

# HSL + Ni-Cd Batteries

Nickel  
Cadmium  
Pocket Plate  
Batteries



**HBL**<sup>®</sup>

# High Reliability HSL+ Ni-Cd Batteries for Standby Applications

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.

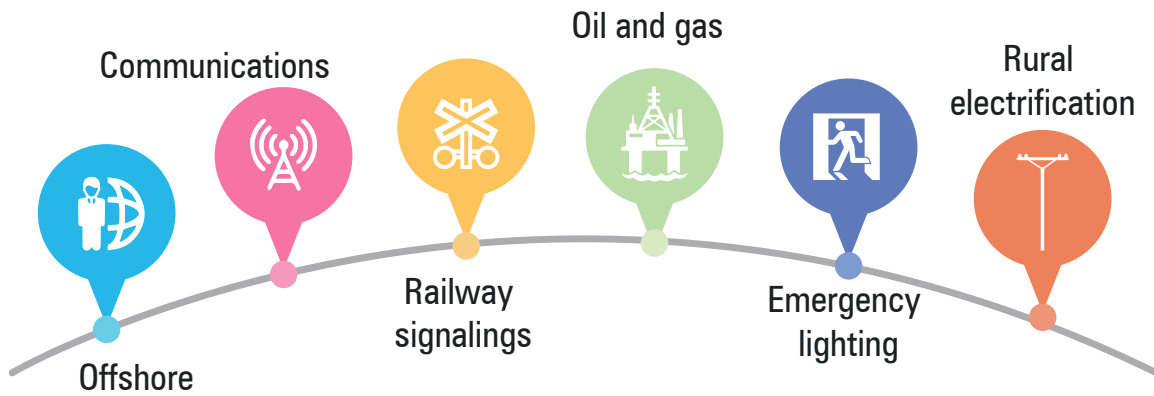
HSL+ range is designed to comply with IEC 62259 and certified by Intertek

## Constructional Cut-view of HSL+ cell

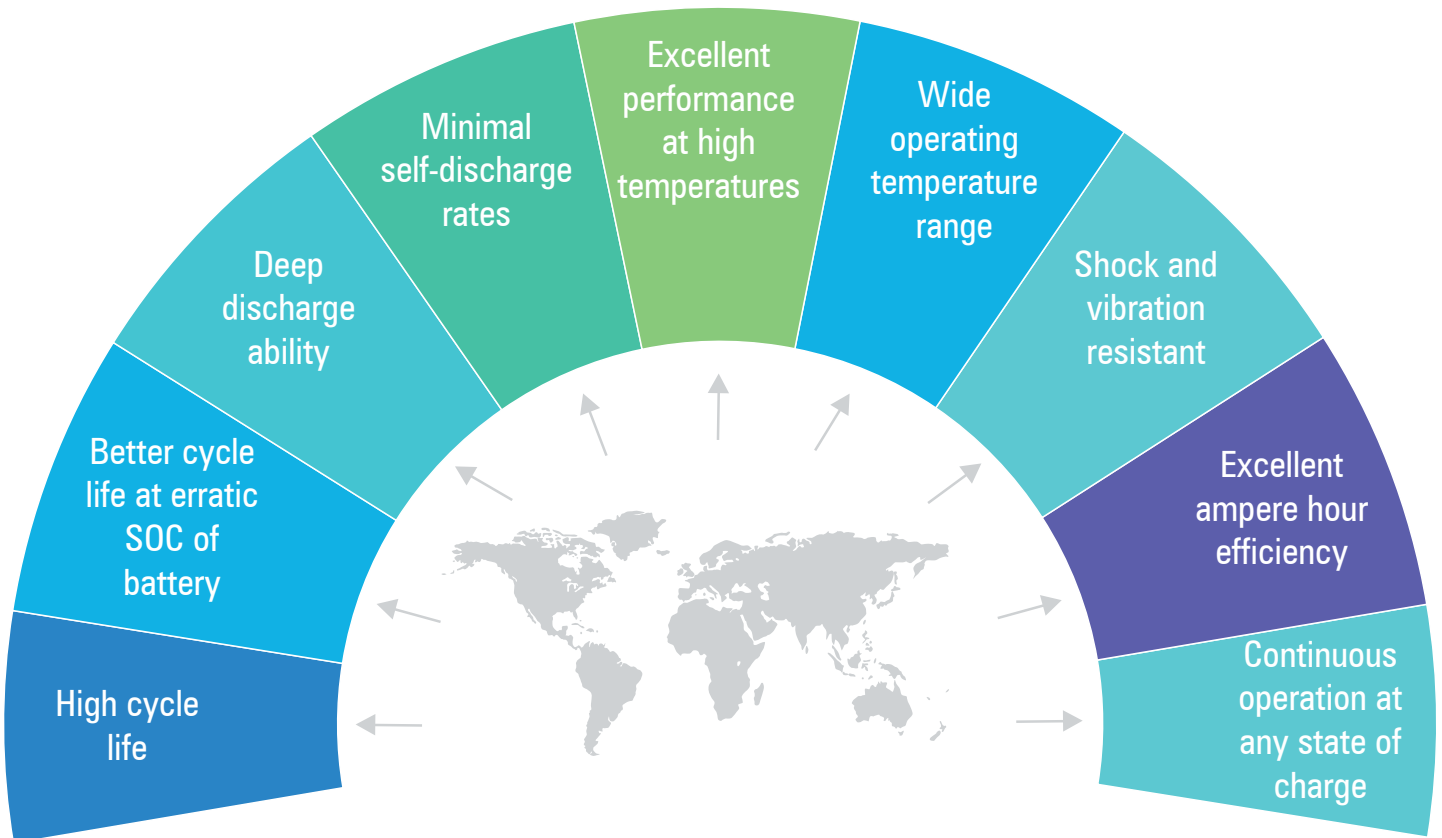
The construction of HSL+ is based on conventional pocket plate technology by introducing special features to enhance the low water usage, giving extended service life & performance when operating even at high temperatures.



## Applications



## Superior Features of HSL+





# Electrical Data

Cell Type	Capacity		Performance data in Amps @End cell voltage = 1.14 V								
	C120 Ah	C5 Ah	2d	3d	4d	5d	6d	7d	8d	9d	10d
	1.0 V	1.0 V	48 h	72 h	96 h	120 h	144 h	168 h	192 h	216 h	240 h
			48	72	96	120	144	168	192	216	240
HSL+ 45	45	43	0.92	0.62	0.47	0.38	0.32	0.28	0.24	0.22	0.20
HSL+ 90	90	85	1.83	1.24	0.93	0.75	0.64	0.55	0.48	0.43	0.39
HSL+ 105	105	100	2.14	1.45	1.09	0.88	0.75	0.64	0.56	0.51	0.46
HSL+ 140	140	128	2.85	1.94	1.45	1.17	0.99	0.86	0.75	0.67	0.61
HSL+ 160	160	148	3.25	2.21	1.66	1.34	1.14	0.98	0.86	0.77	0.69
HSL+ 185	185	171	3.76	2.56	1.92	1.55	1.31	1.14	1.00	0.89	0.80
HSL+ 230	230	213	4.68	3.18	2.38	1.93	1.63	1.41	1.24	1.11	1.00
HSL+ 275	275	256	5.59	3.80	2.85	2.30	1.95	1.69	1.48	1.32	1.19
HSL+ 320	320	300	6.51	4.43	3.32	2.68	2.27	1.96	1.72	1.54	1.39
HSL+ 370	370	341	7.53	5.12	3.83	3.10	2.63	2.27	1.99	1.78	1.61
HSL+ 415	415	384	8.44	5.74	4.30	3.48	2.95	2.55	2.23	2.00	1.80
HSL+ 460	460	427	9.36	6.36	4.77	3.85	3.27	2.82	2.47	2.21	2.00
HSL+ 505	505	469	10.3	6.99	5.23	4.23	3.59	3.10	2.72	2.43	2.19
HSL+ 555	555	512	11.3	7.68	5.75	4.65	3.94	3.41	2.99	2.67	2.41
HSL+ 600	600	554	12.2	8.30	6.22	5.03	4.26	3.68	3.23	2.89	2.60
HSL+ 645	645	597	13.1	8.92	6.69	5.40	4.58	3.96	3.47	3.11	2.80
HSL+ 690	690	639	14.0	9.54	7.15	5.78	4.90	4.24	3.71	3.32	3.00
HSL+ 735	735	682	15.0	10.2	7.62	6.16	5.22	4.51	3.95	3.54	3.19
HSL+ 790	790	731	16.1	10.9	8.19	6.62	5.61	4.85	4.25	3.80	3.43
HSL+ 830	830	768	16.9	11.5	8.60	6.95	5.90	5.09	4.46	4.00	3.60
HSL+ 880	880	815	17.9	12.2	9.12	7.37	6.25	5.40	4.73	4.24	3.82
HSL+ 920	920	853	18.7	12.7	9.54	7.71	6.54	5.65	4.95	4.43	3.99
HSL+ 1020	1020	944	20.7	14.1	10.6	8.54	7.25	6.26	5.49	4.91	4.43
HSL+ 1060	1060	978	21.6	14.7	11.0	8.88	7.53	6.51	5.70	5.10	4.60
HSL+ 1110	1110	1024	22.6	15.4	11.5	9.30	7.89	6.81	5.97	5.34	4.82
HSL+ 1165	1165	1075	23.7	16.1	12.1	9.76	8.28	7.15	6.27	5.61	5.06
HSL+ 1210	1210	1115	24.6	16.7	12.5	10.1	8.60	7.43	6.51	5.83	5.25
HSL+ 1275	1275	1175	25.9	17.6	13.2	10.7	9.06	7.83	6.86	6.14	5.53
HSL+ 1325	1325	1220	27.0	18.3	13.7	11.1	9.42	8.13	7.13	6.38	5.75
HSL+ 1375	1375	1265	28.0	19.0	14.3	11.5	9.77	8.44	7.40	6.62	5.97
HSL+ 1395	1395	1280	28.4	19.3	14.5	11.7	9.91	8.56	7.50	6.72	6.06
HSL+ 1465	1465	1345	29.8	20.3	15.2	12.3	10.4	8.99	7.88	7.05	6.36
HSL+ 1515	1515	1395	30.8	21.0	15.7	12.7	10.8	9.30	8.15	7.29	6.58
HSL+ 1575	1575	1455	32.0	21.8	16.3	13.2	11.2	9.67	8.47	7.58	6.84
HSL+ 1625	1625	1505	33.1	22.5	16.8	13.6	11.5	9.98	8.74	7.82	7.05
HSL+ 1655	1655	1536	33.7	22.9	17.2	13.9	11.8	10.2	8.90	7.97	7.18
HSL+ 1710	1710	1590	34.8	23.7	17.7	14.3	12.2	10.5	9.20	8.23	7.42
HSL+ 1770	1770	1645	36.0	24.5	18.3	14.8	12.6	10.9	9.52	8.52	7.68
HSL+ 1810	1810	1680	36.8	25.0	18.8	15.2	12.9	11.1	9.74	8.71	7.86

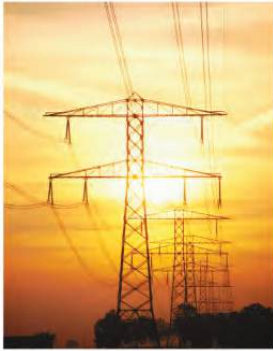
# Electrical Data

Cell Type	Capacity		Performance data in Amps @End cell voltage = 1.16 V									
	C120 Ah	C5 Ah	2d	3d	4d	5d	6d	7d	8d	9d	10d	
	1.0 V	1.0 V	48 h	72 h	96 h	120 h	144 h	168 h	192 h	216 h	240 h	
HSL+ 45	45	43	0.90	0.62	0.46	0.38	0.32	0.27	0.24	0.22	0.20	
HSL+ 90	90	85	1.80	1.23	0.92	0.75	0.63	0.55	0.48	0.43	0.39	
HSL+ 105	105	100	2.10	1.44	1.08	0.88	0.74	0.64	0.56	0.51	0.46	
HSL+ 140	140	128	2.79	1.92	1.44	1.17	0.99	0.85	0.75	0.67	0.61	
HSL+ 160	160	148	3.19	2.19	1.64	1.34	1.13	0.97	0.86	0.77	0.69	
HSL+ 185	185	171	3.69	2.53	1.90	1.55	1.30	1.13	1.00	0.89	0.80	
HSL+ 230	230	213	4.59	3.15	2.36	1.93	1.62	1.40	1.24	1.11	1.00	
HSL+ 275	275	256	5.49	3.76	2.82	2.30	1.94	1.67	1.48	1.32	1.19	
HSL+ 320	320	300	6.39	4.38	3.28	2.68	2.25	1.95	1.72	1.54	1.39	
HSL+ 370	370	341	7.38	5.06	3.80	3.10	2.61	2.25	1.99	1.78	1.61	
HSL+ 415	415	384	8.28	5.68	4.26	3.48	2.92	2.53	2.23	2.00	1.80	
HSL+ 460	460	427	9.18	6.30	4.72	3.85	3.24	2.80	2.47	2.21	2.00	
HSL+ 505	505	469	10.1	6.91	5.18	4.23	3.56	3.07	2.72	2.43	2.19	
HSL+ 555	555	512	11.1	7.60	5.69	4.65	3.91	3.38	2.99	2.67	2.41	
HSL+ 600	600	554	12.0	8.21	6.15	5.03	4.23	3.65	3.23	2.89	2.60	
HSL+ 645	645	597	12.9	8.83	6.62	5.40	4.54	3.93	3.47	3.11	2.80	
HSL+ 690	690	639	13.8	9.44	7.08	5.78	4.86	4.20	3.71	3.32	3.00	
HSL+ 735	735	682	14.7	10.1	7.54	6.16	5.18	4.47	3.95	3.54	3.19	
HSL+ 790	790	731	15.8	10.8	8.10	6.62	5.57	4.81	4.25	3.80	3.43	
HSL+ 830	830	768	16.6	11.4	8.51	6.95	5.85	5.05	4.46	4.00	3.60	
HSL+ 880	880	815	17.6	12.0	9.03	7.37	6.20	5.36	4.73	4.24	3.82	
HSL+ 920	920	853	18.4	12.6	9.44	7.71	6.48	5.60	4.95	4.43	3.99	
HSL+ 1020	1020	944	20.4	14.0	10.5	8.54	7.19	6.21	5.49	4.91	4.43	
HSL+ 1060	1060	978	21.2	14.5	10.9	8.88	7.47	6.45	5.70	5.10	4.60	
HSL+ 1110	1110	1024	22.2	15.2	11.4	9.30	7.82	6.76	5.97	5.34	4.82	
HSL+ 1165	1165	1075	23.3	15.9	12.0	9.76	8.21	7.09	6.27	5.61	5.06	
HSL+ 1210	1210	1115	24.1	16.6	12.4	10.1	8.52	7.36	6.51	5.83	5.25	
HSL+ 1275	1275	1175	25.4	17.5	13.1	10.7	8.98	7.76	6.86	6.14	5.53	
HSL+ 1325	1325	1220	26.4	18.1	13.6	11.1	9.33	8.06	7.13	6.38	5.75	
HSL+ 1375	1375	1265	27.4	18.8	14.1	11.5	9.69	8.37	7.40	6.62	5.97	
HSL+ 1395	1395	1280	27.8	19.1	14.3	11.7	9.83	8.49	7.50	6.72	6.06	
HSL+ 1465	1465	1345	29.2	20.1	15.0	12.3	10.3	8.92	7.88	7.05	6.36	
HSL+ 1515	1515	1395	30.2	20.7	15.5	12.7	10.7	9.22	8.15	7.29	6.58	
HSL+ 1575	1575	1455	31.4	21.6	16.2	13.2	11.1	9.59	8.47	7.58	6.84	
HSL+ 1625	1625	1505	32.4	22.2	16.7	13.6	11.4	9.89	8.74	7.82	7.05	
HSL+ 1655	1655	1536	33.0	22.7	17.0	13.9	11.7	10.1	8.90	7.97	7.18	
HSL+ 1710	1710	1590	34.1	23.4	17.5	14.3	12.0	10.4	9.20	8.23	7.42	
HSL+ 1770	1770	1645	35.3	24.2	18.2	14.8	12.5	10.8	9.52	8.52	7.68	
HSL+ 1810	1810	1680	36.1	24.8	18.6	15.2	12.8	11.0	9.74	8.71	7.86	

Cell Type	Capacity		Performance data in Amps @End cell voltage = 1.18 V									
	C120 Ah	C5 Ah	2d	3d	4d	5d	6d	7d	8d	9d	10d	
	1.0 V	1.0 V	48 h	72 h	96 h	120 h	144 h	168 h	192 h	216 h	240 h	
HSL+ 45	45	43	0.86	0.60	0.46	0.37	0.31	0.27	0.24	0.21	0.19	
HSL+ 90	90	85	1.73	1.20	0.92	0.75	0.63	0.54	0.47	0.43	0.38	
HSL+ 105	105	100	2.01	1.40	1.07	0.87	0.73	0.63	0.55	0.50	0.45	
HSL+ 140	140	128	2.69	1.86	1.42	1.16	0.98	0.84	0.74	0.66	0.60	
HSL+ 160	160	148	3.07	2.13	1.63	1.33	1.12	0.96	0.84	0.76	0.68	
HSL+ 185	185	171	3.55	2.46	1.88	1.53	1.29	1.12	0.98	0.88	0.79	
HSL+ 230	230	213	4.41	3.06	2.34	1.91	1.60	1.39	1.21	1.09	0.98	
HSL+ 275	275	256	5.28	3.66	2.80	2.28	1.92	1.66	1.45	1.30	1.17	
HSL+ 320	320	300	6.14	4.26	3.25	2.65	2.23	1.93	1.69	1.51	1.37	
HSL+ 370	370	341	7.10	4.93	3.76	3.07	2.58	2.23	1.95	1.75	1.58	
HSL+ 415	415	384	7.96	5.52	4.22	3.44	2.89	2.50	2.19	1.96	1.77	
HSL+ 460	460	427	8.82	6.12	4.68	3.81	3.21	2.77	2.43	2.18	1.96	
HSL+ 505	505	469	9.69	6.72	5.13	4.19	3.52	3.05	2.66	2.39	2.16	
HSL+ 555	555	512	10.6	7.39	5.64	4.60	3.87	3.35	2.93	2.63	2.37	
HSL+ 600	600	554	11.5	7.99	6.10	4.97	4.18	3.62	3.16	2.84	2.56	
HSL+ 645	645	597	12.4	8.59	6.56	5.35	4.50	3.89	3.40	3.05	2.75	
HSL+ 690	690	639	13.2	9.18	7.02	5.72	4.81	4.16	3.64	3.26	2.95	
HSL+ 735	735	682	14.1	9.78	7.47	6.09	5.13	4.43	3.88	3.48	3.14	
HSL+ 790	790	731	15.2	10.5	8.03	6.55	5.51	4.76	4.17	3.74	3.37	
HSL+ 830	830	768	15.9	11.0	8.44	6.88	5.79	5.01	4.38	3.93	3.54	
HSL+ 880	880	815	16.9	11.7	8.95	7.29	6.14	5.31	4.64	4.16	3.76	
HSL+ 920	920	853	17.6	12.2	9.35	7.62	6.42	5.55	4.85	4.35	3.93	
HSL+ 1020	1020	944	19.6	13.6	10.4	8.45	7.11	6.15	5.38	4.83	4.35	
HSL+ 1060	1060	978	20.3	14.1	10.8	8.79	7.39	6.39	5.59	5.02	4.53	
HSL+ 1110	1110	1024	21.3	14.8	11.3	9.20	7.74	6.69	5.85	5.25	4.74	
HSL+ 1165	1165	1075	22.3	15.5	11.8	9.66	8.13	7.03	6.14	5.51	4.97	
HSL+ 1210	1210	1115	23.2	16.1	12.3	10.0	8.44	7.30	6.38	5.73	5.17	
HSL+ 1275	1275	1175	24.5	17.0	13.0	10.6	8.89	7.69	6.72	6.03	5.44	
HSL+ 1325	1325	1220	25.4	17.6	13.5	11.0	9.24	7.99	6.99	6.27	5.66	
HSL+ 1375	1375	1265	26.4	18.3	14.0	11.4	9.59	8.29	7.25	6.51	5.87	
HSL+ 1395	1395	1280	26.8	18.6	14.2	11.6	9.73	8.41	7.36	6.60	5.96	
HSL+ 1465	1465	1345	28.1	19.5	14.9	12.1	10.2	8.83	7.73	6.93	6.25	
HSL+ 1515	1515	1395	29.1	20.2	15.4	12.6	10.6	9.14	7.99	7.17	6.47	
HSL+ 1575	1575	1455	30.2	21.0	16.0	13.1	11.0	9.50	8.31	7.45	6.72	
HSL+ 1625	1625	1505	31.2	21.6	16.5	13.5	11.3	9.80	8.57	7.69	6.94	
HSL+ 1655	1655	1536	31.7	22.0	16.8	13.7	11.5	9.98	8.73	7.83	7.07	
HSL+ 1710	1710	1590	32.8	22.8	17.4	14.2	11.9	10.3	9.02	8.09	7.30	
HSL+ 1770	1770	1645	34.0	23.6	18.0	14.7	12.3	10.7	9.34	8.38	7.56	
HSL+ 1810	1810	1680	34.7	24.1	18.4	15.0	12.6	10.9	9.55	8.56	7.73	

# Electrical Data

Cell Type	Capacity		Performance data in Amps @End cell voltage = 1.20 V								
	C120 Ah	C5 Ah	2d	3d	4d	5d	6d	7d	8d	9d	10d
	1.0 V	1.0 V	48 h	72 h	96 h	120 h	144 h	168 h	192 h	216 h	240 h
			48	72	96	120	144	168	192	216	240
HSL+ 45	45	43	0.79	0.56	0.42	0.35	0.30	0.26	0.23	0.21	0.19
HSL+ 90	90	85	1.59	1.12	0.85	0.70	0.60	0.52	0.46	0.41	0.37
HSL+ 105	105	100	1.85	1.30	0.99	0.81	0.70	0.60	0.53	0.48	0.43
HSL+ 140	140	128	2.47	1.74	1.31	1.09	0.93	0.81	0.71	0.64	0.58
HSL+ 160	160	148	2.82	1.98	1.50	1.24	1.07	0.92	0.81	0.73	0.66
HSL+ 185	185	171	3.26	2.29	1.74	1.43	1.23	1.07	0.94	0.84	0.76
HSL+ 230	230	213	4.06	2.85	2.16	1.78	1.53	1.33	1.17	1.05	0.95
HSL+ 275	275	256	4.85	3.41	2.58	2.13	1.83	1.58	1.40	1.26	1.13
HSL+ 320	320	300	5.64	3.97	3.01	2.48	2.13	1.84	1.63	1.46	1.32
HSL+ 370	370	341	6.53	4.59	3.47	2.87	2.46	2.13	1.88	1.69	1.52
HSL+ 415	415	384	7.32	5.14	3.90	3.22	2.76	2.39	2.11	1.89	1.71
HSL+ 460	460	427	8.11	5.70	4.32	3.57	3.06	2.65	2.34	2.10	1.89
HSL+ 505	505	469	8.91	6.26	4.74	3.92	3.36	2.91	2.57	2.31	2.08
HSL+ 555	555	512	9.8	6.88	5.21	4.30	3.70	3.20	2.82	2.53	2.28
HSL+ 600	600	554	10.6	7.44	5.64	4.65	4.00	3.46	3.05	2.74	2.47
HSL+ 645	645	597	11.4	8.00	6.06	5.00	4.30	3.72	3.28	2.94	2.65
HSL+ 690	690	639	12.2	8.55	6.48	5.35	4.60	3.98	3.51	3.15	2.84
HSL+ 735	735	682	13.0	9.11	6.90	5.70	4.90	4.23	3.74	3.36	3.02
HSL+ 790	790	731	13.9	9.8	7.42	6.13	5.26	4.55	4.02	3.61	3.25
HSL+ 830	830	768	14.6	10.3	7.80	6.44	5.53	4.78	4.22	3.79	3.41
HSL+ 880	880	815	15.5	10.9	8.26	6.82	5.86	5.07	4.48	4.02	3.62
HSL+ 920	920	853	16.2	11.4	8.64	7.13	6.13	5.30	4.68	4.20	3.79
HSL+ 1020	1020	944	18.0	12.6	9.6	7.91	6.79	5.88	5.19	4.66	4.20
HSL+ 1060	1060	978	18.7	13.1	10.0	8.22	7.06	6.11	5.39	4.84	4.36
HSL+ 1110	1110	1024	19.6	13.8	10.4	8.61	7.39	6.39	5.65	5.07	4.57
HSL+ 1165	1165	1075	20.5	14.4	10.9	9.03	7.76	6.71	5.93	5.32	4.79
HSL+ 1210	1210	1115	21.3	15.0	11.4	9.4	8.06	6.97	6.16	5.52	4.98
HSL+ 1275	1275	1175	22.5	15.8	12.0	9.9	8.49	7.35	6.49	5.82	5.25
HSL+ 1325	1325	1220	23.4	16.4	12.4	10.3	8.82	7.63	6.74	6.05	5.45
HSL+ 1375	1375	1265	24.2	17.0	12.9	10.7	9.16	7.92	7.00	6.28	5.66
HSL+ 1395	1395	1280	24.6	17.3	13.1	10.8	9.29	8.04	7.10	6.37	5.74
HSL+ 1465	1465	1345	25.8	18.2	13.8	11.4	9.8	8.44	7.45	6.69	6.03
HSL+ 1515	1515	1395	26.7	18.8	14.2	11.7	10.1	8.73	7.71	6.92	6.23
HSL+ 1575	1575	1455	27.8	19.5	14.8	12.2	10.5	9.07	8.01	7.19	6.48
HSL+ 1625	1625	1505	28.7	20.1	15.3	12.6	10.8	9.36	8.27	7.42	6.69
HSL+ 1655	1655	1536	29.2	20.5	15.5	12.8	11.0	9.53	8.42	7.56	6.81
HSL+ 1710	1710	1590	30.2	21.2	16.1	13.3	11.4	9.9	8.70	7.81	7.04
HSL+ 1770	1770	1645	31.2	21.9	16.6	13.7	11.8	10.2	9.01	8.08	7.28
HSL+ 1810	1810	1680	31.9	22.4	17.0	14.0	12.1	10.4	9.21	8.26	7.45



# **HBL**<sup>®</sup>

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