

HSL+ Nickel Cadmium Batteries

Nickel Cadmium Pocket Plate Batteries



HSL™

HSL+ type of Nickel Cadmium Battery is developed by HBL to supply power to critical and demanding applications like solar photovoltaic or renewable energy. These batteries are completely reliable, with minimal maintenance, withstand deep discharges, rough treatment, over long periods and operate at widest temperature range.

HSL+ cells are available with strong steel frame Structure, shocks-resistant polypropylene casing material and flame arresting spill-proof vent. This battery gets better internal recombination by using special polypropylene fibrous type of separator.

Applications

- Offshore
- Communications
- Railway signalings
- Oil and gas
- Emergency lighting
- Rural electrification

Superior Features of HSL+

- High cycle life
- Better cycle life at erratic SOC of battery
- Deep discharge ability
- Minimal self-discharge rates
- Excellent performance at high temperatures
- Wide operating temperature range
- Shock and vibration resistant
- Excellent ampere hour efficiency
- Continuous operation at any state of Charge



HSL+ range

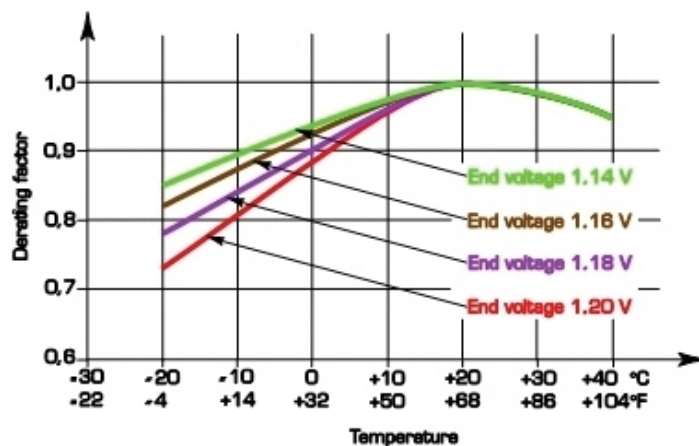
Cell dimensions

Cell Type	Capacity		Height (mm)	Width (mm)	Length per block										Weight (kg)	Recomm ended Charging Current
	C ₁₂₀ 120 h 1.0 V Ah	C ₅ 5 h 1.0 V Ah			1 cell (mm)	2 cells (mm)	3 cells (mm)	4 cells (mm)	5 cells (mm)	6 cells (mm)	8 cells (mm)	9 cells (mm)	10 cells (mm)			
HSL+ 45	45	43	405	195			121	157	192	228	300	336	371	4.2	4.3	
HSL+ 90	90	85	405	195			121	157	192	228	300	336	371	4.9	8.5	
HSL+ 105	105	100	405	195			143	185	228	271	357	400		5.8	10.0	
HSL+ 140	140	128	405	195			175	227	281	334	441			7.2	12.8	
HSL+ 185	185	171	405	195			193	253	312	372				8.4	17.1	
HSL+ 230	230	213	405	195		159	232	304	377					9.9	21.3	
HSL+ 275	275	256	405	195		183	268	352	437					11.5	25.6	
HSL+ 320	320	300	405	195		228	336							15.1	30.0	
HSL+ 370	370	341	405	195		252	372							16.8	34.1	
HSL+ 415	415	384	405	195	159	304								19.4	38.4	
HSL+ 460	460	427	405	195	159	304								19.8	42.7	
HSL+ 505	505	469	405	195	183	352								22.4	46.9	
HSL+ 555	555	512	405	195	183	352								23.0	51.2	
HSL+ 600	600	554	405	195	232									27.0	55.4	
HSL+ 645	645	597	405	195	232									29.0	59.7	
HSL+ 690	690	639	405	195	232									29.6	63.9	
HSL+ 735	735	682	405	195	268									33.0	68.2	
HSL+ 790	790	731	405	195	268									33.8	73.1	
HSL+ 830	830	768	405	195	268									34.5	76.8	
HSL+ 880	880	815	405	195	304									37.0	81.5	
HSL+ 920	920	853	405	195	304									39.6	85.3	
HSL+ 1020	1020	944	405	195	352									43.0	94.4	
HSL+ 1110	1110	1024	405	195	352									46.0	102	

HSL+ complies with IEC 62259 standard.

Derating factor according to temperature and end voltage

For typical solar application with 3 days or more backup time



Performance of HSL+ in amperes at +20°C ±5°C.

for fully charged cells with constant current charge according to IEC 62259 standard.

d = days & h = hours.

Cell Type	End cell voltage = 1.14 V										End cell voltage = 1.16 V									
	C5 Ah	2 d	3 d	4 d	5 d	6 d	7 d	8 d	9 d	10 d	2 d	3 d	4 d	5 d	6 d	7 d	8 d	9 d	10 d	
	5hr 1.0V	48 h	72 h	96 h	120 h	144 h	168 h	192 h	216 h	240 h	48 h	72 h	96 h	120 h	144 h	168 h	192 h	216 h	240 h	
HSL+ 45	43	0.94	0.64	0.48	0.39	0.33	0.28	0.25	0.22	0.20	0.92	0.63	0.48	0.39	0.33	0.28	0.25	0.22	0.20	
HSL+ 90	85	1.86	1.27	0.95	0.77	0.65	0.56	0.49	0.44	0.40	1.82	1.25	0.94	0.77	0.64	0.56	0.49	0.44	0.40	
HSL+ 105	100	2.19	1.49	1.12	0.90	0.76	0.66	0.58	0.52	0.47	2.15	1.47	1.10	0.90	0.76	0.65	0.58	0.52	0.47	
HSL+ 140	128	2.80	1.90	1.43	1.15	0.98	0.85	0.74	0.66	0.60	2.75	1.88	1.42	1.15	0.97	0.84	0.74	0.66	0.60	
HSL+ 185	171	3.74	2.54	1.91	1.54	1.31	1.13	0.99	0.89	0.80	3.67	2.52	1.89	1.54	1.29	1.12	0.99	0.89	0.80	
HSL+ 230	213	4.66	3.17	2.38	1.92	1.63	1.41	1.23	1.10	0.99	4.57	3.14	2.36	1.92	1.61	1.39	1.23	1.10	0.99	
HSL+ 275	256	5.60	3.80	2.85	2.30	1.96	1.69	1.48	1.33	1.20	5.49	3.77	2.83	2.30	1.94	1.68	1.48	1.33	1.20	
HSL+ 320	300	6.56	4.46	3.35	2.70	2.29	1.98	1.73	1.56	1.41	6.44	4.42	3.32	2.70	2.27	1.96	1.73	1.56	1.41	
HSL+ 370	341	7.46	5.07	3.81	3.07	2.60	2.25	1.97	1.77	1.59	7.32	5.02	3.77	3.07	2.58	2.23	1.97	1.77	1.60	
HSL+ 415	384	8.40	5.71	4.29	3.46	2.93	2.54	2.23	1.99	1.79	8.24	5.65	4.24	3.46	2.91	2.51	2.22	1.99	1.79	
HSL+ 460	427	9.34	6.35	4.77	3.84	3.26	2.82	2.47	2.21	1.99	9.16	6.29	4.72	3.84	3.23	2.80	2.47	2.21	1.99	
HSL+ 505	469	10.26	6.97	5.23	4.22	3.58	3.10	2.72	2.43	2.19	10.06	6.90	5.18	4.22	3.55	3.07	2.71	2.43	2.19	
HSL+ 555	512	11.20	7.61	5.71	4.61	3.91	3.38	2.96	2.65	2.39	10.99	7.54	5.66	4.61	3.88	3.35	2.96	2.65	2.39	
HSL+ 600	554	12.12	8.23	6.18	4.98	4.23	3.66	3.20	2.88	2.60	11.89	8.16	6.12	4.98	4.19	3.63	3.20	2.88	2.60	
HSL+ 645	597	13.06	8.87	6.66	5.37	4.56	3.94	3.45	3.10	2.80	12.81	8.79	6.60	5.37	4.52	3.91	3.45	3.10	2.80	
HSL+ 690	639	13.98	9.49	7.13	5.75	4.88	4.22	3.69	3.32	3.00	13.71	9.41	7.06	5.75	4.84	4.19	3.69	3.32	3.00	
HSL+ 735	682	14.92	10.14	7.62	6.14	5.21	4.51	3.95	3.54	3.19	14.63	10.04	7.54	6.14	5.16	4.47	3.94	3.54	3.19	
HSL+ 790	731	15.99	10.86	8.15	6.58	5.59	4.83	4.23	3.79	3.42	15.69	10.77	8.08	6.58	5.53	4.79	4.23	3.79	3.42	
HSL+ 830	768	16.80	11.41	8.56	6.91	5.87	5.07	4.44	3.98	3.59	16.48	11.31	8.49	6.91	5.81	5.03	4.44	3.98	3.59	
HSL+ 880	815	17.83	12.12	9.10	7.34	6.23	5.39	4.72	4.22	3.80	17.48	12.00	9.01	7.34	6.17	5.34	4.71	4.22	3.80	
HSL+ 920	853	18.66	12.68	9.52	7.68	6.52	5.64	4.94	4.42	3.98	18.30	12.56	9.43	7.68	6.46	5.59	4.93	4.42	3.98	
HSL+ 1020	944	20.65	14.01	10.53	8.50	7.21	6.24	5.47	4.90	4.41	20.25	13.90	10.44	8.50	7.14	6.18	5.46	4.90	4.41	
HSL+ 1110	1024	22.40	15.20	11.42	9.22	7.82	6.77	5.93	5.31	4.78	21.97	15.08	11.32	9.22	7.75	6.70	5.92	5.31	4.78	

Cell Type	End cell voltage = 1.18 V										End cell voltage = 1.20 V									
	C5 Ah	2 d	3 d	4 d	5 d	6 d	7 d	8 d	9 d	10 d	2 d	3 d	4 d	5 d	6 d	7 d	8 d	9 d	10 d	
	5hr 1.0V	48 h	72 h	96 h	120 h	144 h	168 h	192 h	216 h	240 h	48 h	72 h	96 h	120 h	144 h	168 h	192 h	216 h	240 h	
HSL+ 45	43	0.89	0.62	0.47	0.38	0.32	0.28	0.25	0.22	0.20	0.82	0.57	0.44	0.36	0.31	0.27	0.24	0.21	0.19	
HSL+ 90	85	1.75	1.22	0.93	0.76	0.64	0.55	0.48	0.43	0.39	1.61	1.13	0.86	0.71	0.61	0.53	0.47	0.42	0.38	
HSL+ 105	100	2.06	1.43	1.09	0.89	0.75	0.65	0.57	0.51	0.46	1.90	1.33	1.01	0.83	0.72	0.62	0.55	0.49	0.45	
HSL+ 140	128	2.64	1.83	1.40	1.14	0.96	0.83	0.73	0.65	0.59	2.43	1.71	1.29	1.07	0.92	0.79	0.70	0.63	0.57	
HSL+ 185	171	3.53	2.45	1.87	1.52	1.28	1.11	0.97	0.87	0.78	3.24	2.28	1.73	1.43	1.22	1.06	0.94	0.84	0.76	
HSL+ 230	213	4.39	3.05	2.33	1.90	1.60	1.38	1.21	1.09	0.98	4.04	2.84	2.15	1.78	1.52	1.32	1.16	1.05	0.95	
HSL+ 275	256	5.28	3.66	2.80	2.28	1.92	1.66	1.45	1.30	1.17	4.85	3.41	2.59	2.13	1.83	1.58	1.40	1.26	1.14	
HSL+ 320	300	6.19	4.29	3.28	2.68	2.25	1.95	1.71	1.53	1.38	5.69	4.00	3.03	2.50	2.15	1.86	1.64	1.47	1.33	
HSL+ 370	341	7.03	4.88	3.73	3.04	2.56	2.21	1.94	1.74	1.57	6.46	4.55	3.45	2.84	2.44	2.11	1.86	1.67	1.51	
HSL+ 415	384	7.92	5.49	4.20	3.42	2.88	2.49	2.18	1.96	1.77	7.28	5.12	3.88	3.20	2.75	2.38	2.10	1.88	1.70	
HSL+ 460	427	8.81	6.11	4.67	3.81	3.20	2.77	2.43	2.17	1.96	8.10	5.69	4.31	3.56	3.05	2.64	2.34	2.10	1.90	
HSL+ 505	469	9.67	6.71	5.13	4.18	3.52	3.04	2.67	2.39	2.16	8.89	6.25	4.74	3.91	3.35	2.90	2.56	2.30	2.08	
HSL+ 555	512	10.56	7.32	5.60	4.57	3.84	3.32	2.91	2.61	2.35	9.71	6.83	5.17	4.27	3.66	3.17	2.80	2.51	2.26	
HSL+ 600	554	11.42	7.92	6.06	4.94	4.16	3.59	3.15	2.82	2.54	10.50	7.39	5.60	4.62	3.96	3.43	3.03	2.72	2.45	
HSL+ 645	597	12.31	8.54	6.53	5.32	4.48	3.87	3.39	3.04	2.74	11.32	7.96	6.03	4.98	4.27	3.70	3.26	2.93	2.64	
HSL+ 690	639	13.18	9.14	6.99	5.69	4.80	4.14	3.63	3.25	2.93	12.12	8.52	6.45	5.33	4.57	3.96	3.49	3.14	2.83	
HSL+ 735	682	14.07	9.76	7.46	6.08	5.12	4.42	3.87	3.47	3.13	12.93	9.09	6.89	5.68	4.88	4.22	3.73	3.35	3.02	
HSL+ 790	731	15.08	10.46	8.00	6.52	5.48	4.74	4.15	3.72	3.35	13.86	9.75	7.39	6.09	5.23	4.52	4.00	3.59	3.24	
HSL+ 830	768	15.84	10.99	8.40	6.85	5.76	4.98	4.36	3.91	3.52	14.56	10.24	7.76	6.40	5.49	4.75	4.20	3.77	3.40	
HSL+ 880	815	16.81	11.66	8.91	7.27	6.11	5.28	4.62	4.15	3.74	15.45	10.86	8.24	6.79	5.83	5.04	4.45	4.00	3.61	
HSL+ 920	853	17.59	12.20	9.33	7.61	6.40	5.53	4.84	4.34	3.91	16.17	11.37	8.62	7.11	6.10	5.28	4.66	4.19	3.78	
HSL+ 1020	944	19.47	13.51	10.33	8.42	7.08	6.12	5.37	4.80	4.32	17.89	12.58	9.54	7.86	6.75	5.84	5.16	4.64	4.18	
HSL+ 1110	1024	21.12	14.65	11.20	9.13	7.68	6.64	5.83	5.21	4.69	19.41	13.65	10.35	8.53	7.32	6.34	5.60	5.03	4.53	



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