

# HSL+ Ni-Cd Batteries

Nickel Cadmium Pocket Plate Batteries





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 operates at widest temperature range.

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

### Applications

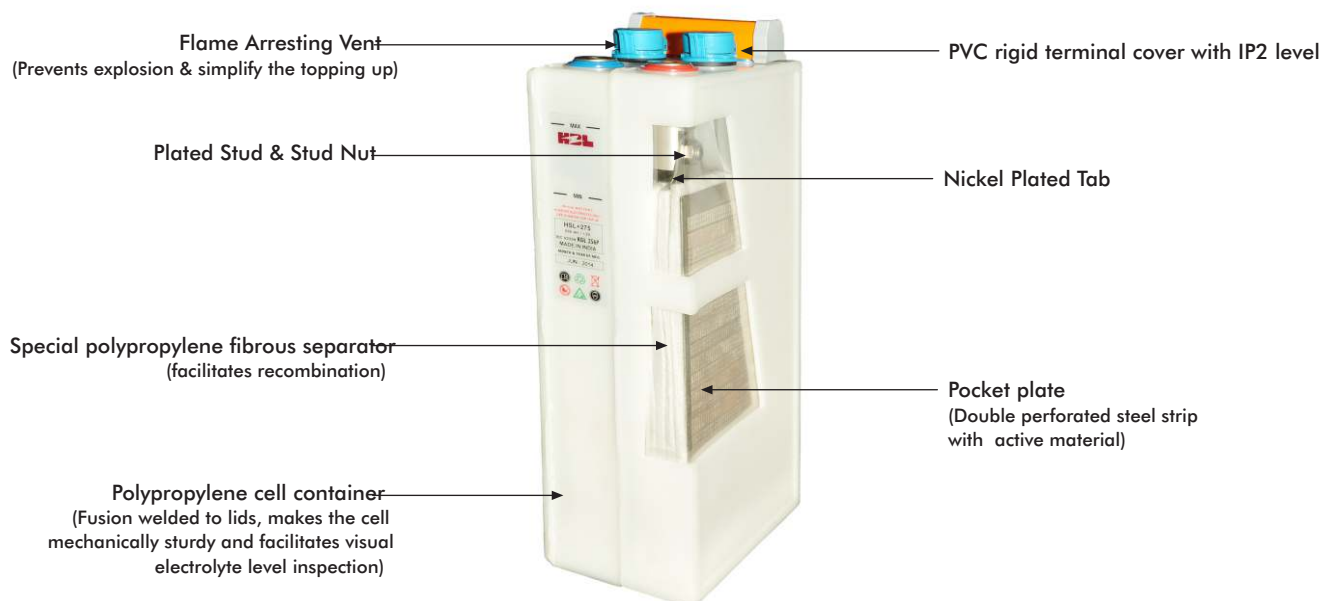
- Offshore
- Communications
- Railway signalings
- Oil and gas
- Emergency lighting
- Rural electrification

### 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

### Constructional Cut-view of HSL+ cell

The construction of HSL+ is based on conventional pocket plate technology by introducing special features to enhance the low water usage, giving extended service life & performance when operating even at high temperatures.





## HSL+ range Cell dimensions

Cell Type	Capacity		Cont. Size Ref.	Height (mm)	Width (mm)	Length per block										Weight (kg)
	C <sub>120</sub> 120 h 1.0 V Ah	C <sub>5</sub> 5h 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	B45-1	405	195			121	157	192	228	300	336	371	4.2	
HSL+ 90	90	85	B45-1	405	195			121	157	192	228	300	336	371	4.9	
HSL+ 105	105	100	B44-1	405	195			143	185	228	271	357	400		5.8	
HSL+ 140	140	128	B42A-1	405	195			175	227	281	334	441			7.2	
HSL+ 185	185	171	B42-1	405	195			193	253	312	372				8.4	
HSL+ 230	230	213	B41B-1	405	195		159	232	304	377					9.9	
HSL+ 275	275	256	B41-1	405	195		183	268	352	437					11.5	
HSL+ 320	320	300	B42A-2	405	195		228	336							15.1	
HSL+ 370	370	341	B42-2	405	195		252	372							16.8	
HSL+ 415	415	384	B41B-2	405	195	159	304								19.4	
HSL+ 460	460	427	B41B-2	405	195	159	304								19.8	
HSL+ 505	505	469	B41-2	405	195	183	352								22.4	
HSL+ 555	555	512	B41-2	405	195	183	352								23.0	
HSL+ 600	600	554	B41B-3	405	195	232									27.0	
HSL+ 645	645	597	B41B-3	405	195	232									29.0	
HSL+ 690	690	639	B41B-3	405	195	232									29.6	
HSL+ 735	735	682	B41-3	405	195	268									33.0	
HSL+ 790	790	731	B41-3	405	195	268									33.8	
HSL+ 830	830	768	B41-3	405	195	268									34.5	
HSL+ 880	880	815	B41B-4	405	195	304									37.0	
HSL+ 920	920	853	B41B-4	405	195	304									39.6	
HSL+ 1020	1020	944	B41-4	405	195	352									43.0	
HSL+ 1110	1110	1024	B41-4	405	195	352									46.0	

HSL+ complies with IEC 62259 standard.





**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									
	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		
	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	0.94	0.64	0.48	0.39	0.33	0.28	0.25	0.22	0.20	0.92	0.63	0.47	0.39	0.33	0.28	0.25	0.22	0.20		
HSL+ 90	1.86	1.26	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	2.19	1.49	1.11	0.90	0.76	0.66	0.58	0.52	0.47	2.15	1.47	1.10	0.90	0.76	0.65	0.59	0.52	0.47		
HSL+ 140	2.80	1.90	1.43	1.15	0.98	0.85	0.74	0.66	0.60	2.75	1.88	1.41	1.15	0.97	0.84	0.74	0.66	0.60		
HSL+ 185	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	4.66	3.17	2.37	1.92	1.63	1.41	1.23	1.10	0.99	4.57	3.14	2.35	1.92	1.61	1.39	1.23	1.10	0.99		
HSL+ 275	5.60	3.80	2.85	2.30	1.96	1.69	1.48	1.33	1.19	5.49	3.77	2.83	2.30	1.91	1.68	1.48	1.33	1.19		
HSL+ 320	6.56	4.46	3.34	2.70	2.29	1.98	1.73	1.56	1.40	6.44	4.42	3.31	2.70	2.27	1.96	1.73	1.56	1.40		
HSL+ 370	7.46	5.07	3.80	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	1.59		
HSL+ 415	8.40	5.71	4.28	3.46	2.93	2.54	2.22	1.99	1.79	8.24	5.65	4.24	3.46	2.91	2.51	2.22	1.99	1.79		
HSL+ 460	9.34	6.35	4.76	3.84	3.26	2.82	2.47	2.21	1.99	9.16	6.29	4.71	3.84	3.23	2.80	2.47	2.21	1.99		
HSL+ 505	10.26	6.97	5.23	4.22	3.58	3.10	2.71	2.43	2.19	10.06	6.90	5.18	4.22	3.55	3.07	2.71	2.43	2.19		
HSL+ 555	11.20	7.61	5.71	4.61	3.91	3.38	2.96	2.65	2.39	10.99	7.54	5.65	4.61	3.88	3.35	2.96	2.65	2.39		
HSL+ 600	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	13.06	8.87	6.65	5.37	4.56	3.94	3.45	3.10	2.79	12.81	8.79	6.59	5.37	4.52	3.91	3.45	3.10	2.79		
HSL+ 690	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	14.92	10.14	7.60	6.14	5.21	4.51	3.94	3.54	3.18	14.63	10.04	7.53	6.14	5.16	4.47	3.94	3.54	3.18		
HSL+ 790	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	16.80	11.41	8.56	6.91	5.87	5.07	4.44	3.98	3.58	16.48	11.31	8.48	6.91	5.81	5.03	4.44	3.98	3.58		
HSL+ 880	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	18.66	12.68	9.51	7.68	6.52	5.64	4.93	4.42	3.98	18.30	12.56	9.42	7.68	6.46	5.59	4.93	4.42	3.98		
HSL+ 1020	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	22.40	15.52	11.41	9.22	7.82	6.77	5.92	5.31	4.78	21.97	15.08	11.31	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									
	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		
	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	0.89	0.62	0.47	0.38	0.32	0.28	0.24	0.22	0.20	0.82	0.57	0.43	0.36	0.31	0.27	0.24	0.21	0.19		
HSL+ 90	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	0.46	0.42	0.38		
HSL+ 105	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	0.44		
HSL+ 140	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	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	4.39	3.05	2.33	1.90	1.60	1.38	1.21	1.08	0.98	4.04	2.84	2.15	1.78	1.52	1.32	1.16	1.05	0.94		
HSL+ 275	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	1.13		
HSL+ 320	6.19	4.29	3.28	2.68	2.25	1.95	1.70	1.53	1.38	5.69	4.00	3.03	2.50	2.15	1.86	1.64	1.47	1.33		
HSL+ 370	7.03	4.88	3.73	3.04	2.56	2.21	1.94	1.74	1.56	6.46	4.55	3.45	2.84	2.44	2.11	1.86	1.67	1.51		
HSL+ 415	7.92	5.49	4.20	3.42	2.88	2.49	2.18	1.96	1.76	7.28	5.12	3.88	3.20	2.75	2.38	2.10	1.88	1.70		
HSL+ 460	8.81	6.11	4.67	3.81	3.20	2.77	2.42	2.17	1.96	8.10	5.69	4.31	3.56	3.05	2.64	2.34	2.10	1.89		
HSL+ 505	9.67	6.71	5.13	4.18	3.52	3.04	2.66	2.39	2.15	8.89	6.25	4.74	3.91	3.35	2.90	2.56	2.30	2.07		
HSL+ 555	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	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	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	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	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	3.01		
HSL+ 790	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	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	3.39		
HSL+ 880	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	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	3.77		
HSL+ 1020	19.47	13.51	10.33	8.42	7.08	6.12	5.37	4.80	4.32	17.89	12.54	9.54	7.86	6.75	5.84	5.16	4.64	4.18		
HSL+ 1110	21.12	14.65	11.20	9.13	7.68	6.64	5.81	5.21	4.69	19.41	13.65	10.35	8.53	7.32	6.34	5.60	5.03	4.52		

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