EverExceed®

power your applications

Ni-Cd XHP

Capacity: 10 Ah to 250 Ah

XHP Range

Low maintenance, high performance Ni-Cd batteries

Powerful assurance for critical applications

Depend upon XHP where vital UPS, engine starting and emergency back- up duties need guaranteed power in an instant. The built-in reliability of sintered/pbe technology and alkaline electrolyte provides up to 20+ years of cost-effective trouble-free service, requiring virtually no maintenance.

Future-proof construction

XHP's steel superstructure and tough polypropylene casing hold sintered and plastic-bonded electrodes with copious amounts of alkaline electrolyte. As none of these materials are corrosive, XHP confidently outperforms lead acid batteries by several years. On-going maintenance, unexpected downtime and replacement costs are completely eliminated with Ni-Cd. XHP batteries only require topping-up every 10 years after single rate charging.

Predictable cost and long life

Owing to its reliability, unique electrochemistry and sturdy construction, accurately predicting your battery's life-cost is now possible. XHP can easily repay your investment within 3-6 years -well within the lifetime of your application.

Reliable in all conditions

XHP is specified onshore for hospitals, traffic control, power generation and process control, and offshore in oil and gas exploration and other hazardous marine installations, where the implications of main power supply interruption cannot be contemplated. Generally operating between temperatures of – 20°C to + 60°C (– 4°F to +140°F), XHP batteries can tolerate extremes of – 50°C to + 70°C (– 58°F to +158°F) for short periods. They can also remain in storage for many years before commissioning without affecting subsequent performance.

Best for engines – perfect for UPS

Electrical abuses such as AC ripple, over- discharging, voltage reversal or high overcharge currents have no effect upon XHP. The battery's plate and separator format make recharging quick and efficient at either single or dual rate. Delivery of high power within a narrow voltage window perfectly suits XHP for UPS duties. There is no risk of sudden death, and because Ni-Cd batteries do not produce corrosive fumes, they can be installed next to sensitive electronic equipment. Even when partially discharged XHP is capable of providing repeated high currents up to 20 times its nominal capacity to make short work of starting your diesel engine or gas turbine.

Battery sizing made easy

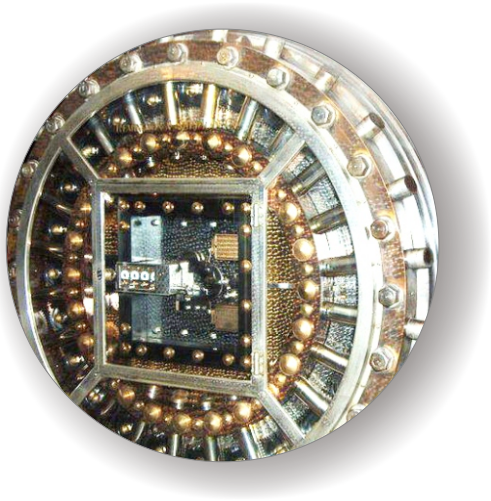
An XHP battery can be designed to exactly match your installation criteria. With BattSize sizing software, calculations are quick and easy. Engineers are always available when you require additional expert advice.

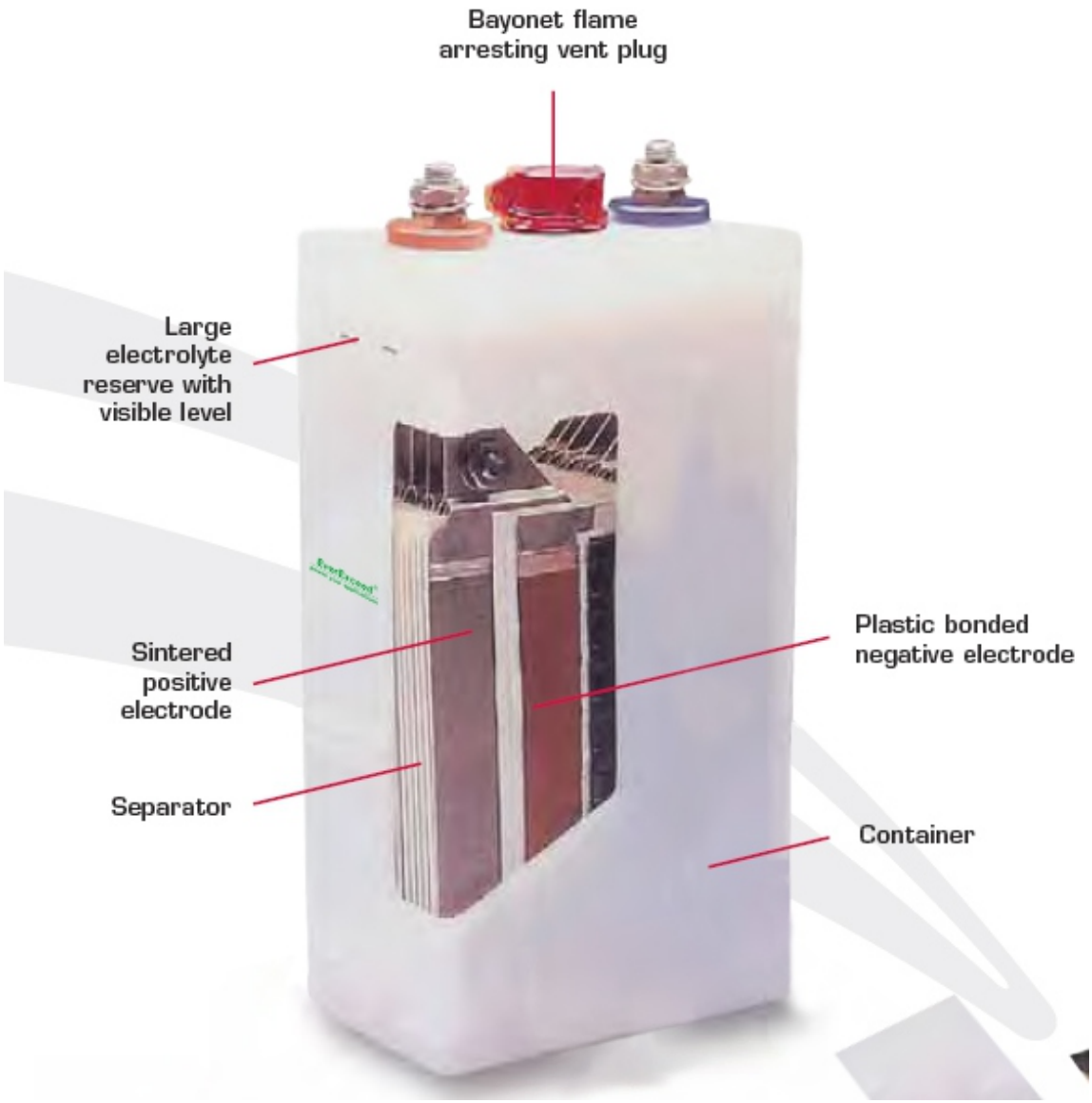
Original equipment or replacement

From a broad range of sizes, weights and performances available, XHP can perfectly meet your requirement for guaranteed power.

Setting standards worldwide

XHP batteries satisfy all major electrical industry standards and are approved for operation on board ships and offshore installations.





Application

XHP Series nickel cadmium batteries are designed for industrial high power applications. Sintered-plate technology used on both positive and negative electrodes provides unrivaled performance in power and energy density. The technology and the production line were acquired from VARTA in Germany.

XHP Series batteries are suitable for ultra high power or high energy density applications such as locomotive diesel engine starting, rolling stock, automatic guided vehicles (AGV), trucks, etc.

XHP Feartures

- Proven VARTA sintered-plate electrode technology
- 3-C charging current
- Over 20-C cranking current
- High tolerance to electrical abuses such as overcharge and overdischarge
- High tolerance to rough handling and mechanical abuse due to strong components and robust construction
- Trouble-free long cycle life
- No risk of sudden death due to the chemistry and the cell structure
- Wide operating temperature: -40°C to 60°C
- Generous electrolyte reserve for long maintenance intervals
- Clear cell case for easy electrolyte level inspection
- Custom cell dimensions available
- Conforms to IEC60623

Battery Charging

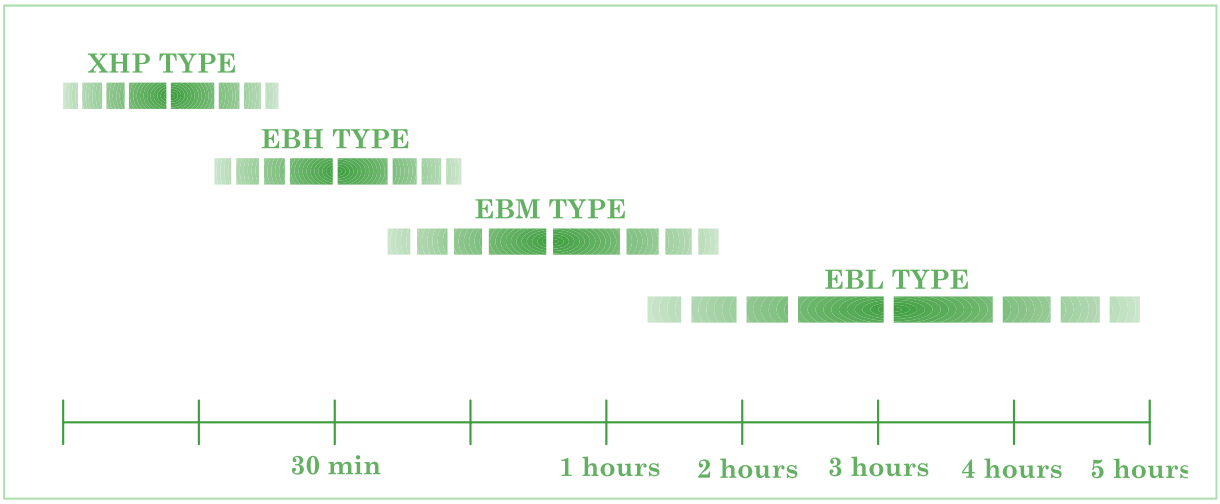
It is recommended to use Constant Voltage method of charging for Nickel Cadmium Batteries, usually with current limitation to C/5 or C/10. Charging voltages must be regularly checked. To optimize the battery performance, it is necessary to ensure that the voltage is kept within the following limits:

Recommended Charging Voltage Per Cell

Cell Type	IEC Type	Floating Charge	Equalizing Charge
XHP	KXP	1.38～1.40	1.46～1.49
EBH	KHP	1.42～1.45	1.55～1.60
EBM	KMP	1.42～1.45	1.55～1.60
EBL	KLP	1.48～1.50	1.55～1.60

Recommended Type Selection

According to backup time required by application:



Initial Charging

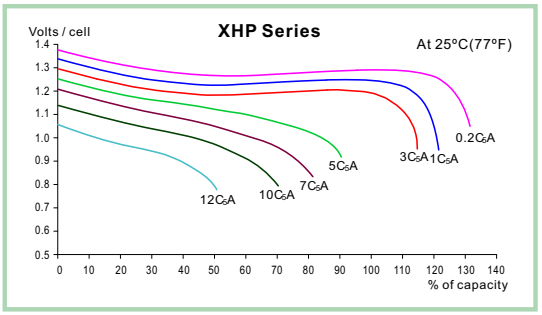
The whole charge should preferably be carried out at constant current. The charging time is inversely proportional to the current which is set by the current limit of the charging equipment.
Recommended rates for the first charging:
0.2 C5A for 10 hours
0.1 C5A for 20 hours

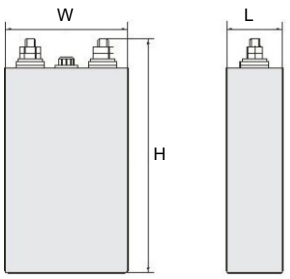
Capacity and dimensions

Cell Type	Capacity (C5 Ah)	Dimensions						Max. Weight		Terminal	Volume of Electrolyte L	Container Material
		Length		Width		Height						
		mm	in	mm	in	mm	in	kg	l b.			
XPH10	10	29.0	1.14	81.0	3.19	218	8.58	1.05	1.32	M10	0.160	PA
XPH20	20	36.5	1.44	81.5	3.21	244	9.61	1.30	2.87	M10	1.150	AS
XPH30	30	42.5	1.67	81.5	3.21	255	10.04	1.65	3.64	M10	0.222	AS
XPH30-(2)	30	36.5	1.44	80.5	3.17	235	9.25	1.50	3.31	M10	0.200	PA
XPH35	35	36.0	1.42	81	3.19	237	9.33	1.60	3.53	M10	0.190	PA
XPH40	40	42.5	1.67	81.5	3.21	255	10.04	1.75	3.86	M10	0.212	AS
XPH40-(2)	40	49.0	1.93	81.5	3.21	244	9.6	1.85	4.08	M10	0.200	ABS
XPH40-(3)	40	66.5	2.62	81	3.19	175	6.89	1.90	4.19	M10	0.210	PA
XPH50	50	49.0	1.93	81.5	3.21	244	9.6	2.00	4.41	M10	0.190	AS
XPH60	60	62.0	2.44	138.5	5.45	267	10.5	3.80	8.38	M16	0.910	ABS
XPH60-(2)	60	50.0	1.97	80.5	3.17	250	9.8	2.20	4.85	M10	0.250	PA
XPH70	70	70.0	2.76	134	5.28	285	11.2	4.40	9.70	M16	1.000	ABS
XPH80	80	70.0	2.76	134	5.28	285	11.2	4.80	10.6	M16	1.000	ABS
XPH80-(2)	80	62.0	2.44	138.5	5.45	267	10.5	4.00	8.8	M16	0.900	ABS
XPH80-(3)	80	74.5	2.93	81	3.19	243	9.6	3.00	6.6	M12	0.450	PA
XPH90	90	70.0	2.76	134	5.28	285	11.2	4.80	10.6	M16	0.950	ABS
XPH90-(2)	90	74.5	2.93	81	3.19	243	9.6	3.10	6.8	M12	0.400	PA
XPH100	100	70.0	2.76	134	5.28	285	11.2	5.00	11.0	M16	0.850	ABS
XPH100-(2)	100	62	2.44	138.5	5.45	267	10.5	4.20	9.3	M16	0.780	ABS
XPH120	120	62	2.44	138.5	5.45	267	10.5	4.30	9.5	M16	0.700	ABS
XPH120-(2)	120	79	3.11	140	5.51	367	14.4	7.00	15.4	M16×1.5	1.300	ABS
XPH120-(3)	120	70	2.76	134	5.28	285	11.2	5.00	11.0	M16	0.800	ABS
XPH140	140	79	3.11	140	5.51	367	14.4	7.20	15.9	M16×1.5	1.200	PP
XPH140-(2)	140	107	4.21	165	6.50	348	13.7	8.80	19.4	M20	2.000	PP
XPH170	170	107	4.21	165	6.5	348	13.7	9.20	20.3	M20	1.750	PP
XPH170-(2)	170	79	3.11	140	5.5	367	14.4	7.40	16.3	M16×1.5	1.020	PP
XPH190	190	79	3.11	140	5.51	367	14.4	8.00	17.6	M16×1.5	1.000	PP
XPH190-(2)	190	107	4.21	165	6.5	348	13.7	10.00	22.0	M20	1.700	PP
XPH200	200	71	2.80	137	5.4	432	17.0	8.80	19.4	M20	1.000	ABS
XPH200-(2)	200	107	4.21	165	6.50	348	13.7	10.00	22.0	M20	1.700	PP
XPH210	210	107	4.21	165	6.5	348	13.7	10.30	22.7	M20	1.650	PP
XPH220	220	107	4.21	165	6.50	348	13.7	10.50	23.1	M20	1.650	PP
XPH230	230	107	4.21	165	6.5	348	13.7	10.60	23.4	M20	1.600	PP
XPH240	240	107	4.21	165	6.5	348	13.7	10.70	23.6	M20	1.600	PP
XPH250	250	107	4.21	165	6.5	348	13.7	10.90	24.0	M20	1.600	PP

EverExceed XHP batteries fulfil all requirements specified by IEC publication 60623.

Discharging Curves





Data for stationary applications

Performance after prolonged float charge of fully charged cells

Available amperes at +20°C ±5°C(+68°F ±9°F)

Final voltage: 1.14 V/cell

Cell Type	C5 Ah	Discharge Time in Minutes				Discharge Time in Seconds		
		20	10	5	1	30	5	1
XPH10	10	23.2	28.8	38.6	51.0	57.0	72.6	76.5
XPH20	20	44.5	55.3	74.2	97.9	109	139	146
XPH30	30	69.5	86.5	115	152	170	217	229
XPH40	40	89.0	110	148	196	218	278	294
XPH50	50	115	144	193	254	284	363	382
XPH60	60	139	173	232	306	341	445	458
XPH70	70	162	202	270	356	398	508	535
XPH80	80	185	231	309	408	455	581	612
XPH90	90	216	260	350	454	513	657	697
XPH100	100	232	288	386	510	569	726	764
XPH120	120	278	346	464	612	683	871	918
XPH140	140	324	404	541	714	796	1017	1070
XPH170	170	393	490	656	866	967	1234	1300
XPH190	190	440	548	733	968	1080	1379	1452
XPH200	200	474	587	793	1040	1147	1483	1559
XPH220	220	508	632	847	1118	1246	1591	1675
XPH230	230	536	670	896	1185	1339	1689	1772
XPH240	240	567	719	958	1246	1421	1782	1875
XPH250	250	595	762	1030	1306	1494	1864	1978

Data for stationary applications

Performance after prolonged float charge of fully charged cells

Available amperes at +20°C ±5°C(+68°F ±9°F)

Final voltage: 1.10 V/cell

Cell Type	C5 Ah	Discharge Time in Minutes				Discharge Time in Seconds		
		20	10	5	1	30	5	1
XPH10	10	24.4	40.2	45.6	63.1	72.6	75.5	94.5
XPH20	20	47.0	77.0	87.4	121	139	144	181
XPH30	30	73.3	121	136	188	217	226	283
XPH40	40	93.9	153	174	242	278	289	363
XPH50	50	122	201	228	315	363	377	472
XPH60	60	146	241	273	378	436	452	567
XPH70	70	171	281	318	441	508	527	661
XPH80	80	196	321	365	505	581	604	756
XPH90	90	219	362	408	574	653	680	851
XPH100	100	244	408	455	630	726	754	945
XPH120	120	294	482	547	757	871	905	1134
XPH140	140	342	562	638	883	1017	1056	1323
XPH170	170	415	683	775	1072	1234	1282	1606
XPH190	190	465	763	865	1198	1379	1448	1795
XPH200	200	499	820	927	1292	1483	1539	1930
XPH220	220	536	881	998	1381	1591	1652	2070
XPH230	230	577	937	1051	1473	1689	1761	2204
XPH240	240	613	989	1112	1555	1782	1859	2328
XPH250	250	649	1040	1195	1648	1875	1967	2451

Data for stationary applications

Performance after prolonged float charge of fully charged cells

Available amperes at +20°C ±5°C(+68°F ±9°F)

Final voltage: 1.05 V/cell

Cell Type	C5 Ah	Discharge Time in Minutes				Discharge Time in Seconds		
		20	10	5	1	30	5	1
XPH10	10	28	46	56	73	82	87	111
XPH20	20	53	88	106	139	157	167	214
XPH30	30	83	138	167	218	245	262	336
XPH40	40	105	176	213	279	314	335	430
XPH50	50	137	230	278	364	409	436	559
XPH60	60	165	276	334	437	491	523	672
XPH70	70	193	322	389	510	574	610	783
XPH80	80	220	369	445	583	655	698	896
XPH90	90	252	412	500	649	731	774	993
XPH100	100	275	460	556	728	819	872	1120
XPH120	120	331	553	667	874	983	1048	1344
XPH140	140	385	645	779	1020	1146	1222	1568
XPH170	170	468	783	946	1238	1392	1483	1903
XPH190	190	523	876	1057	1384	1555	1658	2128
XPH200	200	561	941	1133	1487	1669	1786	2342
XPH220	220	603	1009	1218	1595	1794	1912	2453
XPH230	230	639	1082	1298	1689	1916	1926	2565
XPH240	240	678	1154	1365	1782	2029	2039	2668
XPH250	250	716	1221	1432	1875	2142	2163	2760

Data for stationary applications

Performance after prolonged float charge of fully charged cells

Available amperes at +20°C ±5°C(+68°F ±9°F)

Final voltage: 1.00 V/cell

Cell Type	C5 Ah	Discharge Time in Minutes				Discharge Time in Seconds		
		20	10	5	1	30	5	1
XPH10	10	30.9	51.5	70.0	93.9	103	109	128
XPH20	20	59.3	98.9	134	180	198	210	245
XPH30	30	87.6	155	210	281	310	330	383
XPH40	40	118	198	269	361	397	421	491
XPH50	50	155	258	350	470	517	549	640
XPH60	60	185	309	420	563	621	659	767
XPH70	70	216	361	490	657	724	769	895
XPH80	80	247	412	560	752	828	880	1024
XPH90	90	278	464	630	838	940	990	1119
XPH100	100	309	515	700	939	1035	1099	1279
XPH120	120	371	618	840	1128	1242	1319	1536
XPH140	140	433	721	981	1315	1449	1539	1791
XPH170	170	525	876	1191	1598	1759	1868	2175
XPH190	190	587	979	1331	1785	1966	2089	2431
XPH200	200	628	1051	1432	1910	2112	2229	2620
XPH220	220	678	1129	1535	2059	2268	2408	2804
XPH230	230	709	1185	1617	2256	2421	2544	2987
XPH240	240	742	1226	1689	2338	2534	2678	3245
XPH250	250	773	1257	1751	2421	2627	2802	3378

Data for stationary applications

Performance after prolonged float charge of fully charged cells

Available amperes at +20°C ±5°C(+68°F ±9°F)

Final voltage: 0.85 V/cell

Cell Type	C5 Ah	Discharge Time in Minutes				Discharge Time in Seconds		
		20	10	5	1	30	5	1
XPH10	10	33.0	57.7	101	196	206	254	266
XPH20	20	64.9	109	187	371	391	433	515
XPH30	30	97.9	172	279	546	587	687	710
XPH40	40	132	215	334	721	783	902	924
XPH50	50	165	264	433	876	979	1168	1226
XPH60	60	198	340	494	1051	1277	1494	1544
XPH70	70	231	397	577	1226	1490	1555	1669
XPH80	80	263	464	631	1318	1432	1710	1782
XPH90	90	295	505	721	1483	1586	1864	1957
XPH100	100	356	546	829	1648	1782	2055	2168
XPH120	120	396	680	994	1978	2328	2585	2585
XPH140	140	453	803	1195	2307	2657	2905	2936
XPH170	170	552	948	1463	2781	3203	3595	3492
XPH190	190	609	1030	1627	2987	3399	3777	3832
XPH200	200	642	1097	1669	3193	3543	3935	4099
XPH220	220	707	1236	1751	3399	3852	4223	4331
XPH230	230	733	1308	1794	3554	3996	4398	4604
XPH240	240	762	1380	1844	3708	4151	4635	4851
XPH250	250	788	1452	1906	3863	4305	4841	5099

Data for stationary applications

Performance after prolonged float charge of fully charged cells

Available amperes at +20°C ±5°C(+68°F ±9°F)

Final voltage: 0.65 V/cell

Cell Type	C5 Ah	Discharge Time in Minutes				Discharge Time in Seconds		
		20	10	5	1	30	5	1
XPH10	10	34.0	67.0	109	221	247	381	422
XPH20	20	68.0	125	209	433	482	742	824
XPH30	30	102	191	324	636	752	1070	1185
XPH40	40	136	251	407	846	958	1450	1613
XPH50	50	170	307	505	1065	1185	1798	1967
XPH60	60	204	382	607	1349	1504	2057	2275
XPH70	70	238	446	708	1574	1754	2348	2596
XPH80	80	272	497	778	1748	1875	2436	2679
XPH90	90	306	525	865	1839	2050	2740	2890
XPH100	100	340	619	975	2173	2369	3297	3417
XPH120	120	408	742	1156	2553	2750	4002	4018
XPH140	140	474	870	1340	2987	3306	4100	4530
XPH170	170	577	1138	1547	3399	3811	4739	5096
XPH190	190	639	1237	1741	3561	4017	4972	5344
XPH200	200	675	1298	1792	3749	4151	5068	5449
XPH220	220	742	1391	1854	4123	4429	5160	5664
XPH230	230	762	1483	1906	4305	4563	5284	5850
XPH240	240	786	1566	1967	4491	4687	5408	6026
XPH250	250	811	1648	2029	4635	4862	5562	6180

Calculation Methods

Information required for battery capacity calculation

The following informat on needed for a precise battery capacity calculation:

-Nominal voltage of the system	-Load current required	-Backup time required
-Maximum voltage (for charging)	-Minimum voltage	-Temperature range
-Battery layout and available space	-Physical condition	

Float Voltage Operation

In these conditions the float voltage, being the voltage at which the general load circuit will operate, then a decision will have to be reached on the cell float voltage needed to maintain the battery in the required condition.

$$\text{Number of cells required} = \frac{\text{Circuit voltage}}{\text{Cell Float voltage}} \qquad \text{Minimum cell voltag} = \frac{\text{Minimum D.C. voltage}}{\text{Number of cells}}$$

The most commonly used float voltages are 1.40-1.48 voltage per cell, but the exact figure has to be related carefully to circumstances.

For Example

An EverExceed Nickel Cadmium battery is required to maintain an inverter load of 50KVA at 0.8 power factor for a backup time of 30 minutes, at 20~25°C temperature. The DC voltage to the inverter operates within the limit of 265 volts with the battery on float charge to a minimum of 202 volts at end of back up time. The inverter has an 85% efficiency rate.

-Number of Cells (at recommended float of 1.44VPC) = 265/1.44≈184cells
-Minimum Cell Voltage = 202/184≈1.10 volts per cell
-Maximum Battery Current

$$= \frac{\text{Inverter load in KVA x Power factor}}{\text{Min. cell voltage x Number of cells x Inverter efficiency}}$$

$$= \frac{50\text{KVA} \times 0.80}{1.10 \times 184 \times 0.85} = 232.5 \text{ Amps}$$

We shall choose the battery with capacity equal or just above 232.5Amps.
To meet the 30 minutes backup time requirement, we determine to choose the battery size from EBM Range.
From our catalogue data, the cell type is EBM300.
Battery shall comprise 184 cells of EverExceed Nickel Cadmium type EBM300.

System Voltage	Number of Cells	Spread Range Number of Cells
24	20	18～21
36	30	27～31
48	40	36～41
110	92	88～93
220	184	180～186

The number of cells in a battery may be determined by simply dividing the nominal voltage of the system by the nominal voltage of a cell (1.2 Volts).

EverExceed®
power your applications

Supplied Worldwide by:

EverExceed Corporation