

# KSH

## Nickel Cadmium Sintered Plastic Bonded Batteries



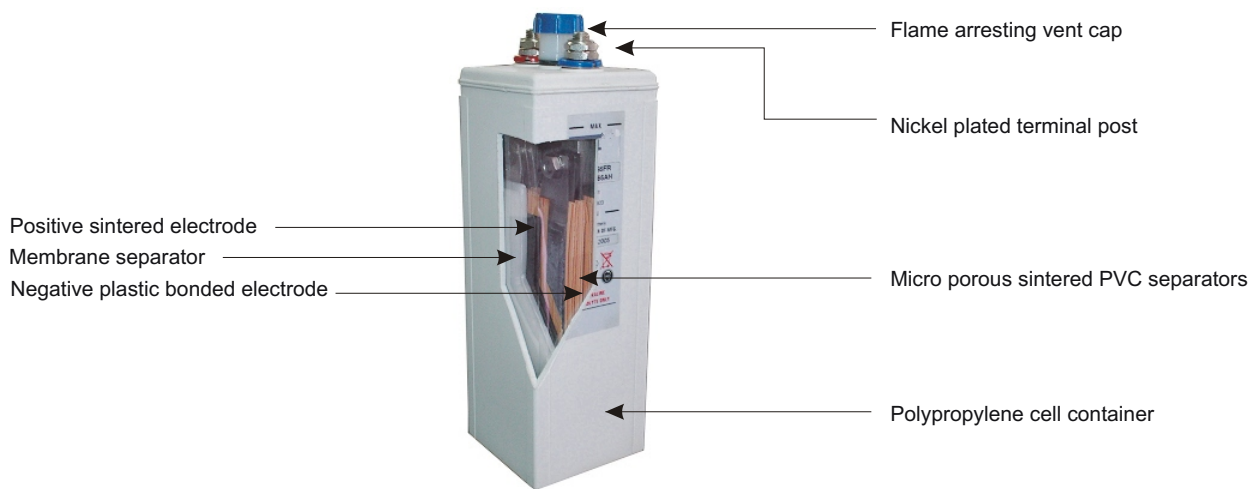
**Dimensional and Electrical Data**



Nickel cadmium KSH range of batteries for high power industrial applications are specially designed using sintered positive plates and plastic bonded negative plates.

The sintered positive plates are manufactured using a high-temperature sintering process to form plates which are strong and porous. The plastic bonded negative plates are specially designed with high power density and have reduced water consumption. The sintered micro-porous separators and membrane separators provide insulation between the plates and permits free flow of electrolyte.

## Construction



These batteries use polypropylene cell containers in single cell construction with thermally welded lids for high impact resistance. Flame retardant containers and lids are optional. Copper terminals and fasteners give these batteries the ruggedness required to meet the demanding application needs.

## Benefits

- ▶ Excellent high rate performance to suit application requirements
- ▶ Compact and light weight
- ▶ Performs reliably at extreme temperatures (+40° to -20°C)
- ▶ Reduced maintenance requirements
- ▶ Low ownership cost when considered over its lifetime
- ▶ Long life (greater than 20 years)
- ▶ Reliable construction (no risk of sudden death)
- ▶ Can withstand extreme temperatures without damage (from +70°C to -50°C)
- ▶ High resistance to electrical abuse
- ▶ Fast recharge capability
- ▶ Absence of corrosive fumes

## Standards

These batteries conform to the following international standards:

- ▶ IEC 60623
- ▶ BS 6260

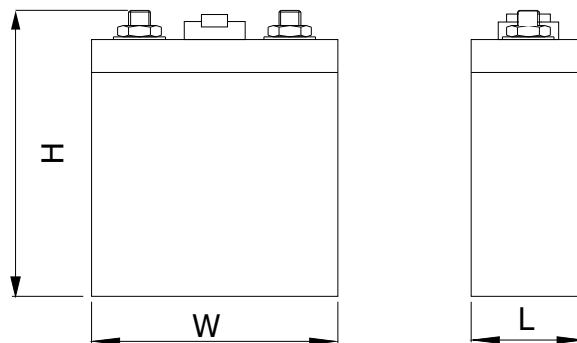
## Applications

- ▶ Engine starting
- ▶ UPS
- ▶ Switchgear
- ▶ Other critical applications



## Dimensions and Weight

Type	Rated Capacity (C <sub>5</sub> Ah)	Dimensions (mm)			Weight per cell (kgs)	Electrolyte reserve (CC)
		L	W	H		
KSH 11	11	46	86	196	1.0	66
KSH 16	16	46	86	276	1.5	160
KSH 21	21	46	86	276	1.6	160
KSH 24	24	46	86	276	1.7	160
KSH 28	28	61	86	276	2.0	215
KSH 36	36	86	86	276	2.7	325
KSH 45	45	86	86	276	2.9	315
KSH 52	52	86	86	276	2.9	315
KSH 60	60	86	86	306	3.4	405
KSH 70	70	86	86	306	3.5	405
KSH 80	80	86	86	306	3.5	390
KSH 90	90	78	166	339	5.8	750
KSH 100	100	78	166	339	6.1	735
KSH 115	115	78	166	339	6.3	720
KSH 130	130	87	166	339	7.0	815
KSH 150	150	103	166	339	8.2	990
KSH 170	170	117	166	339	9.7	1135
KSH 190	190	117	166	339	10.0	1115
KSH 220	220	202	166	339	14.7	2155
KSH 250	250	202	166	339	15.3	2120
KSH 280	280	202	166	339	15.8	2080
KSH 300	300	202	166	339	16.1	2060
KSH 320	320	202	166	339	16.5	2030



# Electrical Performance

## Discharge data in Amperes for a fully charged cell

End Voltage: 1.14 V / cell

Type	Rated Capacity (C5 Ah)	Hours						Minutes						Seconds		
		8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
KSH 11	11	1.3	2.1	3.4	5.1	6.5	8.7	15.3	18.6	21.0	24.0	27.9	37.7	43.4	54.4	60.7
KSH 16	16	2.0	3.1	4.9	7.3	9.5	12.6	22.2	27.0	30.6	34.9	40.5	54.8	63.1	79.2	88.4
KSH 21	21	2.6	4.1	6.6	9.6	12.4	16.7	29.2	35.5	40.2	45.9	53.1	71.9	82.9	104	116
KSH 24	24	2.9	4.6	7.5	11.0	14.1	19.0	33.3	40.5	45.9	52.4	60.7	82.2	94.7	119	132
KSH 28	28	3.4	5.4	8.7	12.8	16.6	22.1	38.9	47.3	53.5	61.1	70.8	96.0	110	138	155
KSH 36	36	4.4	6.9	11.2	16.5	21.3	28.5	50.0	60.7	68.9	78.6	91.1	123	142	178	199
KSH 45	45	5.6	8.7	14.0	20.6	26.6	35.7	62.5	75.9	86.1	98.3	114	155	178	223	248
KSH 52	52	6.5	10.0	16.2	23.7	30.7	41.1	72.2	87.7	99.5	113	131	178	205	258	287
KSH 60	60	7.5	11.6	18.7	27.4	35.5	47.5	78.5	92.5	102	118	137	198	230	284	312
KSH 70	70	8.7	13.5	21.8	32.0	41.3	55.3	91.6	108	119	132	148	231	269	332	364
KSH 80	80	9.9	15.4	24.9	36.6	47.3	63.3	105	123	135	152	170	264	307	379	417
KSH 90	90	11.1	17.4	28.1	41.1	53.1	71.2	106	125	136	159	194	297	345	426	469
KSH 100	100	12.4	19.3	31.2	45.7	59.1	79.1	113	134	153	177	215	330	384	474	521
KSH 115	115	14.2	22.2	35.9	52.5	68.0	91.0	129	155	175	203	247	380	441	544	599
KSH 130	130	16.1	25.1	40.5	59.4	76.8	103	146	175	198	229	280	429	499	615	677
KSH 150	150	18.6	29.0	46.8	68.6	88.6	119	170	201	228	265	323	495	575	710	782
KSH 170	170	21.0	32.8	53.0	77.7	100	134	192	228	259	300	366	561	651	805	886
KSH 190	190	23.5	36.7	59.2	86.9	112	150	214	255	289	335	409	627	728	899	990
KSH 220	220	27.3	42.5	68.6	100	130	174	248	295	334	388	474	726	843	1040	1140
KSH 250	250	30.9	48.3	78.0	114	147	198	282	335	380	440	538	825	958	1180	1300
KSH 280	280	34.6	54.1	87.3	128	166	221	316	376	425	494	602	924	1070	1320	1450
KSH 300	300	37.2	57.9	93.5	137	177	237	338	403	456	528	645	990	1150	1420	1570
KSH 320	320	39.6	61.8	99.8	146	189	254	361	429	487	564	689	1060	1220	1510	1670

End Voltage: 1.10 V / cell

Type	Rated Capacity (C5 Ah)	Hours						Minutes						Seconds		
		8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
KSH 11	11	1.4	2.1	3.5	5.4	7.0	10.0	17.8	22.7	26.1	30.1	35.2	45.6	52.1	64.6	72.0
KSH 16	16	2.0	3.1	5.3	7.7	10.1	14.5	25.8	33.1	37.9	43.7	51.2	66.3	75.9	94.0	105
KSH 21	21	2.6	4.1	6.9	10.1	13.3	19.1	33.8	43.4	49.7	57.4	67.3	86.9	100	123	137
KSH 24	24	3.0	4.7	7.8	11.6	15.2	21.8	38.7	49.6	56.8	65.7	76.9	99.3	114	141	158
KSH 28	28	3.5	5.5	9.1	13.5	17.8	25.5	45.1	57.9	66.3	76.6	89.6	116	132	165	184
KSH 36	36	4.5	7.1	11.7	17.4	22.8	32.7	58.0	74.4	85.1	98.4	115	149	171	212	235
KSH 45	45	5.7	8.8	14.6	21.7	28.5	40.9	72.5	93.0	106	123	144	186	213	265	295
KSH 52	52	6.6	10.2	16.9	25.0	32.9	47.3	83.8	108	123	142	167	215	246	306	340
KSH 60	60	7.6	11.8	19.5	28.9	38.0	54.5	93.5	116	129	148	176	238	275	337	364
KSH 70	70	8.8	13.7	22.7	33.7	44.3	63.6	109	135	152	168	191	277	321	394	424
KSH 80	80	10.0	15.7	26.1	38.6	50.7	72.7	125	155	173	192	218	317	367	450	485
KSH 90	90	11.3	17.6	29.3	43.4	57.0	81.8	128	156	176	202	245	357	413	506	545
KSH 100	100	12.5	19.6	32.5	48.2	63.3	90.9	143	173	195	224	273	397	459	562	606
KSH 115	115	14.4	22.5	37.4	55.4	72.8	105	165	199	224	259	314	456	527	646	697
KSH 130	130	16.3	25.5	42.3	62.7	82.3	118	186	225	254	292	355	515	596	730	788
KSH 150	150	18.8	29.4	48.8	72.3	94.9	135	214	260	293	336	409	595	688	842	909
KSH 170	170	21.3	33.3	55.3	81.9	108	155	243	294	331	382	464	674	780	955	1030
KSH 190	190	23.8	37.3	61.8	91.6	120	173	272	329	371	426	518	753	872	1070	1150
KSH 220	220	27.6	43.1	71.6	106	139	200	314	381	429	494	600	873	1010	1230	1330
KSH 250	250	31.4	49.0	81.3	120	159	227	358	432	488	562	683	991	1150	1400	1510
KSH 280	280	35.1	54.9	91.1	135	178	255	400	485	546	662	765	1110	1280	1580	1700
KSH 300	300	37.7	58.8	97.6	144	190	273	429	519	586	674	819	1190	1370	1690	1820
KSH 320	320	40.2	62.7	104	155	203	291	458	554	624	718	874	1270	1460	1800	1940

**End Voltage: 1.05 V / cell**

Type	Rated Capacity (C5 Ah)	Hours						Minutes						Seconds		
		8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
KSH 11	11	1.4	2.2	3.6	5.5	7.2	10.6	20.4	27.8	33.0	38.7	44.3	55.9	62.9	77.7	86.5
KSH 16	16	2.0	3.2	5.4	7.9	10.4	15.4	29.7	40.4	48.0	56.3	64.5	81.2	91.4	113	126
KSH 21	21	2.6	4.2	7.0	10.4	13.6	20.2	38.9	53.0	63.0	73.8	84.7	107	120	148	166
KSH 24	24	3.0	4.8	8.0	11.9	15.7	23.1	44.4	60.6	72.0	84.4	96.9	122	137	170	189
KSH 28	28	3.5	5.6	9.3	13.8	18.3	27.0	51.9	70.7	84.0	98.5	113	142	161	198	220
KSH 36	36	4.6	7.1	11.9	17.8	23.4	34.6	66.8	90.9	108	126	145	183	206	255	283
KSH 45	45	5.8	8.9	14.9	22.3	29.3	43.3	83.4	114	135	159	182	228	258	318	354
KSH 52	52	6.6	10.3	17.3	25.8	33.8	50.0	96.4	131	156	183	210	264	297	368	409
KSH 60	60	7.6	11.9	19.9	29.7	39.1	57.7	110	146	170	189	220	293	330	404	438
KSH 70	70	8.9	13.9	23.2	34.6	45.7	67.4	128	171	198	220	242	342	385	471	511
KSH 80	80	10.2	15.9	26.6	39.6	52.1	77.0	146	195	225	251	277	391	440	539	584
KSH 90	90	11.4	17.9	26.6	44.5	58.7	86.6	159	204	232	265	310	439	495	606	657
KSH 100	100	12.7	19.8	33.2	49.5	65.1	96.2	177	227	259	294	344	488	549	674	730
KSH 115	115	14.6	22.8	38.2	57.0	74.9	111	203	262	297	338	397	562	632	775	839
KSH 130	130	16.6	25.8	43.2	64.3	84.7	125	229	295	335	383	448	634	715	876	949
KSH 150	150	19.1	29.8	49.8	74.2	97.8	144	265	340	387	441	517	732	825	1010	1090
KSH 170	170	21.6	33.7	56.5	84.1	111	165	300	386	438	500	586	829	934	1140	1240
KSH 190	190	24.1	37.7	63.1	94.0	124	183	335	431	490	559	654	927	1040	1280	1380
KSH 220	220	28.0	43.7	73.1	109	143	212	388	500	568	647	759	1070	1210	1480	1610
KSH 250	250	31.7	49.6	83.0	124	163	240	440	568	645	735	862	1210	1370	1690	1830
KSH 280	280	35.6	55.6	93.0	138	183	270	494	636	722	824	966	1360	1540	1890	2040
KSH 300	300	38.1	59.5	99.7	148	196	289	529	682	775	883	1030	1462	1650	2020	2190
KSH 320	320	40.7	63.5	106	159	209	308	565	726	826	941	1100	1570	1760	2150	2330

**End Voltage: 1.00 V / cell**

Type	Rated Capacity (C5 Ah)	Hours						Minutes						Seconds		
		8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
KSH 11	11	1.4	2.2	3.6	5.6	7.3	10.7	20.8	29.9	36.3	45.8	53.3	66.9	73.8	91.0	101
KSH 16	16	2.0	3.2	5.4	8.0	10.5	15.6	30.3	43.4	52.8	66.5	77.6	97.4	108	133	146
KSH 21	21	2.7	4.2	7.1	10.5	13.8	20.5	39.8	57.1	69.3	87.3	102	128	141	175	193
KSH 24	24	3.0	4.8	8.1	11.9	15.9	23.3	45.5	65.2	79.2	100	116	146	162	199	220
KSH 28	28	3.6	5.6	9.4	13.9	18.5	27.3	53.0	76.1	92.3	116	136	171	189	232	257
KSH 36	36	4.6	7.2	12.0	18.0	23.7	35.0	68.2	97.8	119	149	175	218	242	298	331
KSH 45	45	5.8	9.0	15.0	22.4	29.7	43.8	85.2	122	148	187	219	274	303	373	414
KSH 52	52	6.7	10.4	17.4	25.9	34.2	50.6	98.5	141	172	216	253	316	349	430	478
KSH 60	60	7.6	12.0	20.1	29.9	39.6	58.5	113	161	192	227	272	344	386	472	508
KSH 70	70	8.9	14.0	23.4	34.8	46.2	68.2	131	188	223	266	295	401	451	551	592
KSH 80	80	10.3	16.0	26.8	39.8	52.7	77.9	150	214	256	303	337	459	515	629	677
KSH 90	90	11.5	18.0	30.1	44.8	59.3	87.7	167	232	271	320	379	516	580	708	762
KSH 100	100	12.8	20.0	33.4	49.8	66.0	97.4	185	258	300	356	421	574	644	787	846
KSH 115	115	14.7	23.0	38.5	57.3	75.9	112	212	296	345	409	484	660	740	905	974
KSH 130	130	16.7	26.0	43.5	64.7	85.7	126	240	335	390	463	547	745	837	1020	1100
KSH 150	150	19.2	30.0	50.2	74.7	98.9	146	277	387	450	533	631	861	967	1180	1270
KSH 170	170	21.8	34.0	56.9	84.6	112	166	314	438	510	605	715	975	1090	1330	1430
KSH 190	190	24.3	38.0	63.6	94.6	125	185	350	490	571	676	799	1090	1220	1490	1610
KSH 220	220	28.2	44.0	73.6	109	144	214	406	567	661	783	925	1260	1410	1730	1860
KSH 250	250	32.0	50.0	83.6	124	165	243	462	644	750	890	1050	1430	1610	1970	2120
KSH 280	280	35.9	56.0	93.7	139	184	273	517	721	840	996	1180	1610	1810	2200	2370
KSH 300	300	38.5	60.0	100	148	197	292	553	773	901	1070	1260	1720	1930	2360	2540
KSH 320	320	41.0	64.0	107	159	210	312	591	824	961	1140	1340	1840	2060	2510	2710

**End Voltage: 0.85 V / cell**

Type	Rated Capacity (C5 Ah)	Minutes			Seconds			
		3	1.5	1	30	15	5	1
KSH 11	11	96	108	116	125	134	149	164
KSH 16	16	140	158	169	183	196	217	237
KSH 21	21	184	207	221	239	257	285	312
KSH 24	24	210	236	253	274	294	326	357
KSH 28	28	245	276	295	319	342	380	416
KSH 36	36	316	355	379	411	440	489	535
KSH 45	45	395	443	474	514	550	611	669
KSH 52	52	456	513	546	594	636	706	773
KSH 60	60	477	556	603	671	734	815	869
KSH 70	70	557	649	703	783	856	951	1010
KSH 80	80	637	742	804	895	979	1080	1150
KSH 90	90	715	834	904	1010	1100	1220	1300
KSH 100	100	795	926	1000	1120	1220	1350	1440
KSH 115	115	894	1050	1130	1260	1380	1530	1620
KSH 130	130	1010	1160	1260	1400	1530	1690	1800
KSH 150	150	1160	1340	1450	1620	1760	1950	2070
KSH 170	170	1350	1580	1710	1900	2070	2300	2450
KSH 190	190	1510	1760	1910	2120	2320	2580	2740
KSH 220	220	1710	2000	2160	2410	2650	2920	3090
KSH 250	250	1940	2270	2450	2750	3010	3320	3500
KSH 280	280	2170	2500	2710	3030	3280	3640	3860
KSH 300	300	2320	2690	2900	3240	3510	3900	4140
KSH 320	320	2410	2790	3020	3360	3680	4040	4310

**End Voltage: 0.65 V / cell**

Type	Rated Capacity (C5 Ah)	Minutes		Seconds			
		1.5	1	30	15	5	1
KSH 11	11	150	163	179	187	204	227
KSH 16	16	219	236	260	273	297	331
KSH 21	21	288	310	341	358	389	434
KSH 24	24	328	355	390	408	444	497
KSH 28	28	384	414	455	477	519	580
KSH 36	36	493	532	585	613	667	745
KSH 45	45	616	665	731	766	834	931
KSH 52	52	712	769	845	885	964	1080
KSH 60	60	747	828	939	1010	1110	1200
KSH 70	70	879	960	1090	1170	1290	1400
KSH 80	80	1000	1100	1250	1340	1470	1600
KSH 90	90	1130	1240	1410	1510	1670	1810
KSH 100	100	1250	1380	1580	1680	1850	2010
KSH 115	115	1410	1550	1780	1880	2100	2250
KSH 130	130	1590	1740	1970	2100	2310	2490
KSH 150	150	1840	2010	2270	2420	2670	2880
KSH 170	170	2130	2340	2680	2860	3150	3410
KSH 190	190	2380	2620	2990	3190	3520	3820
KSH 220	220	2710	2980	3390	3600	4030	4310
KSH 250	250	3080	3390	3860	4090	4580	4900
KSH 280	280	3420	3570	4240	4520	4980	5380
KSH 300	300	3670	4010	4540	4850	5340	5770
KSH 320	320	3800	4200	4760	5020	5530	5990



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