.1	53.6	38.4	28.1	23.6	13.9
	6V 6 OPzS 300	149.3	128.8	114.0	93.5	80.0	63.0	45.2	33.0	27.7	16.4
	12V 1 OPzS 50	27.8	23.8	21.0	17.2	14.7	11.5	8.3	6.0	5.2	3.0
	12V 2 OPzS 100	53.8	45.7	40.0	32.4	27.5	21.5	15.2	11.1	9.3	5.5
	12V 3 OPzS 150	78.5	67.0	58.9	47.9	40.8	31.9	22.8	16.6	13.9	8.2
	<b>2V cells</b>	<b>30 min</b>	<b>45 min</b>	<b>1 h</b>	<b>1,5 h</b>	<b>2 h</b>	<b>3 h</b>	<b>5 h</b>	<b>8 h</b>	<b>10 h</b>	<b>20 h</b>
	2V 2 OPzS 100	54.8	47.3	41.8	34.4	29.4	23.2	16.7	12.1	10.4	6.1
	2V 3 OPzS 150	81.7	70.5	62.4	51.3	43.9	34.6	24.9	18.1	15.5	9.1
	2V 4 OPzS 200	104.9	90.4	79.8	65.4	55.9	43.9	31.5	23.0	19.4	11.4
	2V 5 OPzS 250	132.5	114.3	101.1	82.9	70.9	55.7	40.0	29.1	24.7	14.5
	2V 6 OPzS 300	156.4	135.1	119.6	98.3	84.2	66.3	47.7	34.8	29.6	17.4
<b>Type</b>	2V 5 OPzS 350	165.3	144.9	129.4	107.5	92.6	73.5	53.2	39.1	33.0	19.5
	2V 6 OPzS 420	196.2	172.3	154.1	128.1	110.5	87.8	63.6	46.8	39.5	23.4
	2V 7 OPzS 490	226.0	199.2	178.3	148.5	128.2	102.0	74.0	54.5	45.9	27.3
	2V 5 OPzS 500	227.0	202.0	182.4	153.8	133.8	107.6	79.0	58.5	50.0	29.7
	2V 6 OPzS 600	258.0	230.0	208.0	175.8	153.0	122.9	90.1	66.8	56.5	33.7
	2V 7 OPzS 700	306.0	273.0	247.0	209.0	182.5	147.2	108.2	80.5	68.6	40.9
	2V 8 OPzS 800	340.0	304.0	275.0	233.0	203.0	163.1	119.8	88.9	75.2	44.9
	2V 9 OPzS 900	392.0	350.0	317.0	267.0	232.0	186.8	136.8	101.5	86.1	51.2
	2V 10 OPzS 1000	426.0	382.0	346.0	292.0	255.0	205.0	150.7	111.9	94.8	56.6
	2V 12 OPzS 1200	498.0	447.0	406.0	344.0	300.0	242.0	178.0	132.3	111.8	66.9
	2V 11 OPzS 1400	528.0	484.0	445.0	385.0	341.0	280.0	210.0	157.8	134.8	81.3
	2V 12 OPzS 1500	548.0	503.0	464.0	402.0	357.0	293.0	219.0	165.1	140.2	84.8
	2V 14 OPzS 1700	637.0	585.0	539.0	468.0	415.0	341.0	256.0	193.4	165.6	99.9
	2V 15 OPzS 1875	693.0	636.0	587.0	509.0	452.0	371.0	279.0	210.0	179.3	108.3
2V 16 OPzS 2000	752.0	688.0	633.0	546.0	483.0	395.0	295.0	222.0	188.4	113.6	
2V 20 OPzS 2500	926.0	851.0	786.0	683.0	607.0	499.0	375.0	283.0	243.0	146.5	
2V 24 OPzS 3000	1097.0	1009.0	932.0	810.0	718.0	590.0	443.0	335.0	285.0	172.3	

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# Discharge Table in Amperes

End voltage 1.83 V/per cell

<b>Monoblocks</b>	<b>30 min</b>	<b>45 min</b>	<b>1 h</b>	<b>1,5 h</b>	<b>2 h</b>	<b>3 h</b>	<b>5 h</b>	<b>8 h</b>	<b>10 h</b>	<b>20 h</b>
6V 3 OPzS 150	86.0	73.3	64.3	52.3	44.4	34.7	24.6	17.8	15.1	8.8
6V 4 OPzS 200	111.5	95.0	83.3	67.6	57.4	44.6	31.7	22.9	19.3	11.2
6V 5 OPzS 250	137.7	118.0	103.9	84.7	72.2	56.4	40.2	29.1	24.6	14.3
6V 6 OPzS 300	161.4	138.4	122.0	99.5	84.8	66.3	47.3	34.3	28.9	16.9
12V 1 OPzS 50	29.9	25.5	22.4	18.2	15.5	12.1	8.7	6.2	5.4	3.1
12V 2 OPzS 100	57.9	48.9	42.6	34.4	29.0	22.5	15.9	11.5	9.7	5.6
12V 3 OPzS 150	84.6	71.8	62.8	50.9	43.1	33.5	23.8	17.2	14.5	8.4
<b>2V cells</b>	<b>20 h</b>	<b>10 h</b>	<b>8 h</b>	<b>5 h</b>	<b>3 h</b>	<b>2 h</b>	<b>1.5 h</b>	<b>1 h</b>	<b>45 min</b>	<b>30 min</b>
2V 2 OPzS 100	59.2	50.8	44.7	36.6	31.2	24.4	17.5	12.5	10.8	6.2
2V 3 OPzS 150	88.2	75.7	66.7	54.5	46.5	36.5	26.1	18.7	16.1	9.3
2V 4 OPzS 200	113.3	97.1	85.4	69.6	59.3	46.3	33.0	23.8	20.2	11.7
2V 5 OPzS 250	143.2	122.8	108.2	88.3	75.2	58.8	41.8	30.2	25.7	14.9
2V 6 OPzS 300	169.0	145.2	128.0	104.7	89.3	70.0	49.9	36.1	30.8	17.9
2V 5 OPzS 350	180.1	156.7	139.4	115.1	98.8	78.0	56.1	40.8	34.6	20.2
2V 6 OPzS 420	214.0	186.4	166.0	137.3	118.0	93.2	67.2	48.9	41.5	24.3
2V 7 OPzS 490	247.0	216.0	192.3	159.3	137.0	108.4	78.1	57.0	48.3	28.3
2V 5 OPzS 500	248.0	219.0	197.1	165.3	143.2	114.6	83.5	61.1	52.6	30.7
2V 6 OPzS 600	282.0	250.0	225.0	189.2	164.0	131.2	95.5	70.1	59.6	35.0
2V 7 OPzS 700	334.0	297.0	268.0	225.0	195.7	156.8	114.7	84.2	72.2	42.4
2V 8 OPzS 800	372.0	331.0	298.0	251.0	218.0	174.2	127.0	93.2	79.3	46.6
2V 9 OPzS 900	429.0	380.0	343.0	287.0	249.0	199.2	145.1	106.3	90.7	53.1
2V 10 OPzS 1000	466.0	415.0	374.0	315.0	273.0	219.0	159.8	117.3	100.0	58.7
2V 12 OPzS 1200	546.0	487.0	440.0	371.0	322.0	259.0	188.8	138.9	118.1	69.5
2V 11 OPzS 1400	581.0	529.0	485.0	417.0	367.0	300.0	223.0	166.1	142.8	84.5
2V 12 OPzS 1500	603.0	550.0	505.0	436.0	384.0	314.0	234.0	174.1	148.9	88.3
2V 14 OPzS 1700	701.0	639.0	587.0	507.0	447.0	366.0	273.0	204.0	175.5	103.9
2V 15 OPzS 1875	763.0	696.0	640.0	552.0	487.0	398.0	297.0	221.0	190.2	112.7
2V 16 OPzS 2000	827.0	752.0	689.0	591.0	520.0	424.0	314.0	234.0	199.8	118.2
2V 20 OPzS 2500	1020.0	932.0	857.0	740.0	654.0	536.0	400.0	298.0	257.0	152.3
2V 24 OPzS 3000	1209.0	1105.0	1016.0	878.0	775.0	634.0	473.0	353.0	303.0	179.4

Design and/or specifications are subject to change without prior notice. For clarifications and updated information, please contact your local SUNLIGHT sales representative.

# Discharge Table in Amperes

End voltage 1.80 V/per cell

	<b>Monoblocks</b>	<b>30 min</b>	<b>45 min</b>	<b>1 h</b>	<b>1,5 h</b>	<b>2 h</b>	<b>3 h</b>	<b>5 h</b>	<b>8 h</b>	<b>10 h</b>	<b>20 h</b>
	6V 3 OPzS 150	94.7	80.0	69.7	56.1	47.3	36.5	25.7	18.4	15.7	9.0
	6V 4 OPzS 200	122.7	103.8	90.4	72.6	61.1	47.1	33.0	23.6	20.0	11.5
	6V 5 OPzS 250	151.9	129.1	112.9	91.2	77.1	59.6	42.0	30.1	25.5	14.7
	6V 6 OPzS 300	178.2	151.6	132.6	107.2	90.6	70.2	49.4	35.4	30.0	17.3
	12V 1 OPzS 50	32.9	27.8	24.2	19.5	16.5	12.8	9.0	6.4	5.5	3.2
	12V 2 OPzS 100	63.5	53.1	46.0	36.7	30.8	23.7	16.5	11.8	10.0	5.8
	12V 3 OPzS 150	92.9	78.2	68.0	54.5	45.8	35.3	24.8	17.7	15.0	8.7
	<b>2V cells</b>	<b>30 min</b>	<b>45 min</b>	<b>1 h</b>	<b>1,5 h</b>	<b>2 h</b>	<b>3 h</b>	<b>5 h</b>	<b>8 h</b>	<b>10 h</b>	<b>20 h</b>
	2V 2 OPzS 100	65.2	55.5	48.6	39.3	33.3	25.8	18.2	13.0	11.2	6.4
	2V 3 OPzS 150	97.3	82.8	72.5	58.7	49.7	38.5	27.2	19.4	16.7	9.5
	2V 4 OPzS 200	125.0	106.2	92.9	75.0	63.3	48.9	34.4	24.5	21.0	12.0
	2V 5 OPzS 250	158.2	134.4	117.6	95.0	80.3	62.1	43.7	31.1	26.7	15.3
	2V 6 OPzS 300	186.5	158.9	139.3	112.8	95.5	73.9	52.2	37.2	31.9	18.3
<b>Type</b>	2V 5 OPzS 350	200.0	173.1	153.0	125.3	106.8	83.4	59.0	42.4	36.1	20.9
	2V 6 OPzS 420	238.0	206.0	182.4	149.5	127.6	99.8	70.7	50.8	43.3	25.0
	2V 7 OPzS 490	275.0	238.0	211.0	173.6	148.2	116.1	82.3	59.2	50.5	29.1
	2V 5 OPzS 500	278.0	243.0	217.0	180.7	155.6	123.1	88.6	63.5	54.8	31.6
	2V 6 OPzS 600	316.0	278.0	249.0	207.0	178.7	141.4	101.3	73.1	62.4	36.1
	2V 7 OPzS 700	375.0	330.0	296.0	247.0	213.0	169.0	121.8	87.7	75.5	43.7
	2V 8 OPzS 800	418.0	368.0	330.0	275.0	237.0	187.9	134.7	97.3	83.1	48.1
	2V 9 OPzS 900	481.0	423.0	379.0	315.0	271.0	215.0	153.9	110.7	94.9	54.8
	2V 10 OPzS 1000	524.0	462.0	414.0	346.0	298.0	236.0	169.7	122.4	104.7	60.6
	2V 12 OPzS 1200	613.0	542.0	487.0	407.0	352.0	279.0	201.0	145.1	123.9	71.7
	2V 11 OPzS 1400	657.0	593.0	540.0	461.0	404.0	327.0	240.0	174.3	150.3	87.4
	2V 12 OPzS 1500	683.0	618.0	564.0	483.0	423.0	342.0	251.0	183.2	157.2	91.5
	2V 14 OPzS 1700	793.0	717.0	655.0	561.0	492.0	399.0	294.0	214.0	184.8	107.4
	2V 15 OPzS 1875	863.0	781.0	714.0	611.0	536.0	434.0	319.0	233.0	201.0	116.6
	2V 16 OPzS 2000	935.0	843.0	768.0	654.0	572.0	461.0	337.0	245.0	211.0	122.3
	2V 20 OPzS 2500	1155.0	1046.0	956.0	819.0	720.0	585.0	430.0	313.0	271.0	157.5
2V 24 OPzS 3000	1370.0	1242.0	1135.0	973.0	854.0	692.0	509.0	371.0	319.0	185.7	

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# Discharge Table in Amperes

End voltage 1.75 V/per cell

	<b>Monoblocks</b>	<b>30 min</b>	<b>45 min</b>	<b>1 h</b>	<b>1,5 h</b>	<b>2 h</b>	<b>3 h</b>	<b>5 h</b>	<b>8 h</b>	<b>10 h</b>	<b>20 h</b>
	6V 3 OPzS 150	107.0	88.9	76.4	60.2	50.2	38.2	26.7	18.8	16.1	9.2
	6V 4 OPzS 200	139.1	115.4	99.1	78.0	64.9	49.3	34.3	24.3	20.6	11.8
	6V 5 OPzS 250	172.6	144.2	124.4	98.4	82.1	62.6	43.6	30.9	26.4	15.1
	6V 6 OPzS 300	203.0	169.4	146.2	115.8	96.6	73.6	51.3	36.5	31.0	17.8
	12V 1 OPzS 50	37.0	30.7	26.4	20.9	17.5	13.4	9.3	6.6	5.7	3.2
	12V 2 OPzS 100	71.3	58.7	50.1	39.2	32.5	24.7	17.1	12.2	10.3	5.9
	12V 3 OPzS 150	104.9	86.7	74.3	58.4	48.5	36.9	25.7	18.2	15.5	8.9
	<b>2V cells</b>	<b>30 min</b>	<b>45 min</b>	<b>1 h</b>	<b>1,5 h</b>	<b>2 h</b>	<b>3 h</b>	<b>5 h</b>	<b>8 h</b>	<b>10 h</b>	<b>20 h</b>
	2V 2 OPzS 100	74.0	61.9	53.5	42.4	35.5	27.1	18.9	13.4	11.5	6.6
	2V 3 OPzS 150	110.4	92.3	79.8	63.3	52.9	40.5	28.3	20.0	17.1	9.8
	2V 4 OPzS 200	142.1	118.7	102.3	80.9	67.4	51.4	35.8	25.2	21.6	12.3
	2V 5 OPzS 250	179.6	150.3	129.6	102.6	85.6	65.2	45.4	32.0	27.5	15.7
	2V 6 OPzS 300	212.0	177.9	153.7	121.9	101.8	77.7	54.2	38.3	32.9	18.8
<b>Type</b>	2V 5 OPzS 350	231.0	196.6	171.5	137.6	115.5	88.4	61.9	43.7	37.4	21.4
	2V 6 OPzS 420	275.0	234.0	205.0	164.5	138.2	105.9	74.1	52.4	44.8	25.7
	2V 7 OPzS 490	318.0	272.0	238.0	191.3	160.8	123.3	86.3	61.1	52.3	29.9
	2V 5 OPzS 500	322.0	279.0	246.0	201.0	170.2	131.8	93.0	66.1	56.8	32.5
	2V 6 OPzS 600	369.0	320.0	283.0	231.0	196.2	151.7	106.7	75.5	64.8	37.1
	2V 7 OPzS 700	436.0	379.0	336.0	275.0	234.0	181.5	128.1	91.1	78.3	44.8
	2V 8 OPzS 800	487.0	423.0	376.0	307.0	261.0	202.0	142.0	100.5	86.3	49.4
	2V 9 OPzS 900	560.0	486.0	430.0	351.0	298.0	230.0	161.9	114.6	98.4	56.3
	2V 10 OPzS 1000	611.0	532.0	472.0	386.0	328.0	254.0	178.9	126.5	108.7	62.2
	2V 12 OPzS 1200	717.0	625.0	556.0	456.0	388.0	301.0	212.0	150.2	128.7	73.7
	2V 11 OPzS 1400	776.0	691.0	623.0	524.0	453.0	358.0	255.0	182.2	156.6	89.8
	2V 12 OPzS 1500	808.0	722.0	653.0	550.0	476.0	376.0	268.0	190.8	164.1	94.1
	2V 14 OPzS 1700	937.0	836.0	757.0	638.0	553.0	438.0	313.0	224.0	192.6	110.6
	2V 15 OPzS 1875	1021.0	912.0	825.0	696.0	603.0	477.0	340.0	243.0	209.0	119.9
	2V 16 OPzS 2000	1105.0	982.0	886.0	744.0	642.0	505.0	359.0	255.0	220.0	125.7
	2V 20 OPzS 2500	1365.0	1221.0	1106.0	934.0	810.0	642.0	459.0	329.0	283.0	162.1
2V 24 OPzS 3000	1621.0	1452.0	1316.0	1111.0	963.0	762.0	543.0	388.0	333.0	190.9	

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# Discharge Table in Amperes

End voltage 1.70 V/per cell

	<b>Monoblocks</b>	<b>30 min</b>	<b>45 min</b>	<b>1 h</b>	<b>1,5 h</b>	<b>2 h</b>	<b>3 h</b>	<b>5 h</b>	<b>8 h</b>	<b>10 h</b>	<b>20 h</b>
	6V 3 OPzS 150	116.2	94.5	80.2	62.4	51.7	39.2	27.2	19.2	16.4	-
	6V 4 OPzS 200	151.5	123.0	104.3	81.0	66.9	50.6	35.0	24.7	21.0	-
	6V 5 OPzS 250	188.9	154.2	131.2	102.3	84.8	64.2	44.5	31.4	26.8	-
	6V 6 OPzS 300	222.0	181.6	154.5	120.4	99.8	75.6	52.4	37.0	31.6	-
	12V 1 OPzS 50	40.1	32.6	27.7	21.7	18.0	13.7	9.5	6.7	5.8	-
	12V 2 OPzS 100	77.0	62.0	52.4	40.6	33.5	25.3	17.5	12.3	10.5	-
	12V 3 OPzS 150	113.7	92.0	77.9	60.5	50.0	37.8	26.2	18.5	15.8	-
	<b>2V cells</b>	<b>30 min</b>	<b>45 min</b>	<b>1 h</b>	<b>1,5 h</b>	<b>2 h</b>	<b>3 h</b>	<b>5 h</b>	<b>8 h</b>	<b>10 h</b>	<b>20 h</b>
	2V 2 OPzS 100	80.9	66.2	56.4	44.1	36.6	27.8	19.4	13.7	11.7	-
	2V 3 OPzS 150	120.7	98.8	84.2	65.8	54.7	41.5	28.9	20.4	17.4	-
	2V 4 OPzS 200	155.3	127.0	107.9	84.1	69.6	52.7	36.5	25.7	22.0	-
	2V 5 OPzS 250	196.6	160.9	136.8	106.7	88.4	66.9	46.3	32.6	27.9	-
	2V 6 OPzS 300	232.0	190.6	162.4	126.8	105.2	79.8	55.4	39.0	33.4	-
<b>Type</b>	2V 5 OPzS 350	257.0	214.0	183.9	144.5	120.1	91.1	63.3	44.5	38.1	-
	2V 6 OPzS 420	306.0	256.0	220.0	173.0	143.9	109.2	75.9	53.3	45.7	-
	2V 7 OPzS 490	354.0	297.0	256.0	201.0	167.6	127.2	88.4	62.2	53.3	-
	2V 5 OPzS 500	361.0	307.0	267.0	213.0	178.2	136.3	95.4	67.5	57.8	33.2
	2V 6 OPzS 600	415.0	354.0	309.0	246.0	206.0	157.1	109.4	77.1	66.1	37.6
	2V 7 OPzS 700	490.0	419.0	366.0	293.0	245.0	187.9	131.5	93.1	79.7	45.5
	2V 8 OPzS 800	549.0	470.0	410.0	328.0	274.0	209.0	145.7	102.7	88.0	50.1
	2V 9 OPzS 900	631.0	538.0	469.0	374.0	312.0	238.0	166.0	117.2	100.3	57.1
	2V 10 OPzS 1000	689.0	590.0	516.0	412.0	345.0	263.0	183.4	129.4	110.9	63.1
	2V 12 OPzS 1200	809.0	695.0	609.0	488.0	408.0	312.0	217.0	153.2	131.3	74.8
	2V 11 OPzS 1400	883.0	777.0	694.0	570.0	484.0	374.0	263.0	186.6	159.9	91.4
	2V 12 OPzS 1500	922.0	815.0	729.0	601.0	510.0	394.0	276.0	195.6	167.6	95.5
	2V 14 OPzS 1700	1068.0	943.0	843.0	696.0	591.0	458.0	323.0	229.0	196.5	113.0
	2V 15 OPzS 1875	1164.0	1029.0	920.0	759.0	645.0	499.0	351.0	249.0	214.0	122.0
	2V 16 OPzS 2000	1259.0	1107.0	987.0	809.0	685.0	528.0	370.0	262.0	224.0	127.6
	2V 20 OPzS 2500	1558.0	1378.0	1234.0	1020.0	868.0	673.0	474.0	337.0	288.0	165.6
2V 24 OPzS 3000	1853.0	1640.0	1471.0	1215.0	1033.0	799.0	561.0	397.0	340.0	193.9	

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# Discharge Table in Amperes

End voltage 1.65 V/per cell

End voltage 1.65 V/per cell											
	<b>Monoblocks</b>	<b>30 min</b>	<b>45 min</b>	<b>1 h</b>	<b>1,5 h</b>	<b>2 h</b>	<b>3 h</b>	<b>5 h</b>	<b>8 h</b>	<b>10 h</b>	<b>20 h</b>
	6V 3 OPzS 150	122.4	97.9	82.5	63.8	52.7	39.8	27.6	-	-	-
	6V 4 OPzS 200	159.7	127.6	107.3	82.8	68.3	51.4	35.5	-	-	-
	6V 5 OPzS 250	199.9	160.5	135.3	104.7	86.5	65.3	45.2	-	-	-
	6V 6 OPzS 300	235.0	188.8	159.2	123.2	101.8	76.8	53.2	-	-	-
	12V 1 OPzS 50	42.1	33.7	28.5	22.1	18.3	13.9	9.7	-	-	-
	12V 2 OPzS 100	80.6	64.1	53.8	41.4	34.1	25.7	17.7	-	-	-
	12V 3 OPzS 150	119.4	95.2	80.1	61.8	51.0	38.4	26.6	-	-	-
	<b>2V cells</b>	<b>30 min</b>	<b>45 min</b>	<b>1 h</b>	<b>1,5 h</b>	<b>2 h</b>	<b>3 h</b>	<b>5 h</b>	<b>8 h</b>	<b>10 h</b>	<b>20 h</b>
	2V 2 OPzS 100	85.4	68.8	58.1	45.1	37.3	28.3	19.6	-	-	-
	2V 3 OPzS 150	127.5	102.7	86.7	67.3	55.7	42.2	29.3	-	-	-
	2V 4 OPzS 200	164.5	132.0	111.3	86.0	71.0	53.6	37.0	-	-	-
	2V 5 OPzS 250	208.0	167.1	141.0	109.1	90.1	68.0	47.0	-	-	-
	2V 6 OPzS 300	247.0	198.3	167.5	129.8	107.3	81.1	56.2	-	-	-
Type	2V 5 OPzS 350	277.0	226.0	191.2	148.6	122.9	92.8	64.2	-	-	-
	2V 6 OPzS 420	330.0	270.0	229.0	178.0	147.2	111.3	77.0	-	-	-
	2V 7 OPzS 490	383.0	314.0	266.0	207.0	171.5	129.6	89.7	-	-	-
	2V 5 OPzS 500	393.0	327.0	280.0	220.0	182.8	139.1	97.0	-	-	-
	2V 6 OPzS 600	454.0	379.0	325.0	255.0	212.0	160.4	111.1	-	-	-
	2V 7 OPzS 700	536.0	448.0	385.0	303.0	252.0	191.7	133.6	-	-	-
	2V 8 OPzS 800	602.0	504.0	432.0	339.0	282.0	213.0	147.9	-	-	-
	2V 9 OPzS 900	690.0	576.0	494.0	387.0	321.0	243.0	168.7	-	-	-
	2V 10 OPzS 1000	756.0	633.0	544.0	427.0	354.0	269.0	186.4	-	-	-
	2V 12 OPzS 1200	889.0	747.0	643.0	506.0	420.0	319.0	221.0	-	-	-
	2V 11 OPzS 1400	981.0	850.0	746.0	598.0	501.0	383.0	268.0	-	-	-
	2V 12 OPzS 1500	1028.0	894.0	788.0	632.0	530.0	404.0	281.0	-	-	-
	2V 14 OPzS 1700	1188.0	1032.0	909.0	731.0	613.0	470.0	329.0	-	-	-
	2V 15 OPzS 1875	1296.0	1127.0	993.0	798.0	669.0	512.0	358.0	-	-	-
	2V 16 OPzS 2000	1399.0	1211.0	1061.0	848.0	710.0	541.0	377.0	-	-	-
	2V 20 OPzS 2500	1735.0	1511.0	1333.0	1074.0	901.0	690.0	483.0	-	-	-
2V 24 OPzS 3000	2066.0	1801.0	1591.0	1281.0	1074.0	820.0	571.0	-	-	-	

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# Discharge Table in Amperes

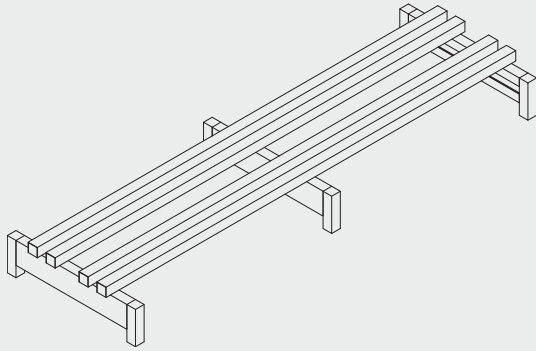
End voltage 1.60 V/per cell

	<b>Monoblocks</b>	<b>30 min</b>	<b>45 min</b>	<b>1 h</b>	<b>1,5 h</b>	<b>2 h</b>	<b>3 h</b>	<b>5 h</b>	<b>8 h</b>	<b>10 h</b>	<b>20 h</b>
	6V 3 OPzS 150	126.1	100.0	84.1	64.8	53.4	40.3	-	-	-	-
	6V 4 OPzS 200	164.9	130.5	109.4	84.1	69.2	52.0	-	-	-	-
	6V 5 OPzS 250	207.0	164.4	138.0	106.3	87.7	66.0	-	-	-	-
	6V 6 OPzS 300	244.0	193.6	162.5	125.2	103.2	77.7	-	-	-	-
	12V 1 OPzS 50	43.3	34.5	29.0	22.4	18.6	14.1	-	-	-	-
	12V 2 OPzS 100	82.9	65.4	54.7	42.0	34.6	26.0	-	-	-	-
	12V 3 OPzS 150	123.0	97.3	81.6	62.7	51.6	38.9	-	-	-	-
	<b>2V cells</b>	<b>30 min</b>	<b>45 min</b>	<b>1 h</b>	<b>1,5 h</b>	<b>2 h</b>	<b>3 h</b>	<b>5 h</b>	<b>8 h</b>	<b>10 h</b>	<b>20 h</b>
	2V 2 OPzS 100	88.4	70.4	59.2	45.8	37.8	28.6	-	-	-	-
	2V 3 OPzS 150	132.0	105.2	88.5	68.4	56.5	42.7	-	-	-	-
	2V 4 OPzS 200	170.2	135.2	113.5	87.4	72.0	54.2	-	-	-	-
	2V 5 OPzS 250	215.0	171.3	143.8	110.9	91.4	68.8	-	-	-	-
	2V 6 OPzS 300	255.0	203.0	170.8	131.9	108.8	82.1	-	-	-	-
<b>Type</b>	2V 5 OPzS 350	290.0	232.0	195.8	151.3	124.8	94.1	-	-	-	-
	2V 6 OPzS 420	347.0	278.0	235.0	181.3	149.6	112.7	-	-	-	-
	2V 7 OPzS 490	403.0	324.0	273.0	211.0	174.3	131.4	-	-	-	-
	2V 5 OPzS 500	417.0	339.0	288.0	224.0	185.9	141.0	98.1	-	-	-
	2V 6 OPzS 600	484.0	395.0	335.0	260.0	215.0	162.6	112.4	-	-	-
	2V 7 OPzS 700	571.0	466.0	396.0	309.0	256.0	194.4	135.2	-	-	-
	2V 8 OPzS 800	643.0	525.0	446.0	347.0	287.0	217.0	149.7	-	-	-
	2V 9 OPzS 900	735.0	599.0	508.0	395.0	327.0	247.0	170.8	-	-	-
	2V 10 OPzS 1000	807.0	661.0	561.0	436.0	361.0	273.0	188.7	-	-	-
	2V 12 OPzS 1200	952.0	782.0	665.0	517.0	428.0	323.0	223.0	-	-	-
	2V 11 OPzS 1400	1067.0	904.0	780.0	615.0	512.0	389.0	271.0	-	-	-
	2V 12 OPzS 1500	1121.0	955.0	826.0	651.0	541.0	411.0	285.0	-	-	-
	2V 14 OPzS 1700	1293.0	1100.0	952.0	752.0	627.0	478.0	333.0	-	-	-
	2V 15 OPzS 1875	1413.0	1203.0	1041.0	822.0	684.0	521.0	362.0	-	-	-
	2V 16 OPzS 2000	1522.0	1288.0	1110.0	873.0	725.0	550.0	381.0	-	-	-
	2V 20 OPzS 2500	1891.0	1614.0	1398.0	1105.0	922.0	702.0	489.0	-	-	-
2V 24 OPzS 3000	2255.0	1928.0	1670.0	1319.0	1098.0	834.0	579.0	-	-	-	

Design and/or specifications are subject to change without prior notice. For clarifications and updated information, please contact your local SUNLIGHT sales representative.

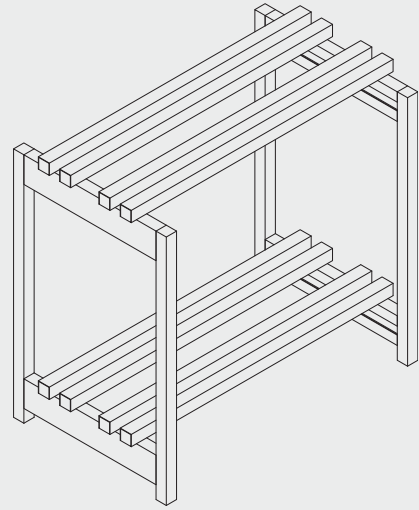
# Indicative Installation Racks

Rack 1 floor - 2 rows



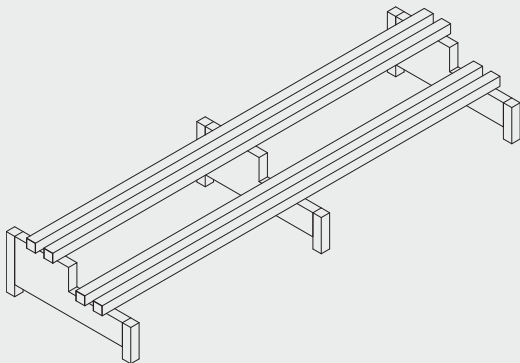
1

Rack 2 floors - 2 rows



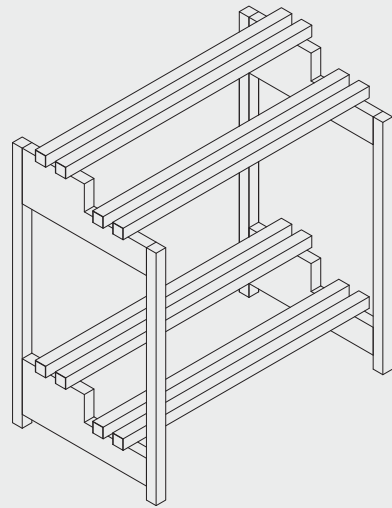
1A

Rack 1 floor - 2 steps



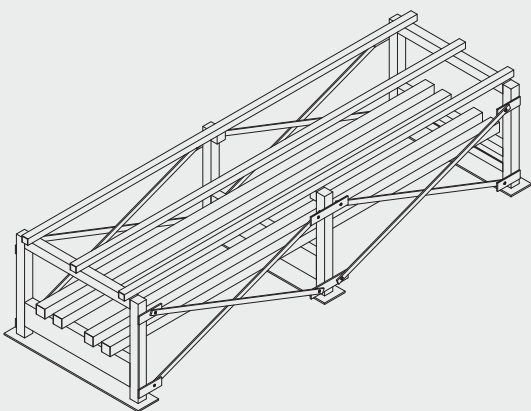
2

Rack 2 floors - 2 steps



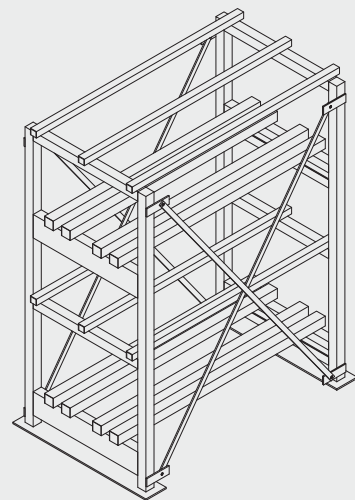
2A

Rack 1 floor - 2 rows (antiseismic)



3

Rack 2 floors - 2 rows (antiseismic)



3A

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## SUNLIGHT MANUFACTURING PLANT

The SUNLIGHT Manufacturing Plant is headquartered in Northern Greece. Since 1991, there has been a systematic investment in the development of one of the most modern industrial units of Europe in accordance with the strictest international standards.

In a total area of 142,000 m<sup>2</sup>, with indoor areas of more than 55,000 m<sup>2</sup>, the SUNLIGHT Manufacturing Plant has six high-end production units that are recognized for their high specialization.

Aiming at the production of high added value and quality products, the production and assembly lines of the SUNLIGHT Industrial Unit are used for:

- Cylindrical Zinc-Chloride cells such as R6HD (AA), R14HD (C) and R20HD (D) sizes.
- Advanced Lead-Acid batteries for submarine propulsion.
- Silver-Zinc batteries for combat and exercise torpedoes.
- Stationary and traction Lead-Acid batteries (vented type).
- Sealed Lead-Acid Batteries (VRLA).
- Autonomous Photovoltaic Hybrid Power Supply Systems.
- Battery packs for military and commercial applications.
- Assembly of Power Supply Systems for telecommunication applications.
- Assembly of Uninterruptible Power Systems (UPS).
- Assembly of Industrial Rectifiers.
- Assembly of Generating Sets ranging from 5 to 3,000 KVA.

## MANAGEMENT SYSTEMS for QUALITY, ENVIRONMENTAL CONTROL, OCCUPATIONAL HEALTH & SAFETY

The SUNLIGHT Manufacturing Plant has established and maintains management systems for Quality (ISO 9001), Environmental control (ISO 14001) and Occupational Health and Safety (OHSAS 18001).

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