EverExceed®

power your applications

Ni-Cd Pocket Plate Range

EBH Range

Capacity: 10 Ah to 500 Ah

The block battery – for dependability

The wide range of low, medium and high capacity types makes accurate selection easy, based on discharge time and end of discharge voltage. Robust construction and generous electrolyte reserve enable the battery to withstand wide temperature fluctuations in stationary cycling behaviour over its 20+ years' life.

Built with a future Nickel-cadmium plates are completely reliable, with no risk of thermal runaway or sudden death. Generally operating between temperatures of -20˚C to +60˚C(-4˚F to +140˚F), they can tolerate extremes of -50˚C to +70˚C (-58˚F to +158˚F) for short periods.

With only periodic checks, the block battery will provide up to 20+ years' completely faithful service.

Trouble-free long cycle life

The EverExceed nickel-cadmium block battery's unique electrochemistry enables it to regularly withstand any depth of discharge.

Following a deep discharge the block battery is designed to recharge very quickly and economically, using standard single or two-level charging equipment.

Be sure of a low overall cost

The Ni-Cd block battery is the most highly cost-efficient solution to stored power requirements.

- No downtime
- No replacement costs
- Minimal maintenance
- Ease of installation
- 20+ years' operating life.

Easy storage and installation

Nickel-cadmium block batteries are quick and easy to install as original equipment and may be stored for many years in a discharged state under correct conditions.

On installation a simple bolted connector enables the battery to be rapidly commissioned.

Assured reliability

Ni-Cd is equally dependable in controlled city environments or harsh, unpredictable conditions in the world's most remote and unpopulated areas.

The Ni-Cd battery's block construction makes it highly resistant to electrical abuse and transport over rough terrain, precluding risk of subsequent failure.

Optimized for performance:

An electrolyte solution of potassium hydroxide and a small amount of lithium hydroxide acts only as an ion transfer medium, delivering optimum performance without causing base material degradation.

Good reserves and circulation of the electrolyte are achieved by a wide inter-plate space. Injection moulded plastic grids both separate plate and insulate plate edges. For extremely low temperatures a special high density electrolyte is available.

The block battery is fitted with a specially designed flame arresting flip top vent and does not produce corrosive vapours. The tough polypropylene casing ensures the battery's structural integrity throughout its long life.

EverExceed supports these Single Cell ranges with:

- quality approved manufacture to ISO 9001 and the TUV certification
- Single Cell batteries have been developed in line with the safety requirements of EN-50272-2 and components used (such as insulated cable connectors and end lug covers) are defined to ensure high protection against electric shocks (Ip2 level).
- full recycling service to protect the environment

Protective cover
- to prevent external short-circuits
- in line with EN 50272-2 (safety) with IP2 level

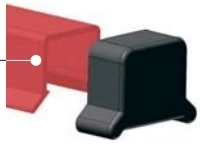
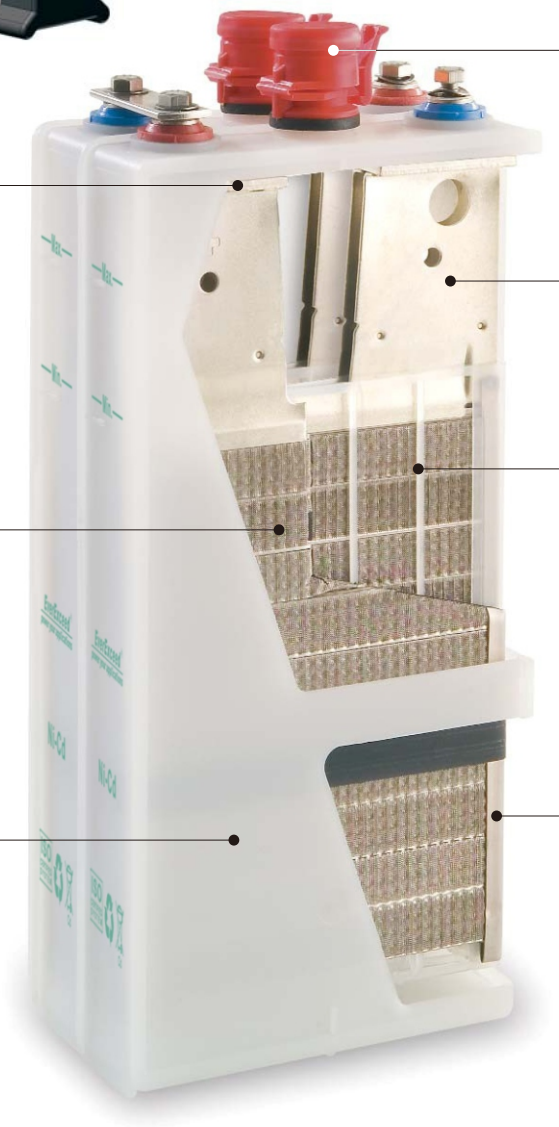


Plate group bus
Connects the plate tabs with the terminal post. Plate tabs and terminal post are projection- welded to the plate group bus.



Flame-arresting vents
Material: polypropylene.

Plate tab
Spot-welded both to the plate side-frames and to the upper edge of the pocket plate.

Separating grids
These separate the plates and insulate the plate frames from each other. The grids allow free circulation of electrolyte between the plates.

Plate
Horizontal pockets of double- perforated steel strips.

Plate frame
Seals the plate pockets and serves as a current collector.

Cell container
Material: translucent polypropylene.

The cells are welded together to form rugged blocks of 1 - 6 cells depending on the cell size and type.

The EverExceed Single Cell ranges fully comply and exceed the IEC 60623 standard requirements.

Application

EBH Series nickel cadmium batteries are designed for general industrial applications where absolute reliability is a necessity. Service-proven pocket-plate technology ensures long uninterrupted battery life without the risk of sudden loss of power.

EBH Series batteries are suitable for high discharge rate applications (30 minutes and below) such as switchgear tripping, diesel engine starting, UPS, etc.

EBH Feartures

- 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 (MBS) or translucent (PP) plastic cell case for easy electrolyte level inspection
- Plastic grid spacers eliminate separator deterioration problem
- Custom cell dimensions available
- 20 years service life in stationary applications
- Conforms to IEC60623

Battery Charging

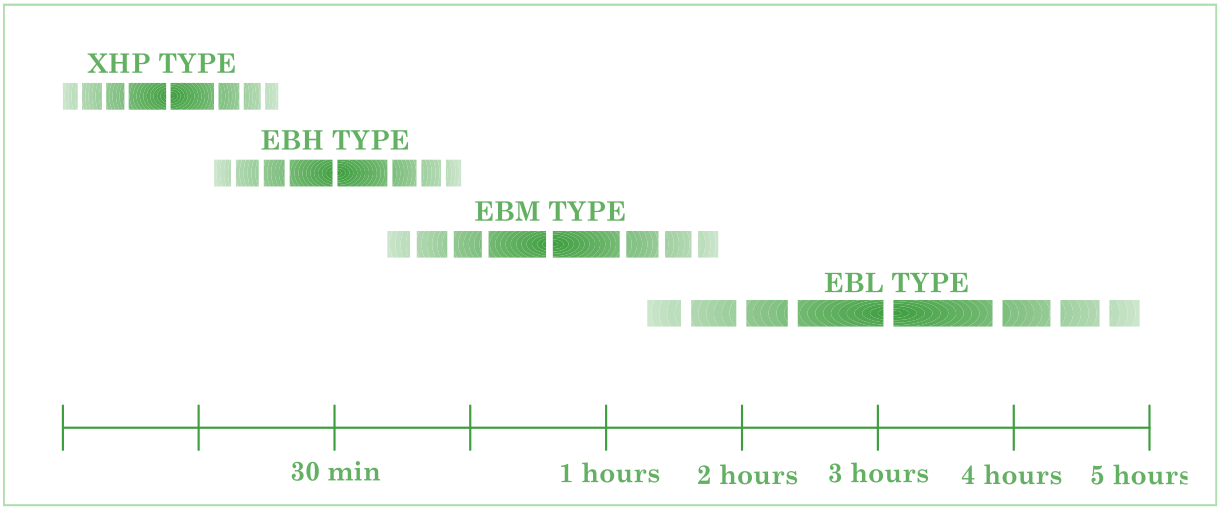
It is recommended to use Constant Voltage method of charging for Nickel Cadmium Batteries, usually with current limitation to C/5 or C/10. Charging voltages must be regularly checked. To optimize the battery performance, it is necessary to ensure that the voltage is kept within the following limits:

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:



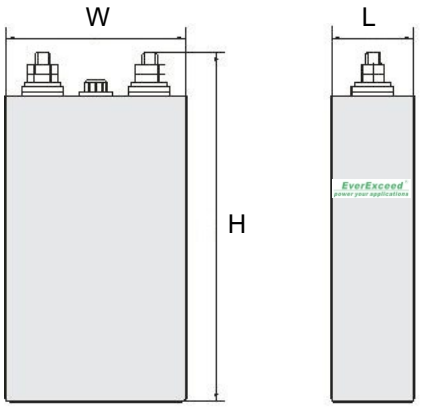
Initial Charging

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

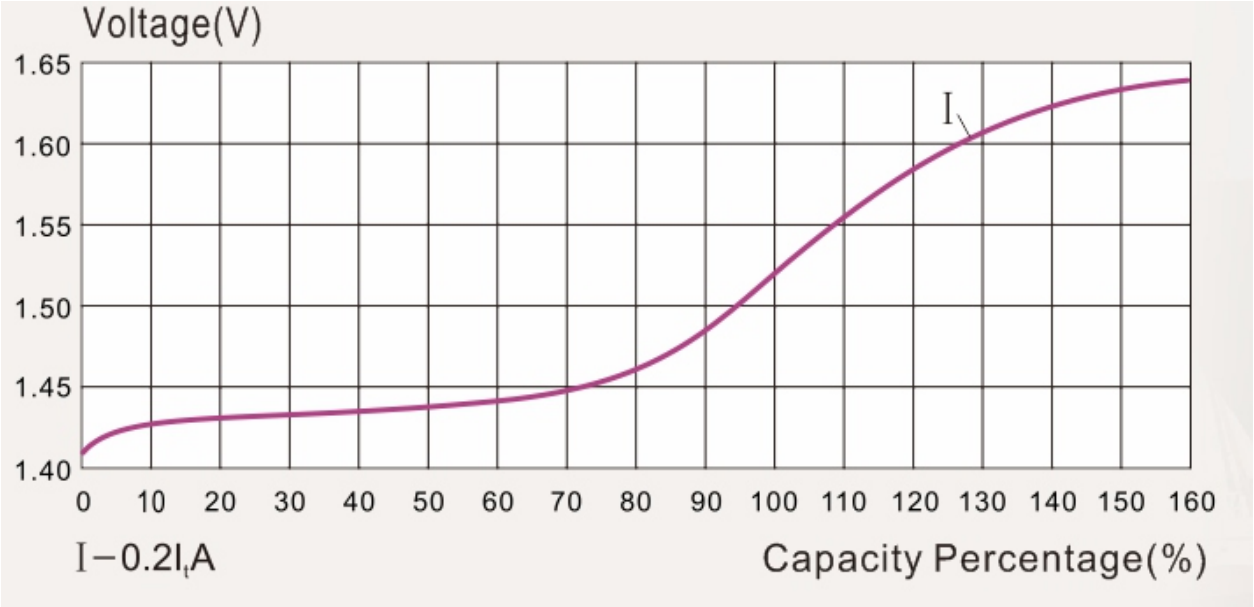
Capacity and dimensions

Cell Type	Capacity (C5 Ah)	Dimensions						Weight				Terminal	Cell Case Material
		Length		Width		Height		Without Electrolyte		With Electrolyte			
		mm	in	mm	in	mm	in	kg	lb.	kg	lb.		
EBH10	10	48.0	1.89	81.0	3.2	245	9.6	1.5	3.3	1.8	4.0	M10 X1	MBS
EBH20	20	68.0	2.68	134	5.3	245	9.6	1.8	4.0	2.8	6.2	M10 X1	MBS/PP
EBH30	30	70.0	2.76	134	5.3	285	11.2	3.0	6.6	4.0	8.8	M16	MBS/PP
EBH35	35	70.0	2.76	134	5.3	285	11.2	3.2	7.1	4.0	8.8	M16	MBS/PP
EBH40	40	70.0	2.76	134	5.3	285	11.2	3.3	7.3	4.5	9.9	M16	MBS/PP
EBH50	50	80.0	3.15	141	5.6	370	14.6	4.7	10.4	6.2	13.7	M16	MBS/PP
EBH60	60	80.0	3.15	141	5.6	370	14.6	5.0	11.0	6.5	14.3	M16	MBS/PP
EBH70	70	106	4.17	164	6.5	345	13.6	6.8	15.0	9.0	19.8	M20	MBS/PP
EBH80	80	106	4.17	164	6.46	345	13.6	7.50	16.5	9.20	20.3	M20	MBS/PP
EBH100	100	106	4.17	164	6.46	345	13.6	7.90	17.4	10.0	22.0	M20	MBS/PP
EBH120	120	164	6.46	167	6.57	365	14.4	10.0	22.0	14.0	30.9	M20	MBS/PP
EBH150	150	164	6.46	167	6.57	365	14.4	13.5	29.8	15.0	33.1	M20	MBS/PP
EBH180	180	176	6.93	291	11.46	510	20.1	14.8	32.6	22.0	48.5	M20	MBS
EBH200	200	176	6.93	291	11.5	510	20.1	22.0	48.5	34.5	76.1	2×M20	MBS
EBH250	250	176	6.93	291	11.5	510	20.1	25.0	55.1	35.5	78.3	2×M20	MBS
EBH300	300	176	6.93	291	11.5	510	20.1	27.5	60.6	37.0	81.6	2×M20	MBS
EBH350	350	176	6.93	291	11.5	510	20.1	29.0	63.9	38.0	83.8	2×M20	MBS
EBH400	400	186	7.32	398	15.7	570	22.4	37.0	81.6	58.0	128	3×M20	MBS
EBH500	500	186	7.32	398	15.7	570	22.4	40.0	88.2	59.0	130	3×M20	MBS

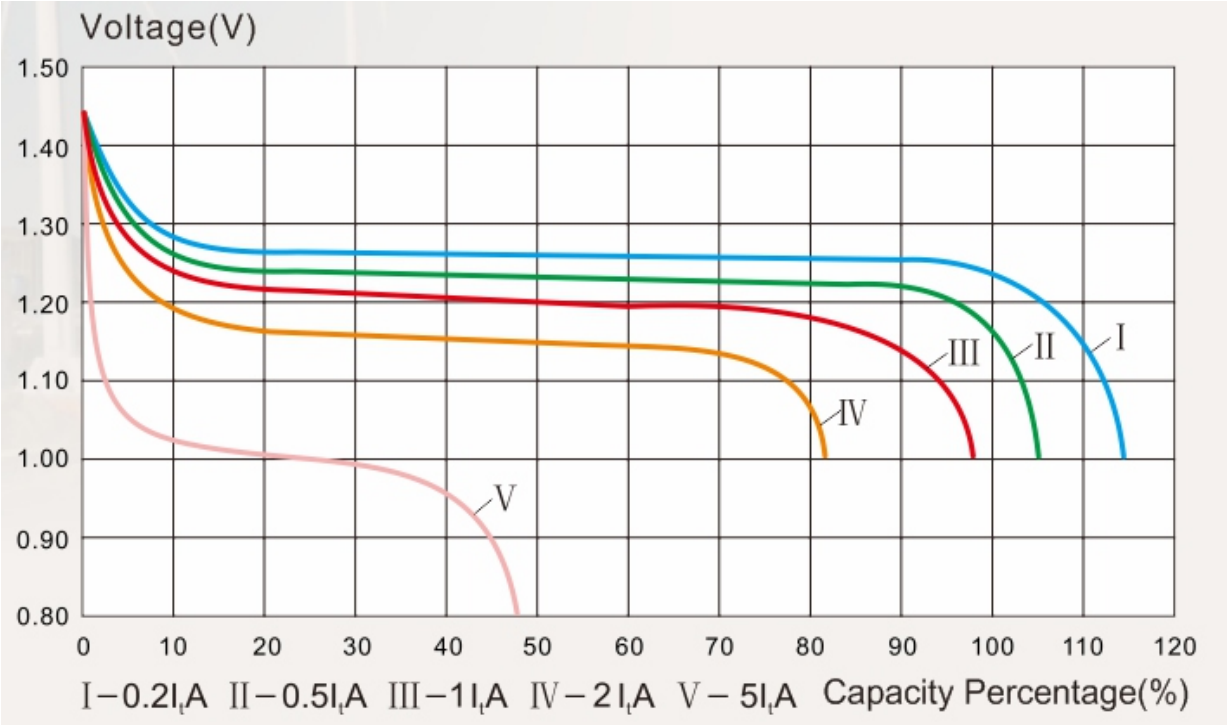
EverExceed EBH batteries fulfil all requirements specified by IEC publication 60623.



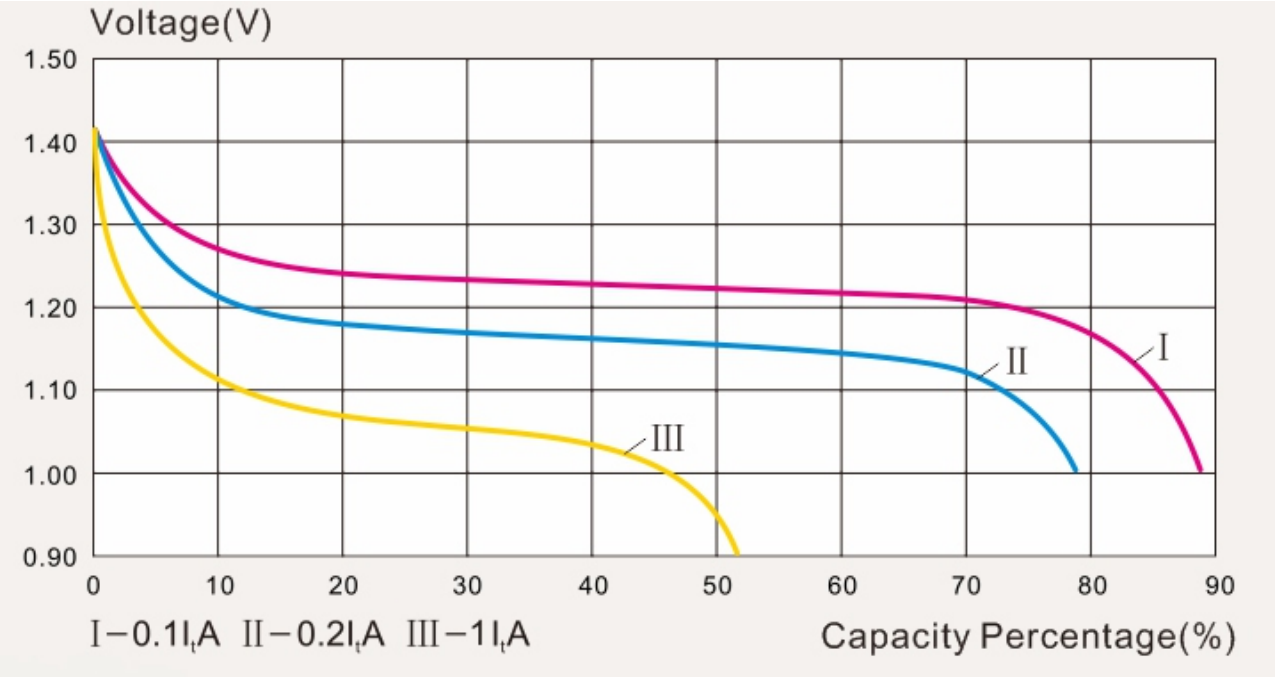
Charging Curves of EBH Series(20℃ ± 5℃)



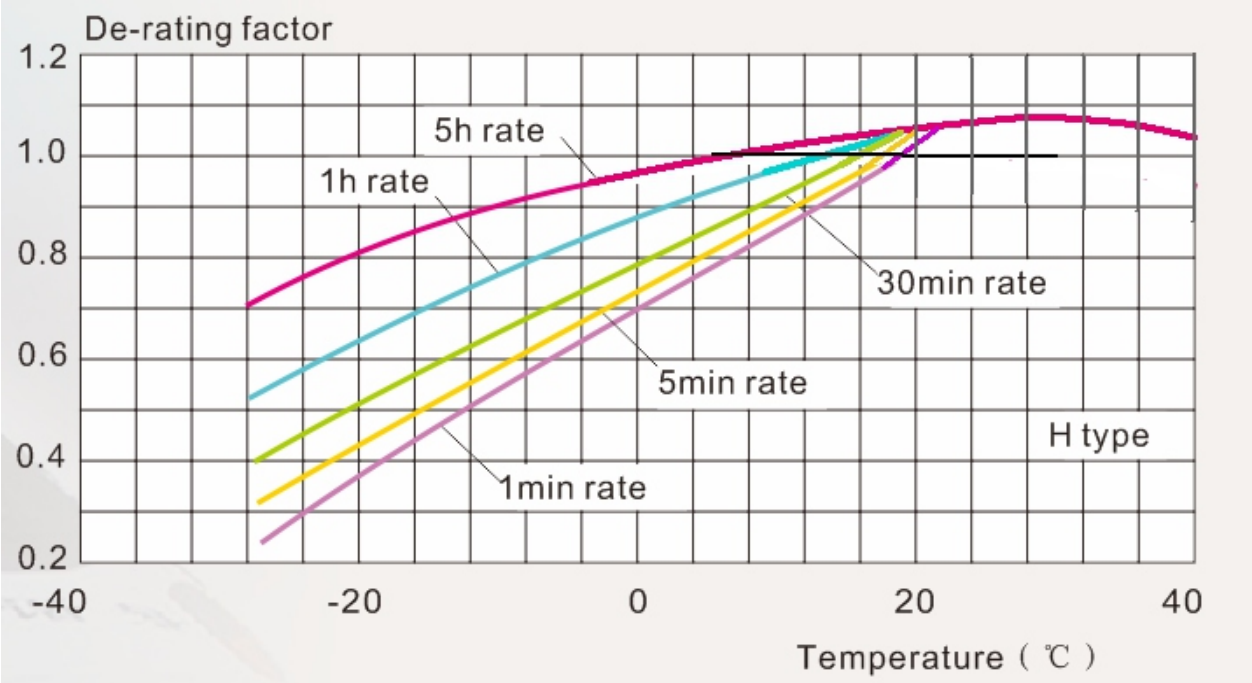
Discharging Curves of EBH Series(20℃ ± 5℃)



Discharging Curves of EBH Series(−18℃ ± 2℃)



Temperature Effect Curves of EBH Series



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 Hours							Discharge Time in Minutes							Time in Seconds		
		10	8	5	3	2	1.5	1	45	30	20	15	10	5	1	30	5	1
EBH10	10	1.1	1.3	2.0	3.1	4.5	5.8	8.3	9.4	12.4	14.2	16.3	19.0	23.9	38.6	41.3	48.9	50.5
EBH20	20	2.1	2.5	4.0	6.2	9.0	11.5	16.5	18.7	24.3	28.3	32.5	38.1	47.9	77.3	82.6	97.9	101
EBH30	30	3.2	3.8	5.9	9.3	13.6	17.5	24.7	34.5	36.6	43.8	48.6	56.7	71.6	109	125	147	151
EBH35	35	3.7	4.4	7.1	11.3	14.2	21.1	29.4	38.1	43.9	52.6	58.4	68.1	86.0	131	150	177	182
EBH40	40	4.2	5.0	7.9	12.4	18.0	23.3	33.6	37.5	48.9	58.5	65.4	75.7	95.8	145	165	196	202
EBH50	50	5.3	6.3	9.9	15.5	22.7	29.4	41.9	48.9	61.3	73.1	82.4	94.8	121	181	207	245	253
EBH60	60	6.3	7.6	11.8	18.5	27.0	35.0	49.4	59.7	72.1	87.6	98.4	113	144	218	250	294	304
EBH70	70	7.4	8.9	13.9	21.6	31.4	40.8	57.9	67.0	85.8	102	115	132	168	253	289	343	354
EBH80	80	8.4	10.1	15.9	24.7	36.1	46.6	67.2	77.3	98.1	117	131	151	192	290	331	391	405
EBH100	100	10.5	12.9	20.1	30.9	44.8	58.2	83.9	113	123	146	165	191	240	361	413	489	506
EBH120	120	12.6	15.1	23.7	37.1	53.8	70.0	98.9	118	144	175	197	227	288	438	501	587	604
EBH150	150	16.0	19.1	29.9	46.4	67.5	87.0	126	155	180	213	247	285	361	546	618	736	759
EBH180	180	19.7	23.2	36.1	57.7	19.6	106	152	187	216	155	299	345	436	675	745	886	912
EBH200	200	21.1	25.5	39.7	61.8	89.6	116	168	196	247	284	330	381	479	726	826	979	1011
EBH250	250	26.3	31.5	49.4	77.3	113	145	209	242	299	355	409	482	606	906	1033	1224	1265
EBH300	300	31.5	37.9	59.3	92.7	135	175	252	330	361	426	489	571	723	1092	1240	1471	1517
EBH350	350	36.8	44.3	69.2	108	158	203	293	340	419	497	573	672	845	1267	1446	1713	1771
EBH400	400	42.0	50.5	79.1	129	179	232	335	391	489	569	654	758	958	1442	1652	1957	2023
EBH500	500	52.5	63.1	98.9	155	225	289	418	484	598	711	814	948	1203	1804	2065	2446	2529

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 Hours							Discharge Time in Minutes							Time in Seconds		
		10	8	5	3	2	1.5	1	45	30	20	15	10	5	1	30	5	1
EBH10	10	1.1	1.3	2.0	3.2	4.8	6.2	8.9	13.4	14.9	17.6	20.1	23.5	28.3	42.7	48.4	58.2	60.8
EBH20	20	2.2	2.5	4.0	6.5	9.5	12.5	17.8	20.1	29.7	35.3	40.2	46.4	56.7	85.0	96.8	116	122
EBH30	30	3.2	3.8	6.0	9.6	14.4	18.6	26.8	30.9	43.8	52.8	59.9	70.6	85.0	128	145	175	182
EBH35	35	3.8	4.6	7.1	11.3	17.0	22.1	31.4	36.1	51.5	61.8	70.0	82.4	99.4	149	170	206	213
EBH40	40	4.3	5.2	8.0	13.0	19.1	24.7	35.6	58.2	70.6	79.9	92.7	113	170	194	232	242	254
EBH50	50	5.4	6.3	10.0	16.2	23.8	30.9	44.6	53.6	72.6	88.1	100	116	142	213	242	289	304
EBH60	60	6.5	7.6	11.9	19.3	28.8	37.6	53.6	61.8	87.6	105	119	139	170	254	290	348	365
EBH70	70	7.6	8.9	14.0	22.7	33.5	43.3	62.4	72.1	101	124	140	165	199	299	340	407	424
EBH80	80	8.7	10.2	16.0	25.9	37.9	49.4	71.3	85.5	116	141	160	185	228	340	387	464	484
EBH100	100	10.8	12.9	20.1	32.4	16.6	61.8	89.1	129	145	176	200	232	284	425	484	579	606
EBH120	120	13.0	15.5	24.2	38.6	57.2	74.7	108	134	175	210	239	278	340	510	581	696	729
EBH150	150	16.3	19.1	30.0	48.5	71.1	92.7	134	155	218	264	300	348	426	639	726	867	908
EBH180	180	20.1	23.6	36.1	60.0	85.5	113	166	191	270	319	361	430	515	767	898	1072	1092
EBH200	200	21.6	25.3	40.2	64.9	95.0	124	178	258	290	351	400	464	569	850	968	1157	1210
EBH250	250	27.1	31.7	50.0	81.9	118	155	222	268	364	439	500	580	711	1062	1210	1445	1513
EBH300	300	32.4	38.1	59.9	97.0	142	185	268	340	436	526	598	695	852	1275	1452	1735	1816
EBH350	350	37.9	44.4	70.0	114	166	216	311	391	510	614	698	812	994	1487	1700	2024	2119
EBH400	400	43.3	51.5	80.3	130	190	247	355	464	581	701	798	927	1136	1700	1936	2312	2421
EBH500	500	54.1	63.4	100	164	237	309	445	567	726	878	999	1159	1411	2125	2421	2890	3026

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 Hours							Discharge Time in Minutes							Time in Seconds		
		10	8	5	3	2	1.5	1	45	30	20	15	10.0	5	1	30	5	1
EBH10	10	1.1	1.3	2.1	3.3	4.8	6.4	9.3	13.4	16.5	21.6	23.8	27.8	34.5	49.4	56.7	67.1	71.6
EBH20	20	2.2	2.6	4.1	6.6	9.8	12.9	18.6	21.6	33.2	43.3	47.6	55.6	69.0	98.9	113	137	143
EBH30	30	3.3	3.9	6.2	10.0	14.5	19.2	28.8	33.0	49.4	64.9	73.6	87.0	109	145	169	206	211
EBH35	35	4.0	4.6	7.4	11.8	17.5	22.7	34.0	39.1	59.7	77.8	86.5	103	129	170	203	248	254
EBH40	40	4.4	5.2	8.2	13.4	19.7	25.8	37.3	46.4	66.4	86.5	95.3	111	138	198	227	274	286
EBH50	50	5.6	6.4	10.3	16.6	24.7	32.1	46.6	57.7	82.9	105	118	139	172	244	283	342	357
EBH60	60	6.7	7.7	12.4	20.1	29.6	38.6	56.1	72.1	99.4	127	143	168	207	294	340	412	430
EBH70	70	7.8	9.0	14.4	23.2	34.5	45.3	65.4	86.5	116	148	167	196	242	343	397	480	502
EBH80	80	8.9	10.3	16.3	26.5	39.3	51.5	74.6	97.9	133	169	191	224	276	397	453	536	573
EBH100	100	11.1	12.9	20.4	33.1	49.2	64.4	93.2	113	166	211	238	279	345	489	567	670	716
EBH120	120	13.4	15.5	24.5	40.2	59.0	77.3	112	132	199	253	286	335	414	587	680	803	859
EBH150	150	16.7	19.3	30.6	50.0	73.6	96.8	140	167	249	317	355	414	519	736	846	1004	1071
EBH180	180	20.1	23.7	37.6	60.8	89.1	122	173	206	308	392	439	512	642	910	1045	1241	1324
EBH200	200	22.2	25.8	40.8	66.1	98.5	129	186	221	332	423	474	556	690	979	1133	1339	1433
EBH250	250	27.8	32.1	51.0	84.6	124	162	234	335	415	528	592	690	864	1261	1432	1674	1797
EBH300	300	33.4	38.5	61.3	100	147	194	280	330	497	634	711	828	1038	1472	1691	2009	2142
EBH350	350	38.9	45.3	71.6	118	172	227	328	371	581	742	829	966	1210	1621	1991	2343	2502
EBH400	400	44.5	51.5	81.6	132	197	258	373	464	663	847	948	1112	1380	1957	2266	2678	2859
EBH500	500	55.6	64.3	102	168	245	322	467	546	829	1057	1185	1380	1720	2405	2822	3348	3574

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 Hours							Discharge Time in Minutes							Time in Seconds		
		10	8	5	3	2	1.5	1	45	30	20.0	15	10	5	1	30	5	1
EBH10	10	1.1	1.3	2.1	3.4	5.0	6.6	9.6	11.3	17.5	23.5	27.8	32.0	39.8	57.7	64.9	79.3	84.5
EBH20	20	2.3	2.7	4.1	6.8	10.0	13.2	19.2	23.7	35.0	47.0	55.4	64.1	79.5	115	130	159	169
EBH30	30	3.4	4.1	6.2	10.1	15.0	19.8	28.8	37.1	52.5	70.0	81.4	96.3	119	174	195	238	253
EBH35	35	3.7	4.6	7.3	12.9	16.7	21.6	19.7	36.8	46.1	60.8	69.8	91	132	173	186	251	274
EBH40	40	4.5	5.4	8.2	13.5	20.2	26.4	38.7	48.4	70.0	93.9	109	129	159	232	260	317	338
EBH50	50	5.7	6.8	10.3	16.9	25.2	33.0	48.4	60.8	87.6	117	136	161	199	289	325	397	422
EBH60	60	6.8	8.1	12.4	20.4	30.4	39.8	58.0	72.1	106	141	163	193	239	347	389	476	507
EBH70	70	7.9	9.5	14.4	23.8	35.3	46.9	68.0	84.5	123	166	191	225	283	433	497	577	639
EBH80	80	9.1	10.8	16.5	27.0	40.4	53.0	77.4	95.8	140	187	217	258	319	464	519	634	676
EBH100	100	11.3	13.5	20.6	33.7	50.5	66.0	96.8	118	175	235	272	320	398	577	649	793	845
EBH120	120	13.6	16.3	24.7	40.7	60.0	78.8	118	144	210	281	324	383	478	692	773	948	1004
EBH150	150	17.0	20.3	30.9	51.0	75.7	100	145	183	263	354	409	481	602	865	1066	1195	1294
EBH180	180	20.6	24.7	39.1	62.8	91.7	123	175	227	319	427	494	577	743	1069	1318	1477	1599
EBH200	200	22.7	27.1	41.2	67.4	99.9	134	194	239	350	472	545	642	801	1154	1288	1566	1687
EBH250	250	28.3	33.8	51.5	85.0	126	166	242	330	438	590	681	793	1001	1442	1607	1957	2156
EBH300	300	34.0	40.7	61.8	102	151	200	290	361	525	708	817	962	1195	1730	1928	2369	2536
EBH350	350	39.7	47.4	72.1	119	176	232	338	412	613	826	953	1122	1392	2019	2250	2750	2982
EBH400	400	45.3	54.1	82.4	136	200	265	386	474	700	943	1089	1282	1590	2307	2575	3131	3378
EBH500	500	56.7	67.6	103	170	251	331	483	597	876	1179	1361	1586	1988	2884	3214	3914	4223

Calculation Methods

Information required for battery capacity calculation

The following informat on needed fbr 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®

Supplied Worldwide by:

EverExceed Corporation