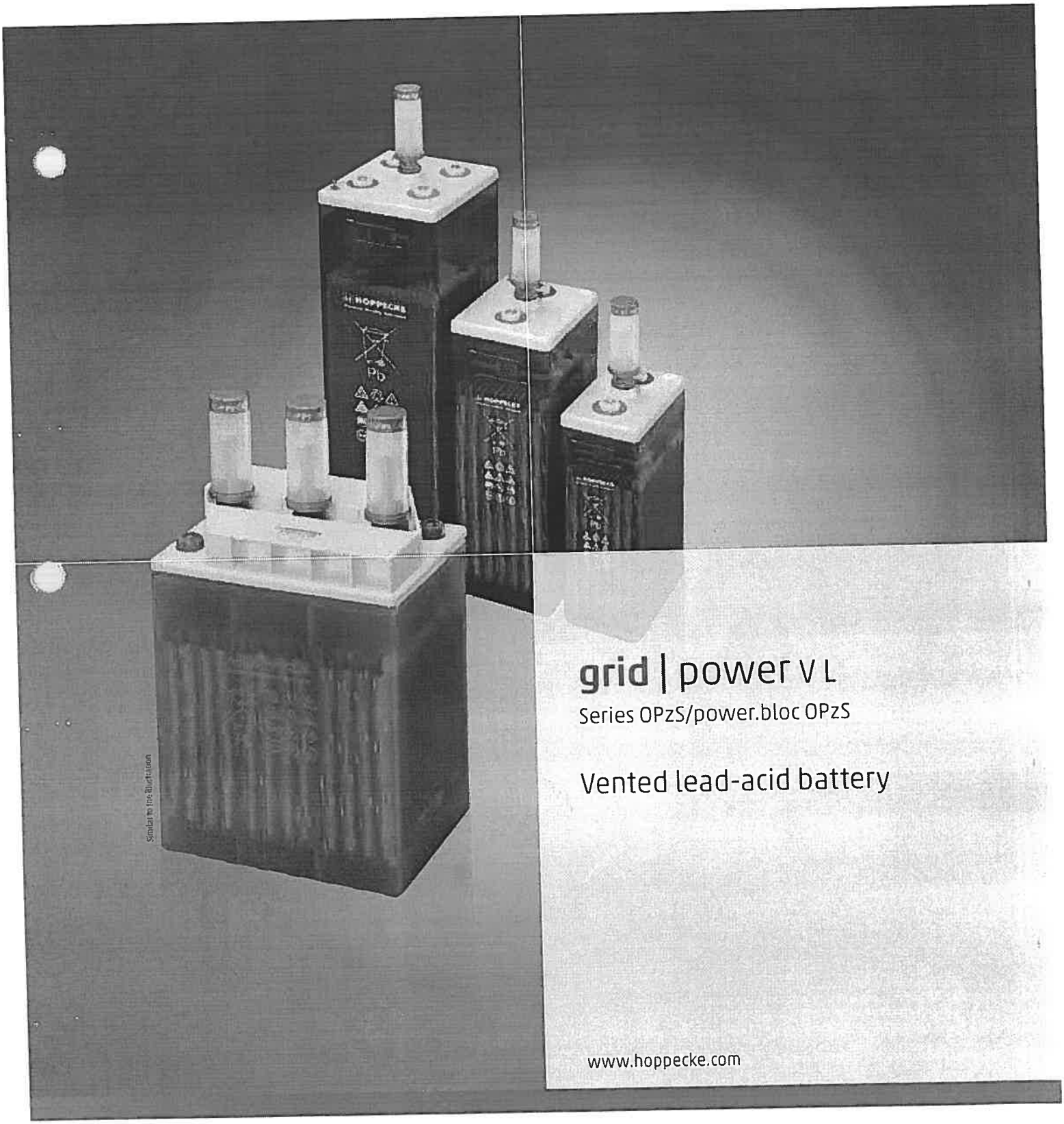
HOPPECKE
POWER FROM INNOVATION

Информацията по-долу е заличена съгл. чл. 45 и чл. 59, ал. 1 от ЗЗЛД, във връзка с чл. 36а, ал. 3 от ЗОП.



grid | power V L

Series OPzS/power.bloc OPzS

Vented lead-acid battery

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HOPPECKE
POWER FROM INNOVATION

grid | power VL Series OPzS

Typical applications:

- Telecommunications
  - Mobile phone stations
  - BTS-stations
  - Off-grid/on-grid solutions
- Power Supply
- Security lighting

Your benefits:

- Very high expected service life – due to optimized low-antimony selenium alloy
- Excellent cycle stability – due to tubular plate design
- Maximum compatibility – design according to DIN 40736-1
- Higher short-circuit safety even during the installation – based on HOPPECKE system connectors
- Extremely extended water refill intervals up to maintenance-free – optional use of AquaGen® recombination system minimizes emission of gas and aerosols[1]

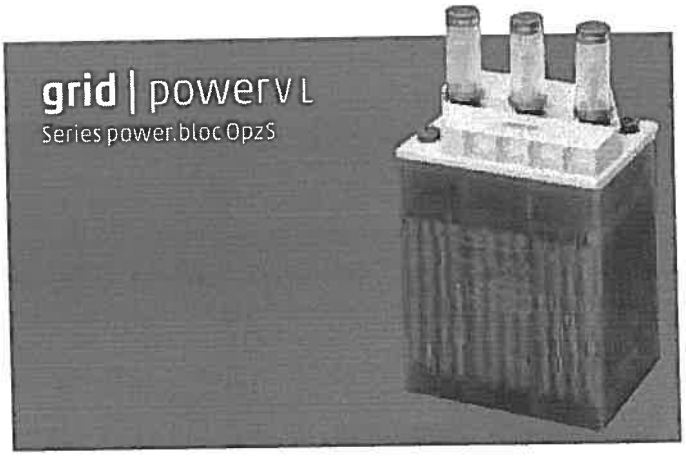
grid | power VL Series power.bloc OPzS

Typical applications:

- Telecommunications
  - Mobile phone stations
  - BTS-stations
  - Off-grid/on-grid solutions
- Power Supply systems
- Security lighting

Your benefits:

- High expected service life – due to optimized low-antimony selenium alloy
- Excellent cycle stability – due to tubular plate design
- Maximum compatibility – dimensions according to DIN 40737-3
- Easy assembly and installation – battery lid with integral handle
- Higher short-circuit safety even during the installation – based on HOPPECKE system connectors
- Extremely extended water refill intervals up to maintenance-free – optional use of AquaGen® recombination system minimizes emission of gas and aerosols[1]



[1] Similar to sealed lead-acid batteries

Capacities dimensions and weights

Series OPzS	DIN Type		C_{10}/1.80 V Ah	C_5/1.77 V Ah	C_3/1.75 V Ah	C_1/1.67 V Ah	max.* Weight kg	Weight electrolyte kg (1.24 kg/l)	max.* Length L mm	max.* Width W mm	max.* Height H mm	Fig.
grid | power VL 2-215	4 OPzS	200	213	182	161	118	17.3	4.5	105	208	420	A
grid | power VL 2-270	5 OPzS	250	266	227	201	147	21.0	5.6	126	208	420	A
grid | power VL 2-325	6 OPzS	300	320	273	241	177	24.9	6.7	147	208	420	A
grid | power VL 2-390	5 OPzS	350	390	345	303	217	29.3	8.5	126	208	535	A
grid | power VL 2-470	6 OPzS	420	468	414	363	261	34.4	10.1	147	208	535	A
grid | power VL 2-550	7 OPzS	490	546	483	426	304	39.5	11.7	168	208	535	A
grid | power VL 2-690	6 OPzS	600	686	590	510	353	46.1	13.3	147	208	710	A
grid | power VL 2-805	7 OPzS	700	801	691	596	411	59.1	16.7	215	193	710	B
grid | power VL 2-920	8 OPzS	800	915	790	681	470	63.1	17.3	215	193	710	B
grid | power VL 2-1035	9 OPzS	900	1026	887	767	529	72.4	20.5	215	235	710	B
grid | power VL 2-1150	10 OPzS	1000	1140	985	852	588	76.4	21.1	215	235	710	B
grid | power VL 2-1265	11 OPzS	1100	1256	1086	938	647	86.6	25.2	215	277	710	B
grid | power VL 2-1380	12 OPzS	1200	1370	1185	1023	706	90.6	25.8	215	277	710	B
grid | power VL 2-1610	12 OPzS	1500	1610	1400	1197	784	110.4	32.7	215	277	855	B
grid | power VL 2-1880	14 OPzS	1750	1881	1632	1397	914	142.3	46.2	215	400	815	C
grid | power VL 2-2015	15 OPzS	1875	2016	1748	1496	980	146.6	46.7	215	400	815	C
grid | power VL 2-2150	16 OPzS	2000	2150	1865	1596	1045	150.9	45.9	215	400	815	C
grid | power VL 2-2420	18 OPzS	2250	2412	2097	1796	1176	179.1	56.4	215	490	815	D
grid | power VL 2-2555	19 OPzS	2375	2546	2213	1895	1242	182.9	55.6	215	490	815	D
grid | power VL 2-2690	20 OPzS	2500	2680	2330	1995	1307	187.3	55.7	215	490	815	D
grid | power VL 2-2960	22 OPzS	2750	2952	2562	2195	1437	212.5	67.0	215	580	815	D
grid | power VL 2-3095	23 OPzS	2875	3086	2678	2294	1503	216.8	65.9	215	580	815	D
grid | power VL 2-3230	24 OPzS	3000	3220	2795	2394	1568	221.2	66.4	215	580	815	D
grid | power VL 2-3500	26 OPzS	3250	3488	3028	2594	1699	229.6	65.4	215	580	815	D

C_{10}, C_5, C_3 and C_1 = Capacity at 10 h, 5 h, 3 h and 1 h discharge

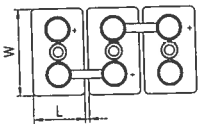
* according to DIN 40736-1 data to be understood as maximum values

Series power.bloc OPzS	DIN Type		C_{10}/1.80 V Ah	C_5/1.77 V Ah	C_3/1.75 V Ah	C_1/1.67 V Ah	max.* Weight kg	Weight electrolyte kg (1.24 kg/l)	max.* Length L mm	max.* Width W mm	max.* Height H mm	Fig.
grid | power VL 12-50	12 V 1 power.bloc OPzS	50	50	44	39	28	37.0	15.0	272	205	383	A
grid | power VL 12-100	12 V 2 power.bloc OPzS	100	101	88	78	57	48.0	13.0	272	205	383	A
grid | power VL 12-150	12 V 3 power.bloc OPzS	150	151	132	117	85	67.0	18.0	380	205	383	A
grid | power VL 6-200	6 V 4 power.bloc OPzS	200	202	176	155	114	47.0	13.0	272	205	383	B
grid | power VL 6-250	6 V 5 power.bloc OPzS	250	252	220	194	142	60.0	20.0	380	205	383	B
grid | power VL 6-300	6 V 6 power.bloc OPzS	300	302	264	233	171	67.0	18.0	380	205	383	B

C_{10}, C_5, C_3 and C_1 = Capacity at 10 h, 5 h, 3 h and 1 h discharge

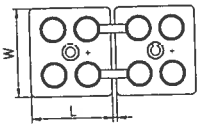
* according to DIN 40737-3 data to be unterstood as maximum values

Fig. A Series OPzS



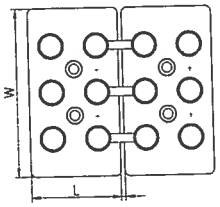
grid | power VL 2-215 -
grid | power VL 2-690

Fig. B Series OPzS



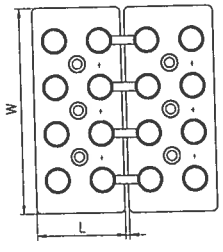
grid | power VL 2-805 -
grid | power VL 2-1610

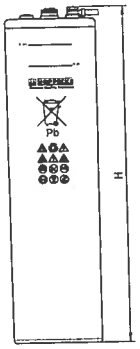
Fig. C Series OPzS



grid | power VL 2-1880-
grid | power VL 2-2150

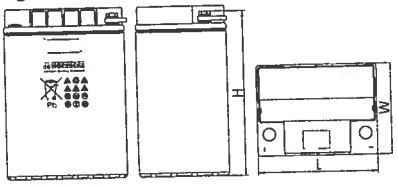
Fig. D Series OPzS





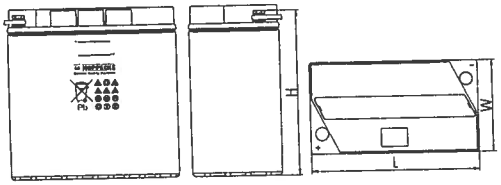
grid | power VL 2-2420 -
grid | power VL 2-3500

Fig. A Series power.bloc OPzS



grid | power VL 12-50 -
grid | power VL 12-150

Fig. B Series power.bloc OPzS



grid | power VL 6-200 -
grid | power VL 6-300

Design life: up to 20 years

Optimal environmental compatibility – closed loop for recovery of materials in an accredited recycling system

Design life: up to 18 years

Optimal environmental compatibility – closed loop for recovery of materials in an accredited recycling system

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HOPPECKE Batterien GmbH & Co. KG
Bontkirchener Str. 1
D - 59929 Brilon
Tel: +49 (0) 2963 61-374
Fax: +49 (0) 2963 61-270
E-Mail: reservepower@hoppecke.com

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Datenbasis: power.bloc OPzS_Projektierungsdaten_Ampere_R_INT_0802

Discharge current in A / Entladestrom in A / Ток разряда в А / Courrant de décharge in A

V1.4 / 26.02.2018

Vorlage (Template): V2.1 (04.09.2013

Battery / Batterie / Элемент / La batterie	3'	4'	5'	6'	7'	8'	9'	10'	15'	20'	25'	30'	35'	40'	45'	50'	55'	1 h	2 h	3 h	4 h	5 h	6 h	7 h	8 h	9 h	10 h
grid | power V L 12-50; 1,6V/Z	95,0	91,4	88,1	85,0	82,1	79,4	76,8	74,4	64,5	56,8	50,0	45,2	41,2	38,0	35,3	32,9	30,7	28,8	17,7	13,1	10,6	8,9	7,7	6,8	6,1	5,6	5,1
grid | power V L 12-100; 1,6V/Z	190,0	183,0	176,0	170,0	164,0	159,0	154,0	149,0	129,0	114,0	100,0	90,3	82,5	76,0	70,5	65,9	61,5	57,6	35,4	26,3	21,2	17,8	15,4	13,7	12,2	11,1	10,2
grid | power V L 12-150; 1,6V/Z	285,0	274,0	264,0	255,0	246,0	238,0	230,0	223,0	193,0	170,0	150,0	136,0	124,0	114,0	106,0	98,8	92,2	86,4	53,2	39,4	31,9	26,6	23,2	20,5	18,3	16,7	15,4
grid | power V L 6-200; 1,6V/Z	380,0	366,0	352,0	340,0	328,0	317,0	307,0	298,0	258,0	227,0	200,0	181,0	165,0	152,0	141,0	132,0	123,0	115,0	70,9	52,5	42,5	35,5	30,9	27,4	24,4	22,3	20,5
grid | power V L 6-250; 1,6V/Z	475,0	457,0	440,0	425,0	410,0	397,0	384,0	372,0	322,0	284,0	250,0	226,0	206,0	190,0	176,0	165,0	154,0	144,0	88,6	65,7	53,1	44,4	38,6	34,2	30,6	27,8	25,6
grid | power V L 6-300; 1,6V/Z	570,0	548,0	528,0	510,0	492,0	476,0	461,0	447,0	387,0	341,0	300,0	271,0	247,0	228,0	212,0	198,0	184,0	173,0	106,0	78,8	63,7	53,3	46,3	41,1	36,7	33,4	30,7

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Discharge current in A / Entladestrom in A / Ток разряда в A / Courrant de décharge in A

V1.4 / 26.02.2018

Vorlage (Template): V2.1 (04.09.2013)

Battery / Batterie / Элемент / La batterie	3'	4'	5'	6'	7'	8'	9'	10'	15'	20'	25'	30'	35'	40'	45'	50'	55'	1 h	2 h	3 h	4 h	5 h	6 h	7 h	8 h	9 h	10 h
grid | power V L 12-50; 1,63V/Z	87,0	84,2	81,6	79,1	76,7	74,5	72,4	70,4	61,7	54,9	48,5	44,1	40,4	37,4	34,9	32,7	30,7	28,8	17,7	13,1	10,6	8,9	7,7	6,8	6,1	5,6	5,1
grid | power V L 12-100; 1,63V/Z	174,0	168,0	163,0	158,0	153,0	149,0	145,0	141,0	123,0	110,0	97,0	88,1	80,9	74,8	69,7	65,3	61,5	57,6	35,4	26,3	21,2	17,8	15,4	13,7	12,2	11,1	10,2
grid | power V L 12-150; 1,63V/Z	261,0	253,0	245,0	237,0	230,0	223,0	217,0	211,0	185,0	165,0	146,0	132,0	121,0	112,0	105,0	98,0	92,2	86,4	53,2	39,4	31,9	26,6	23,2	20,5	18,3	16,7	15,4
grid | power V L 6-200; 1,63V/Z	348,0	337,0	326,0	315,0	307,0	298,0	289,0	281,0	247,0	220,0	194,0	176,0	162,0	150,0	139,0	131,0	123,0	115,0	70,9	52,5	42,5	35,5	30,9	27,4	24,4	22,3	20,5
grid | power V L 6-250; 1,63V/Z	435,0	421,0	408,0	395,0	384,0	372,0	362,0	352,0	309,0	274,0	243,0	220,0	202,0	187,0	174,0	163,0	154,0	144,0	88,6	65,7	53,1	44,4	38,6	34,2	30,6	27,8	25,6
grid | power V L 6-300; 1,63V/Z	522,0	505,0	489,0	474,0	460,0	447,0	434,0	422,0	370,0	329,0	291,0	264,0	243,0	224,0	209,0	196,0	184,0	173,0	106,0	78,8	63,7	53,3	46,3	41,1	36,7	33,4	30,7

HOPPECKE
POWER FROM INNOVATION

Discharge current in A / Entladestrom in A / Ток разряда в A / Courrant de décharge in A

V1.4 / 26.02.2018

Vorlage (Template): V2.1 (04.09.2013)

Battery / Batterie / Элемент / La batterie	3'	4'	5'	6'	7'	8'	9'	10'	15'	20'	25'	30'	35'	40'	45'	50'	55'	1 h	2 h	3 h	4 h	5 h	6 h	7 h	8 h	9 h	10 h
grid | power V L 12-50; 1,65V/Z	83,2	80,6	78,2	75,9	73,7	71,6	69,7	67,8	59,8	53,4	47,3	43,1	39,7	36,8	34,4	32,2	30,4	28,8	17,7	13,1	10,6	8,9	7,7	6,8	6,1	5,6	5,1
grid | power V L 12-100; 1,65V/Z	166,0	161,0	156,0	152,0	147,0	143,0	139,0	136,0	120,0	107,0	94,6	86,2	79,3	73,6	68,7	64,5	60,8	57,6	35,4	26,3	21,2	17,8	15,4	13,7	12,2	11,1	10,2
grid | power V L 12-150; 1,65V/Z	250,0	242,0	235,0	228,0	221,0	215,0	209,0	203,0	179,0	160,0	142,0	129,0	119,0	110,0	103,0	96,7	91,2	86,4	53,2	39,4	31,9	26,6	23,2	20,5	18,3	16,7	15,4
grid | power V L 6-200; 1,65V/Z	333,0	323,0	313,0	304,0	295,0	287,0	279,0	271,0	239,0	214,0	189,0	172,0	159,0	147,0	137,0	129,0	122,0	115,0	70,9	52,5	42,5	35,5	30,9	27,4	24,4	22,3	20,5
grid | power V L 6-250; 1,65V/Z	416,0	403,0	391,0	379,0	369,0	358,0	348,0	339,0	299,0	267,0	237,0	216,0	198,0	184,0	172,0	161,0	152,0	144,0	88,6	65,7	53,1	44,4	38,6	34,2	30,6	27,8	25,6
grid | power V L 6-300; 1,65V/Z	499,0	484,0	469,0	455,0	442,0	430,0	418,0	407,0	359,0	320,0	284,0	259,0	238,0	221,0	206,0	193,0	182,0	173,0	106,0	78,8	63,7	53,3	46,3	41,1	36,7	33,4	30,7

HOPPECKE
POWER FROM INNOVATION

Discharge current in A / Entladestrom in A / Ток разряда в A / Courrant de décharge in A

V1.4 / 26.02.2018

Vorlage (Template): V2.1 (04.09.2013)

Battery / Batterie / Элемент / La batterie	3'	4'	5'	6'	7'	8'	9'	10'	15'	20'	25'	30'	35'	40'	45'	50'	55'	1 h	2 h	3 h	4 h	5 h	6 h	7 h	8 h	9 h	10 h
grid | power V L 12-50; 1,67V/Z	79,6	77,2	74,9	72,7	70,7	68,7	66,9	65,2	57,7	51,7	46,0	42,1	38,8	36,1	33,8	31,8	30,0	28,4	17,7	13,1	10,6	8,9	7,7	6,8	6,1	5,6	5,1
grid | power V L 12-100; 1,67V/Z	159,0	154,0	150,0	145,0	141,0	137,0	134,0	130,0	115,0	103,0	92,0	84,1	77,7	72,2	67,6	63,5	60,0	56,9	35,4	26,3	21,2	17,8	15,4	13,7	12,2	11,1	10,2
grid | power V L 12-150; 1,67V/Z	239,0	232,0	225,0	218,0	212,0	206,0	201,0	196,0	173,0	155,0	138,0	126,0	117,0	108,0	101,0	95,3	90,0	85,3	53,2	39,4	31,9	26,6	23,2	20,5	18,3	16,7	15,4
grid | power V L 6-200; 1,67V/Z	318,0	309,0	300,0	291,0	283,0	275,0	268,0	261,0	231,0	207,0	184,0	168,0	155,0	144,0	135,0	127,0	120,0	114,0	70,9	52,5	42,5	35,5	30,9	27,4	24,4	22,3	20,5
grid | power V L 6-250; 1,67V/Z	398,0	386,0	374,0	364,0	353,0	344,0	335,0	326,0	288,0	259,0	230,0	210,0	194,0	181,0	169,0	159,0	150,0	142,0	88,6	65,7	53,1	44,4	38,6	34,2	30,6	27,8	25,6
grid | power V L 6-300; 1,67V/Z	478,0	463,0	449,0	436,0	424,0	412,0	402,0	391,0	346,0	310,0	276,0	252,0	233,0	217,0	203,0	191,0	180,0	171,0	106,0	78,8	63,7	53,3	46,3	41,1	36,7	33,4	30,7

Discharge current in A / Entladestrom in A / Ток разряда в A / Courrant de décharge in A

V1.4 / 26.02.2018

Vorlage (Template): V2.1 (04.09.2013)

Battery / Batterie / Элемент / La batterie	3'	4'	5'	6'	7'	8'	9'	10'	15'	20'	25'	30'	35'	40'	45'	50'	55'	1 h	2 h	3 h	4 h	5 h	6 h	7 h	8 h	9 h	10 h
grid | power V L 12-50; 1,7V/Z	72,2	72,2	70,1	68,0	66,1	64,4	62,7	61,1	54,3	48,9	43,9	40,4	37,4	34,9	32,8	30,9	29,2	27,8	17,7	13,1	10,6	8,9	7,7	6,8	6,1	5,6	5,1
grid | power V L 12-100; 1,7V/Z	144,0	144,0	140,0	136,0	132,0	129,0	125,0	122,0	109,0	97,8	87,8	80,7	74,8	69,8	65,5	61,8	58,5	55,5	35,4	26,3	21,2	17,8	15,4	13,7	12,2	11,1	10,2
grid | power V L 12-150; 1,7V/Z	217,0	217,0	210,0	204,0	198,0	193,0	188,0	183,0	163,0	147,0	132,0	121,0	112,0	105,0	98,3	92,6	87,7	83,3	53,2	39,4	31,9	26,6	23,2	20,5	18,3	16,7	15,4
grid | power V L 12-200; 1,7V/Z	289,0	289,0	280,0	272,0	265,0	257,0	251,0	244,0	217,0	196,0	176,0	161,0	150,0	140,0	131,0	124,0	117,0	111,0	70,9	52,5	42,5	35,5	30,9	27,4	24,4	22,3	20,5
grid | power V L 6-250; 1,7V/Z	361,0	361,0	350,0	340,0	331,0	322,0	313,0	305,0	271,0	245,0	219,0	202,0	187,0	175,0	164,0	154,0	146,0	139,0	88,6	65,7	53,1	44,4	38,6	34,2	30,6	27,8	25,6
grid | power V L 6-300; 1,7V/Z	433,0	433,0	420,0	408,0	397,0	386,0	376,0	367,0	326,0	293,0	263,0	242,0	224,0	209,0	197,0	185,0	175,0	167,0	106,0	78,8	63,7	53,3	46,3	41,1	36,7	33,4	30,7

Discharge current in A / Entladestrom in A / Ток разряда в A / Courrant de décharge in A

V1.4 / 26.02.2018

Vorlage (Template): V2.1 (04.09.2013)

Battery / Batterie / Знакчит / La batterie	3'	4'	5'	6'	7'	8'	9'	10'	15'	20'	25'	30'	35'	40'	45'	50'	55'	1 h	2 h	3 h	4 h	5 h	6 h	7 h	8 h	9 h	10 h
grid | power V L 12-50; 1,73V/Z	64,6	64,6	64,6	62,8	61,1	59,5	58,0	56,6	50,6	45,8	41,6	38,5	35,8	33,5	31,6	29,8	28,3	27,0	17,5	13,1	10,6	8,9	7,7	6,8	6,1	5,6	5,1
grid | power V L 12-100; 1,73V/Z	129,0	129,0	129,0	126,0	122,0	119,0	116,0	113,0	101,0	91,6	83,3	76,9	71,6	67,1	63,1	59,7	56,6	53,9	34,9	26,3	21,2	17,8	15,4	13,7	12,2	11,1	10,2
grid | power V L 12-150; 1,73V/Z	194,0	194,0	194,0	188,0	183,0	179,0	174,0	170,0	152,0	137,0	125,0	115,0	107,0	101,0	94,7	89,5	85,0	80,9	52,4	39,4	31,9	26,6	23,2	20,5	18,3	16,7	15,4
grid | power V L 6-200; 1,73V/Z	258,0	258,0	258,0	251,0	244,0	238,0	232,0	226,0	202,0	183,0	167,0	154,0	143,0	134,0	126,0	119,0	113,0	108,0	69,8	52,5	42,5	35,5	30,9	27,4	24,4	22,3	20,5
grid | power V L 6-250; 1,73V/Z	323,0	323,0	323,0	314,0	306,0	298,0	290,0	283,0	253,0	229,0	208,0	192,0	179,0	168,0	158,0	149,0	142,0	135,0	87,3	65,7	53,1	44,4	38,6	34,2	30,6	27,8	25,6
grid | power V L 6-300; 1,73V/Z	388,0	388,0	388,0	377,0	367,0	357,0	348,0	340,0	303,0	275,0	250,0	231,0	215,0	201,0	189,0	179,0	170,0	162,0	105,0	78,8	63,7	53,3	46,3	41,1	36,7	33,4	30,7

HOPPECKE
POWER FROM INNOVATION

Discharge current in A / Entladestrom in A / Ток разряда в A / Courrant de décharge la A

V1.4 / 26.02.2018

Vorlage (Template): V2.1 (04.09.2013)

Battery / Batterie / Элемент / La batterie	3'	4'	5'	6'	7'	8'	9'	10'	15'	20'	25'	30'	35'	40'	45'	50'	55'	1 h	2 h	3 h	4 h	5 h	6 h	7 h	8 h	9 h	10 h
grid | power V L 12-50; 1,75V/Z	59,6	59,6	59,6	59,6	58,0	56,5	55,1	53,8	48,1	43,7	40,1	37,2	34,7	32,5	30,7	29,0	27,6	26,3	17,2	13,0	10,5	8,9	7,7	6,8	6,1	5,6	5,1
grid | power V L 12-100; 1,75V/Z	119,0	119,0	119,0	119,0	116,0	113,0	110,0	108,0	96,3	87,4	80,3	74,4	69,4	65,1	61,4	58,1	55,2	52,5	34,3	25,9	21,0	17,8	15,4	13,7	12,2	11,1	10,2
grid | power V L 12-150; 1,75V/Z	179,0	179,0	179,0	179,0	174,0	170,0	165,0	161,0	144,0	131,0	120,0	112,0	104,0	97,6	92,0	87,1	82,8	78,9	51,5	38,9	31,5	26,6	23,2	20,5	18,3	16,7	15,4
grid | power V L 6-200; 1,75V/Z	238,0	238,0	238,0	238,0	232,0	226,0	220,0	215,0	193,0	175,0	161,0	149,0	139,0	130,0	123,0	116,0	110,0	105,0	68,6	51,8	42,0	35,5	30,9	27,4	24,4	22,3	20,5
grid | power V L 6-250; 1,75V/Z	298,0	298,0	298,0	298,0	290,0	283,0	276,0	269,0	241,0	219,0	201,0	186,0	173,0	163,0	153,0	145,0	138,0	131,0	85,8	64,8	52,5	44,4	38,6	34,2	30,6	27,8	25,6
grid | power V L 6-300; 1,75V/Z	358,0	358,0	358,0	358,0	348,0	339,0	331,0	323,0	289,0	262,0	241,0	223,0	208,0	195,0	184,0	174,0	166,0	158,0	103,0	77,8	63,0	53,3	46,3	41,1	36,7	33,4	30,7

Discharge current in A / Entladestrom in A / Ток разряда в А / Courrant de décharge in A

V1.4 / 26.02.2018

Vorlage (Template): v2.1 (04.09.2013

Battery / Batterie / Элемент / La batterie	3'	4'	5'	6'	7'	8'	9'	10'	15'	20'	25'	30'	35'	40'	45'	50'	55'	1 h	2 h	3 h	4 h	5 h	6 h	7 h	8 h	9 h	10 h
grid | power V L 12-50; 1,77V/Z	55,9	55,9	55,9	55,9	54,5	53,2	51,9	50,8	45,7	41,7	38,5	35,7	33,4	31,4	29,7	28,2	26,8	25,6	16,8	12,8	10,4	8,8	7,6	6,8	6,1	5,6	5,1
grid | power V L 12-100; 1,77V/Z	112,0	112,0	112,0	112,0	109,0	106,0	104,0	102,0	91,5	83,5	76,9	71,5	66,9	62,9	59,4	56,3	53,6	51,1	33,7	25,6	20,8	17,6	15,3	13,6	12,2	11,1	10,2
grid | power V L 12-150; 1,77V/Z	168,0	168,0	168,0	168,0	164,0	160,0	156,0	152,0	137,0	125,0	115,0	107,0	100,0	94,3	89,1	84,5	80,4	76,7	50,5	38,3	31,2	26,4	22,9	20,4	18,3	16,7	15,4
grid | power V L 6-200; 1,77V/Z	224,0	224,0	224,0	224,0	218,0	213,0	208,0	203,0	183,0	167,0	154,0	143,0	134,0	126,0	119,0	113,0	107,0	102,0	67,4	51,1	41,5	35,2	30,6	27,1	24,4	22,3	20,5
grid | power V L 6-250; 1,77V/Z	280,0	280,0	280,0	280,0	273,0	266,0	260,0	254,0	229,0	209,0	192,0	179,0	167,0	157,0	148,0	141,0	134,0	128,0	84,2	63,9	51,9	44,0	38,2	33,9	30,6	27,8	25,6
grid | power V L 6-300; 1,77V/Z	335,0	335,0	335,0	335,0	327,0	319,0	312,0	305,0	274,8	250,0	231,0	214,0	201,0	189,0	178,0	169,0	161,0	153,0	101,0	76,7	62,3	52,7	45,9	40,7	36,7	33,4	30,7

HOPPECKE
POWER FROM INNOVATION

Discharge current in A / Entladestrom in A / Ток разряда в A / Courrant de décharge in A

V1.4 / 26.02.2018

Vorlage (Template): V2.1 (04.09.2013

Battery / Batterie / Элемент / La batterie	3'	4'	5'	6'	7'	8'	9'	10'	15'	20'	25'	30'	35'	40'	45'	50'	55'	1 h	2 h	3 h	4 h	5 h	6 h	7 h	8 h	9 h	10 h
grid | power V L 12-50; 1,8V/Z	49,5	49,5	49,5	49,5	49,5	48,4	47,3	46,3	42,1	38,6	35,8	33,4	31,4	29,6	28,0	26,6	25,4	24,3	16,2	12,4	10,1	8,6	7,5	6,7	6,0	5,5	5,0
grid | power V L 12-100; 1,8V/Z	98,9	98,9	98,9	98,9	98,9	96,7	94,7	92,7	84,2	77,3	71,6	66,8	62,7	59,2	56,0	53,3	50,8	48,5	32,4	24,8	20,2	17,2	15,0	13,3	12,0	10,9	10,1
grid | power V L 12-150; 1,8V/Z	148,0	148,0	148,0	148,0	148,0	145,0	142,0	139,0	126,0	116,0	107,0	100,0	94,1	88,7	84,0	79,9	76,2	72,8	48,6	37,2	30,3	25,8	22,5	20,0	18,0	16,4	15,1
grid | power V L 6-200; 1,8V/Z	198,0	198,0	198,0	198,0	198,0	193,0	189,0	185,0	168,0	155,0	143,0	134,0	125,0	118,0	112,0	107,0	102,0	97,1	64,9	49,6	40,4	34,3	29,9	26,6	24,0	21,9	20,2
grid | power V L 6-250; 1,8V/Z	247,0	247,0	247,0	247,0	247,0	242,0	237,0	232,0	210,0	193,0	179,0	167,0	157,0	148,0	140,0	133,0	127,0	121,0	81,1	61,9	50,6	42,9	37,4	33,3	30,0	27,4	25,2
grid | power V L 6-300; 1,8V/Z	297,0	297,0	297,0	297,0	297,0	290,0	284,0	278,0	252,0	232,0	215,0	200,0	188,0	177,0	168,0	160,0	152,0	146,0	97,3	74,3	60,7	51,5	44,9	39,9	36,0	32,8	30,2

Discharge current in A / Entladestrom in A / Ток разряда в A / Courrant de décharge in A

V1.4 / 26.02.2018

Vorlage (Template): V2.1 (04.09.2013)

Battery / Batterie / Элемент / La batterie	3'	4'	5'	6'	7'	8'	9'	10'	15'	20'	25'	30'	35'	40'	45'	50'	55'	1 h	2 h	3 h	4 h	5 h	6 h	7 h	8 h	9 h	10 h
grid | power V L 12-50; 1,83V/Z	41,9	41,9	41,9	41,9	41,9	41,9	41,9	41,1	37,7	34,9	32,6	30,6	28,8	27,3	25,9	24,7	23,7	22,7	15,4	11,9	9,8	8,3	7,3	6,5	5,8	5,3	4,9
grid | power V L 12-100; 1,83V/Z	83,7	83,7	83,7	83,7	83,7	83,7	83,7	82,2	75,4	69,8	65,1	61,1	57,6	54,6	51,9	49,5	47,3	45,4	30,9	23,8	19,5	16,6	14,5	12,9	11,7	10,6	9,8
grid | power V L 12-150; 1,83V/Z	126,0	126,0	126,0	126,0	126,0	126,0	126,0	123,0	113,0	105,0	97,7	91,7	86,5	81,9	77,8	74,2	71,0	68,0	46,3	35,7	29,3	24,9	21,8	19,4	17,5	16,0	14,7
grid | power V L 6-200; 1,83V/Z	167,0	167,0	167,0	167,0	167,0	167,0	167,0	164,0	151,0	140,0	130,0	122,0	115,0	109,0	104,0	99,0	94,6	90,7	61,7	47,6	39,0	33,2	29,0	25,8	23,3	21,3	19,6
grid | power V L 6-250; 1,83V/Z	209,0	209,0	209,0	209,0	209,0	209,0	209,0	205,0	189,0	175,0	163,0	153,0	144,0	136,0	130,0	124,0	118,0	113,0	77,2	59,5	48,8	41,5	36,3	32,3	29,2	26,6	24,5
grid | power V L 6-300; 1,83V/Z	251,0	251,0	251,0	251,0	251,0	251,0	251,0	247,0	226,0	209,0	195,0	183,0	173,0	164,0	156,0	148,0	142,0	136,0	92,6	71,3	58,5	49,8	43,6	38,8	35,0	31,9	29,4

Discharge current in A / Entladestrom in A / Ток разряда в A / Courrant de décharge in A

V1.4 / 26.02.2018

Vorlage (Template): V2.1 (04.09.2013)

Battery / Batterie / Элемент / La batterie	3'	4'	5'	6'	7'	8'	9'	10'	15'	20'	25'	30'
grid | power V L 12-50; 1,85V/Z	34,8	34,8	34,8	34,8	34,8	34,8	34,8	34,8	34,8	32,4	30,4	28,6
grid | power V L 12-100; 1,85V/Z	69,7	69,7	69,7	69,7	69,7	69,7	69,7	69,7	69,7	64,8	60,7	57,2
grid | power V L 12-150; 1,85V/Z	105,0	105,0	105,0	105,0	105,0	105,0	105,0	105,0	105,0	97,2	91,1	85,7
grid | power V L 6-200; 1,85V/Z	139,0	139,0	139,0	139,0	139,0	139,0	139,0	139,0	139,0	130,0	121,0	114,0
grid | power V L 6-250; 1,85V/Z	174,0	174,0	174,0	174,0	174,0	174,0	174,0	174,0	174,0	162,0	152,0	143,0
grid | power V L 6-300; 1,85V/Z	209,0	209,0	209,0	209,0	209,0	209,0	209,0	209,0	209,0	194,0	182,0	171,0

Battery / Batterie / Элемент / La batterie	35'	40'	45'	50'	55'	1 h	2 h	3 h	4 h	5 h	6 h	7 h	8 h	9 h	10 h
grid | power V L 12-50; 1,85V/Z	27,0	25,7	24,4	23,4	22,4	21,5	14,8	11,5	9,4	8,1	7,1	6,3	5,7	5,2	4,8
grid | power V L 12-100; 1,85V/Z	54,1	51,3	48,9	46,7	44,7	42,9	29,6	22,9	18,9	16,1	14,1	12,6	11,4	10,4	9,6
grid | power V L 12-150; 1,85V/Z	81,1	77,0	73,3	70,1	67,1	64,4	44,3	34,4	28,3	24,2	21,2	18,9	17,1	15,6	14,4
grid | power V L 6-200; 1,85V/Z	108,0	103,0	97,8	93,4	89,5	85,9	59,1	45,8	37,7	32,2	28,2	25,2	22,7	20,8	19,1
grid | power V L 6-250; 1,85V/Z	135,0	128,0	122,0	117,0	112,0	107,0	73,9	57,3	47,2	40,3	35,3	31,4	28,4	26,0	23,9
grid | power V L 6-300; 1,85V/Z	162,0	154,0	147,0	140,0	134,0	129,0	88,7	68,8	56,6	48,3	42,3	37,7	34,1	31,2	28,7

Discharge current in A / Entladestrom in A / Ток разряда в A / Courrant de décharge in A

V1.4 / 26.02.2018

Vorlage (Template): V2.1 (04.09.2013)

Battery / Batterie / Элемент / La batterie	3'	4'	5'	6'	7'	8'	9'	10'	15'	20'	25'	30'	35'	40'	45'	50'	55'	1 h	2 h	3 h	4 h	5 h	6 h	7 h	8 h	9 h	10 h
grid | power V L 12-50; 1,87V/Z	29,9	29,9	29,9	29,9	29,9	29,9	29,9	29,9	29,9	29,9	28,1	26,5	25,1	23,9	22,8	21,8	21,0	20,1	14,0	10,9	9,0	7,7	6,8	6,1	5,5	5,0	4,7
grid | power V L 12-100; 1,87V/Z	59,8	59,8	59,8	59,8	59,8	59,8	59,8	59,8	59,8	59,8	56,2	53,0	50,3	47,8	45,6	43,7	41,9	40,3	28,0	21,9	18,1	15,5	13,6	12,2	11,0	10,1	9,3
grid | power V L 12-150; 1,87V/Z	89,7	89,7	89,7	89,7	89,7	89,7	89,7	89,7	89,7	89,7	84,2	79,5	75,4	71,7	68,5	65,5	62,9	60,4	42,1	32,8	27,1	23,2	20,4	18,2	16,5	15,1	14,0
grid | power V L 6-200; 1,87V/Z	120,0	120,0	120,0	120,0	120,0	120,0	120,0	120,0	120,0	120,0	112,0	106,0	101,0	95,6	91,3	87,4	83,8	80,6	56,1	43,8	36,2	31,0	27,2	24,3	22,0	20,1	18,6
grid | power V L 6-250; 1,87V/Z	149,0	149,0	149,0	149,0	149,0	149,0	149,0	149,0	149,0	149,0	140,0	133,0	126,0	120,0	114,0	109,0	105,0	101,0	70,1	54,7	45,2	38,7	34,0	30,4	27,5	25,2	23,3
grid | power V L 6-300; 1,87V/Z	179,0	179,0	179,0	179,0	179,0	179,0	179,0	179,0	179,0	179,0	168,0	159,0	151,0	143,0	137,0	131,0	126,0	121,0	84,1	65,6	54,3	46,5	40,8	36,5	33,0	30,2	27,9

Discharge current in A / Entladestrom in A / Ток разряда в А / Courrant de décharge in A

V1.4 / 26.02.2018

Vorlage (Template). V2.1 (04.09.2013)

Battery / Batterie / Энемент / La batterie	3'	4'	5'	6'	7'	8'	9'	10'	15'	20'	25'	30'	35'	40'	45'	50'	55'	1 h	2 h	3 h	4 h	5 h	6 h	7 h	8 h	9 h	10 h
grid | power V L 12-50; 1,9V/Z	24,4	24,4	24,4	24,4	24,4	24,4	24,4	24,4	24,4	24,4	24,4	23,2	22,0	21,0	20,1	19,3	18,5	17,8	12,6	9,9	8,3	7,1	6,3	5,7	5,1	4,7	4,4
grid | power V L 12-100; 1,9V/Z	48,9	48,9	48,9	48,9	48,9	48,9	48,9	48,9	48,9	48,9	48,9	46,3	44,0	42,0	40,2	38,5	37,1	35,7	25,2	19,9	16,6	14,3	12,6	11,3	10,3	9,5	8,8
grid | power V L 12-150; 1,9V/Z	73,3	73,3	73,3	73,3	73,3	73,3	73,3	73,3	73,3	73,3	73,3	69,5	66,0	63,0	60,3	57,8	55,6	53,5	37,9	29,8	24,8	21,4	18,9	17,0	15,4	14,2	13,2
grid | power V L 6-200; 1,9V/Z	97,8	97,8	97,8	97,8	97,8	97,8	97,8	97,8	97,8	97,8	97,8	92,6	88,1	84,0	80,4	77,1	74,1	71,4	50,5	39,8	33,1	28,5	25,2	22,6	20,6	18,9	17,6
grid | power V L 6-250; 1,9V/Z	122,0	122,0	122,0	122,0	122,0	122,0	122,0	122,0	122,0	122,0	122,0	116,0	110,0	105,0	100,0	96,4	92,6	89,2	63,1	49,7	41,4	35,7	31,5	28,3	25,7	23,7	21,9
grid | power V L 6-300; 1,9V/Z	147,0	147,0	147,0	147,0	147,0	147,0	147,0	147,0	147,0	147,0	147,0	139,0	132,0	126,0	121,0	116,0	111,0	107,0	75,7	59,6	49,7	42,8	37,8	33,9	30,9	28,4	26,3

Discharge current in A / Entladestrom in A / Ток разряда в A / Courant de décharge in A

V1.4 / 26.02.2018

Vorlage (Template): V2.1 (04.09.2013

Battery / Batterie / Элемент / La batterie	3'	4'	5'	6'	7'	8'	9'	10'	15'	20'	25'	30'	35'	40'	45'	50'	55'	1 h	2 h	3 h	4 h	5 h	6 h	7 h	8 h	9 h	10 h
grid | power V L 12-50; 1,93V/Z	17,8	17,8	17,8	17,8	17,8	17,8	17,8	17,8	17,8	17,8	17,8	17,8	17,8	17,1	16,4	15,8	15,3	14,8	10,8	8,6	7,3	6,3	5,6	5,1	4,6	4,3	4,0
grid | power V L 12-100; 1,93V/Z	35,6	35,6	35,6	35,6	35,6	35,6	35,6	35,6	35,6	35,6	35,6	35,6	35,6	34,1	32,8	31,6	30,5	29,5	21,5	17,3	14,5	12,6	11,2	10,2	9,3	8,6	8,0
grid | power V L 12-150; 1,93V/Z	53,4	53,4	53,4	53,4	53,4	53,4	53,4	53,4	53,4	53,4	53,4	53,4	53,4	51,2	49,2	47,5	45,8	44,3	32,3	25,9	21,8	19,0	16,9	15,2	13,9	12,9	12,0
grid | power V L 6-200; 1,93V/Z	71,2	71,2	71,2	71,2	71,2	71,2	71,2	71,2	71,2	71,2	71,2	71,2	71,2	68,3	65,7	63,3	61,1	59,1	43,1	34,5	29,1	25,3	22,5	20,3	18,6	17,2	16,0
grid | power V L 6-250; 1,93V/Z	88,9	88,9	88,9	88,9	88,9	88,9	88,9	88,9	88,9	88,9	88,9	88,9	88,9	85,3	82,1	79,1	76,3	73,8	53,8	43,1	36,4	31,6	28,1	25,4	23,2	21,5	20,0
grid | power V L 6-300; 1,93V/Z	107,0	107,0	107,0	107,0	107,0	107,0	107,0	107,0	107,0	107,0	107,0	107,0	107,0	102,0	98,5	94,9	91,6	88,6	64,6	51,8	43,6	37,9	33,7	30,5	27,9	25,8	24,0

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Typetest
grid | power V L
Product Range OPzS
IEC 60896 – 11

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Remark: HOPPECKE Batterien GmbH & Co. KG renamed the cells with OPzS design to its new brand grid | power V L. The names of OPzS and grid | power V L are referring to each other directly and there is no technical difference. The present type test which is ongoing is being continued with the current OPzS design and this name conversion has no influence on the test itself.

ВЯРНО С ОРИГИНАЛА

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Result summary:

<table>
<tr><th>No</th><th>Test</th><th>Results</th></tr>
<tr><td>1</td><td>Capacity test</td><td>
<table>
<tr><th></th><th>C10 [%]</th><th>C5 [%]</th><th>C3 [%]</th><th>C1 [%]</th></tr>
<tr><td>6 OPzS 300</td><td>108.8 (2)</td><td>114.7 (1)</td><td>113.1 (2)</td><td>121.3 (1)</td></tr>
<tr><td>7 OPzS 490</td><td>106.9 (1)</td><td>104.4 (1)</td><td>103.3 (1)</td><td>112.8 (1)</td></tr>
<tr><td>6 OPzS 600</td><td>105.9 (2)</td><td>108.3 (1)</td><td>109.9 (1)</td><td>120.6 (1)</td></tr>
<tr><td>12 OPzS 1500</td><td>112.0 (2)</td><td>112.0 (1)</td><td>116.3 (2)</td><td>137.1 (1)</td></tr>
</table>
</td></tr>
<tr><td>2</td><td>Test of suitability for floating battery operation (3)</td><td>Density variation: passed
Voltage variation: passed
Water consumption: passed
Capacity test: passed
(1)(2)</td></tr>
<tr><td>3</td><td>Endurance in discharge-charge cycles (3)</td><td>Test passed
(repuirement > 100 cycles)
in progress – 663 cycles (1)(2)</td></tr>
<tr><td>4</td><td>Endurance in overcharge (3)</td><td>18 units (1)(2), test passed</td></tr>
<tr><td>5</td><td>Charge retention test (3)</td><td>Capacity loss 1.2% per month (1)(2)</td></tr>
<tr><td>6</td><td>Short-circuit current and internal resistance determination</td><td>
<table>
<tr><th></th><th>Ri [mOhm]</th><th>ISC [A]</th></tr>
<tr><td>6 OPzS 300 (1)</td><td>0.569</td><td>3480</td></tr>
<tr><td>7 OPzS 490 (1)</td><td>0.437</td><td>4504</td></tr>
<tr><td>6 OPzS 600 (1)</td><td>0.440</td><td>4495</td></tr>
<tr><td>12 OPzS 1500 (1)</td><td>0.218</td><td>9072</td></tr>
</table>
</td></tr>
</table>

(1) Test was witnessed by Mr. C. Hoppe (Surveyor, Essen Operation, DNV GL Maritime)
(2) Test was reviewed by Mr. C. Hoppe (Surveyor, Essen Operation, DNV GL Maritime)
(3) The Type Test on the battery type OPzS was done in accordance to IEC 60896 part 11.
The cells selected for the test (7 OPzS 490 with 70 Ah plate) consist of similar / equal parts as all other cell sizes.

Due to the fact that the 50 Ah, 70 Ah , 100 Ah and the 125 Ah plate use the same technology,

- the same kind of grids,
- the same active mass,
- the same separators
- and they differ mainly in dimension,

the results for the life time tests as with the Type Test of 7 OPzS 490 (Test of suitability for floating battery operation, Endurance in discharge-charge cycles, Endurance in overcharge, Charge retention test) can be carried over to the other types.

Due to different electrical values (different capacities) of the plates the following tests will be done with all types:

- capacity test according to IEC 60896-11
- short-circuit current and internal resistance determination

Signatures:

HOPPECKE representatives

Released by:

i.V.

p. p. Mr. Wilhelm Giller 28.03.19

Manager of
Physical Laboratory

HOPPECKE Batterien
Physikalisches Labor
Bontkirchener Str. 1
59929 Brilon
Deutschland

Prepared by:

i.A. 28.03.19

p. p. Mr. Patrick Schluer

Physical
Laboratory

DNV GL representatives

Witnessed/Reviewed by:

ENVIRONMENT - SAFEGUARDING LIFE, PROPERTY AND THE 10 64 DNV·GL 3922

ВЯРНО С ОРИГИНАЛА

София Sofia

p. p. **Mr. C. Hoppe**

Surveyor, Essen Operation
DNV GL Maritime

Test Report Physical Test Laboratory

Test location: **HOPPECKE Batterien GmbH & Co KG, physical test field**

Reference documents: **IEC 60896 – 11**

Test object:

Batt. 1:
- 6 cells of the type **6 OPzS 300** (50 Ah plate) with original connectors, connected in series.
- Cell- no.: 01-06
- Manufacturing identification no.: 8865001

Batt. 2:
- 3 cells of the type **6 OPzS 300** (50 Ah plate) with original connectors, connected in series.
- Cell- no.: 07-09
- Manufacturing identification no.: 8865001

Batt. 3:
- 6 cells of the type **7 OPzS 490** (70 Ah plate) with original connectors, connected in series.
- Cell- no.: 10-15
- Manufacturing identification no.: 8865002

Batt. 4:
- 3 cells of the type **7 OPzS 490** (70 Ah plate) with original connectors, connected in series.
- Cell- no.: 16-18
- Manufacturing identification no.: 8865002

Batt. 5:
- 6 cells of the type **7 OPzS 490** (70 Ah plate) with original connectors, connected in series.
- Cell- no.: 19-24
- Manufacturing identification no.: 8865002

Batt. 6:

- 6 cells of the type **7 OPzS 490** (70 Ah plate) with original connectors, connected in series.
- Cell- no.: 25-30
- Manufacturing identification no.: 8865002

Batt. 7:

- 6 cells of the type **7 OPzS 490** (70 Ah plate) with original connectors, connected in series.
- Cell- no.: 31-36
- Manufacturing identification no.: 8865002

Batt. 10:

- 6 cells of the type **6 OPzS 600** (100 Ah plate) with original connectors, connected in series.
- Cell- no.: 46-51
- Manufacturing identification no.: 8865003

Batt. 11:

- 3 cells of the type **6 OPzS 600** (100 Ah plate) with original connectors, connected in series.
- Cell- no.: 52-54
- Manufacturing identification no.: 8865003

Batt. 12:

- 6 cells of the type **12 OPzS 1500** (125 Ah plate) with original connectors, connected in series.
- Cell- no.: 55-60
- Manufacturing identification no.: 8865004

Batt. 13:

- 3cells of the type **12 OPzS 1500** (125 Ah plate) with original connectors, connected in series.
- Cell- no.: 61-63
- Manufacturing identification no.: 8865004

Test Report Physical Test Laboratory

Test procedure:

Batt.-type:	Batt-no.:	Test-procedure
6 OPzS 300	1	C10 + C5 + C3 + C1
	2	Short-circuit current
7 OPzS 490	3	C10 + 60896 - 11 / 16
	4	Short-circuit current
	5	C5 + 60896 – 11 / 18
	6	C3 + 60896 – 11 / 15
	7	C1 + 60896 – 11 / 17
6 OPzS 600	10	C10 + C5 + C3 + C1
	11	Short-circuit current
12 OPzS 1500	12	C10 + C5 + C3 + C1
	13	Short-circuit current

Test period: Tests start February 2017

Test Report Physical Test Laboratory

Used testing sets:

Batt.-type:	Test	Unit:	Type:	Structure-no.:	Next calibration date:
6 OPzS 300	**Capacity test** C10 C5 C3	Battery Tester	Moran 264 100A/20V	1814080179	April 2017
		Chart-recorder	6 Channel	1814022210	July 2017
		Density meter	DMA 35	1813010018	August 2017
	Capacity test C1	Battery Tester	BasyTec 001 360A/20V	1814080220	April 2017
		Chart-recorder	Yokogawa DX 220	1814060039	August 2017
		Shunt	600 A / 60 mV	1814040157	June 2017
		Thermometer	PT 100	1814050067	September 2017
		Density meter	DMA 35	1813010018	August 2017
	Short circuit and D.C. internal resistance	Battery Tester	Digatron 153 2000A/20V	1814080002	August 2017
		Chart-recorder	Yokogawa DX 208	1814060036	August 2017
		Shunt	2000 A / 200 mV	1814040091	June 2018
		Thermometer	PT 100	1814050081	March 2017
		Densitymeter	DMA 35	1813010018	August 2017

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Batt.-type:	Test	Unit:	Type:	Structure-no.:	Next calibration date:
7 OPzS 490	**Capacity test** C10	Battery Tester	Moran 208 100A/20V	1814080120	July 2017
		Chart-recorder	6 Channel	1814021206	July 2017
		Density meter	DMA 35	1813010018	August 2017
	Capacity test C5	Battery Tester	Moran 271 200A/20V	1814080147	April 2017
		Chart-recorder	6 Channel	1814021110	July 2017
		Density meter	DMA 35	1813010018	August 2017
	Capacity test C3	Battery Tester	Moran 272 200A/20V	1814080148	April 2017
		Chart-recorder	6 Channel	1814022202	July 2017
		Density meter	DMA 35	1813010018	August 2017
	Capacity test C1	Battery Tester	Digatron 351 1000A/20V	1814080004	August 2017
		Chart-recorder	Yokogawa DX 230	1814060038	August 2017
		Shunt	500 A / 60 mV	1814040141	June 2017
		Thermometer	PT 100	1814050121	September 2017
		Densitymeter	DMA 35	1813010018	August 2017

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Batt.-type:	Test	Unit:	Type:	Structure-no.:	Next calibration date:
7 OPzS 490	**Test of suitability for floating battery operation** C10 - Start	Battery Tester	Moran 208 100A/20V	1814080120	July 2017
		Chart-recorder	6 Channel	1814021206	July 2017
		Density meter	DMA 35	1813010018	August 2017
	Test of suitability for floating battery operation C10 - End	Battery Tester	Moran 270 100A/20V	1814080120	July 2018
		Chart-recorder	6 Channel	1814021107	August 2018
		Density meter	DMA 35	1813010018	August 2018
	Endurance in discharge-charge cycles	Battery Tester	Moran 307 200A/20V	1814080185	April 2017
		Chart-recorder	6 Channel	1814022203	July 2017
		Density meter	DMA 35	1813010018	August 2017
	Endurance in overcharge C1 – Start	Battery Tester	Digatron 351 1000A/20V	1814080004	August 2017
		Chart-recorder	Yokogawa DX 230	1814060038	August 2017
		Shunt	500 A / 60 mV	1814040141	June 2017
		Thermometer	PT 100	1814050121	September 2017
		Densitymeter	DMA 35	1813010018	August 2017
	Endurance in overcharge Overcharge	Battery Tester	Moran 260 50A/20V	1814080175	April 2017
		Chart-recorder	6 Channel	1814022207	July 2017
		Density meter	DMA 35	1813010018	August 2017

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Batt.-type:	Test	Unit:	Type:	Structure-no.:	Next calibration date:
7 OPzS 490	**Charge retention test** C10 Start	Battery Tester	Moran 208 100A/20V	1814080120	July 2017
		Chart-recorder	6 Channel	1814021206	July 2017
		Density meter	DMA 35	1813010018	August 2017
	Charge retention test C10 End	Battery Tester	Moran 303 100A/20V	1814080196	Mai 2018
		Chart-recorder	6 Channel	1814021112	July 2017
		Density meter	DMA 35	1813010018	August 2017
	Short circuit and D.C. internal resistance	Battery Tester	Digatron 153 2000A/20V	1814080002	August 2017
		Chart-recorder	Yokogawa DX 208	1814060036	August 2017
		Shunt	2000 A / 200 mV	1814040091	June 2018
		Thermometer	PT 100	1814050081	March 2017
		Densitymeter	DMA 35	1813010018	August 2017

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Batt.-type:	Test	Unit:	Type:	Structure-no.:	Next calibration date:
6 OPzS 600	**Capacity test** C10 C5	Battery Tester	Moran 307 200A/20V	1814080185	April 2017
		Chart-recorder	6 Channel	1814022203	July 2017
		Density meter	DMA 35	1813010018	August 2017
	Capacity test C3	Battery Tester	Digatron 351 1000A/20V	1814080004	August 2017
		Chart-recorder	Yokogawa MV 2000	1814060048	July 2017
		Shunt	300 A / 60 mV	1814040181	June 2017
		Thermometer	PT 100	1814050135	September 2017
		Densitymeter	DMA 35	1813010018	August 2017
	Capacity test C1	Battery Tester	Digatron 351 1000A/20V	1814080004	August 2017
		Chart-recorder	Yokogawa MW 100	1814060056	September 2017
		Shunt	600 A / 60 mV	1814040217	January 2018
		Thermometer	PT 100	1814050135	September 2017
		Densitymeter	DMA 35	1813010018	August 2017
	Short circuit and D.C. internal resistance	Battery Tester	Digatron 153 2000A/20V	1814080002	August 2017
		Chart-recorder	Yokogawa DX 208	1814060036	August 2017
		Shunt	2000 A / 200 mV	1814040091	June 2018
		Thermometer	PT 100	1814050081	March 2017
		Densitymeter	DMA 35	1813010018	August 2017

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Batt.-type:	Test	Unit:	Type:	Structure-no.:	Next calibration date:
12 OPzS 1500	**Capacity test** C10	Battery Tester	Moran 272 200A/20V	1814080148	April 2017
		Chart-recorder	6 Channel	1814022202	July 2017
		Density meter	DMA 35	1813010018	August 2017
	Capacity test C5	Battery Tester	Benning 303 500A/100V	1814080202	June 2017
		Chart-recorder	Yokogawa MV 2000	1814060048	July 2017
		Shunt	500 A / 100 mV	1814040201	November 2017
		Thermometer	PT 100	1814050075	September 2017
		Densitymeter	DMA 35	1813010018	August 2017
	Capacity test C3	Battery Tester	Digatron 351 1000A/20V	1814080004	August 2017
		Chart-recorder	Yokogawa DX 230	1814060044	August 2017
		Shunt	1000 A / 100 mV	1814040203	November 2017
		Thermometer	PT 100	1814050131	September 2017
		Densitymeter	DMA 35	1813010018	August 2017

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Batt.-type:	Test	Unit:	Type:	Structure-no.:	Next calibration date:
12 OPzS 1500	**Capacity test** C1	Battery Tester	Digatron 153 2000A/20V	1814080002	August 2017
		Chart-recorder	Yokogawa DX 230	1814060044	August 2017
		Shunt	2000 A / 200 mV	1814040091	June 2018
		Thermometer	PT 100	1814050075	September 2017
		Densitymeter	DMA 35	1813010018	August 2017
	Short circuit and D.C. internal resistance	Battery Tester	Digatron 051 3000A/20V Digatron 153 2000A/20V	1814080201 1814080002	Mai 2017 August 2017
		Chart-recorder	Yokogawa DX 208	1814060041	August 2017
		Shunt	6000 A / 60 mV	1814040025	November 2018
		Thermometer	PT 100	1814050131	September 2017
		Densitymeter	DMA 35	1813010018	August 2017