

# Ni-Cd block battery

Excellence in technology, reliability in performance



**saft**

# Saft Nife Ni-Cd block battery

## The broadest capability in the world -

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*Saft Nife Ni-Cd block batteries are one of the world's most reliable power back-up systems. For improving quality and safety, safeguarding the environment and reducing costs, only Saft block batteries provide a truly reliable solution.*

#### **Why nickel-cadmium? Why Saft?**

- For installations requiring totally reliable power back-up, failsafe engine starting or bulk energy storage, the uniquely long life and low maintenance characteristics of Saft Ni-Cd blocks cannot be bettered.
- More than 100 years' experience in developing pocket plate technology is built into every Saft Nife Ni-Cd battery

#### **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 +50°C (-4°F to +122°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.



# total reliability for a low life cycle cost

## Trouble-free long cycle life

The Saft Nife 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.

## Specified worldwide

Diverse installations such as Australia's Sydney Opera House, and AGIP Refinery in Italy, depend on Saft Ni-Cd power back-up. From USA substations to Chinese UPS usage; protecting South American hydropower, offshore in Norway and diesel power stations in the Middle East, Saft Nife nickel-cadmium block batteries are specified for failsafe dependability worldwide.

## Easy storage and installation

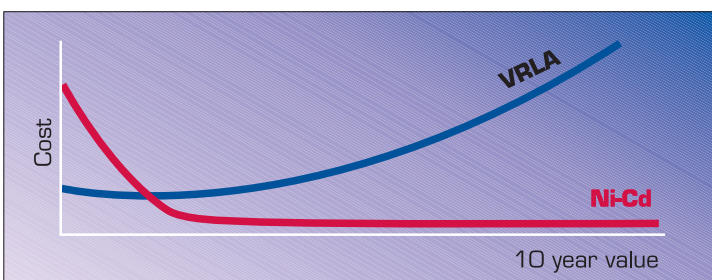
Nickel-cadmium block batteries are quick and easy to install as original equipment and may be stored for many years in a discharged state under correct conditions.

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.



# Quality built, quality tested for durability and performance –

The Saft Nife block battery is manufactured in Sweden at one of our many internationally accredited ISO 9001 sites.

## 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.

## Built to international standards of safety

The Saft Nife Nickel-Cadmium block battery meet, and exceed, the requirements of the IEC 60623 standard.

The 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).



## Calculating your battery size

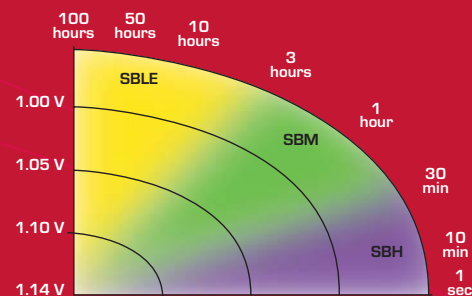
It is important to specify the optimum battery size for your particular installation. Nickel-cadmium ranges offer many permutations to create the optimum battery for your application.

Saft's battery sizing and comparison software has been developed to make your battery selection easy, and is available on request from our website: [www.saftbatteries.com](http://www.saftbatteries.com) or by contacting your nearest Saft Sales office.

## World-class service

Saft's international network of subsidiaries and agents is ready to support you following installation, whenever and wherever you need them.

Skilled Saft engineers and technicians are trained to provide detailed support and advice on specific requirements.



The block battery range caters for the diverse discharge requirements of industry

# solutions for all kinds of industry

## Rate discharge

SBLE, SBM and SBH offer different performance characteristics and cover a wide capacity range, enabling selection of a Saft NiFe Ni-Cd battery for any application.

	Intercity and urban transport	Electricity, gas, water production and distribution	Offshore & onshore, petrochemical refineries	Chemical, mining, steel metal works	Commercial and public buildings	Hospitals, X-ray equipment	Radio, satellite, cable, cellular base & repeater stations	Substations and signaling	Traffic control	All other applications	
SBLE	●	●	●	●	●	●	●	●	●	●	Power back-up Bulk energy storage
SBM	●	●	●	●	●	●	●	●	●	●	Power back-up
SBH	●	●	●	●	●	●	●	●	●	●	Starting, power back-up

## L type

The L type has the thickest plates and is designed for applications where the battery is required to provide

- a reliable source of energy over long discharge periods.
- a current that is relatively low in comparison with the total stored energy.
- discharges are generally infrequent.

L type is typically used in power backup and bulk energy storage applications.

## M type

The M type is designed for applications where the batteries are usually required to sustain

- electrical loads for between 30 minutes to 3 hours
- "mixed" loads which involve a mixture of high and low discharge rates.
- frequent or infrequent discharges.

M type is typically used in power backup applications.

## H type

The H type uses very thin plates and is designed for applications demanding

- a relatively high current over short periods
- usually less than 30 minutes' duration
- frequent or infrequent discharges.

H type is typically used in starting and power back up applications.



# Safe and tough, by design

## An investment in quality

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.

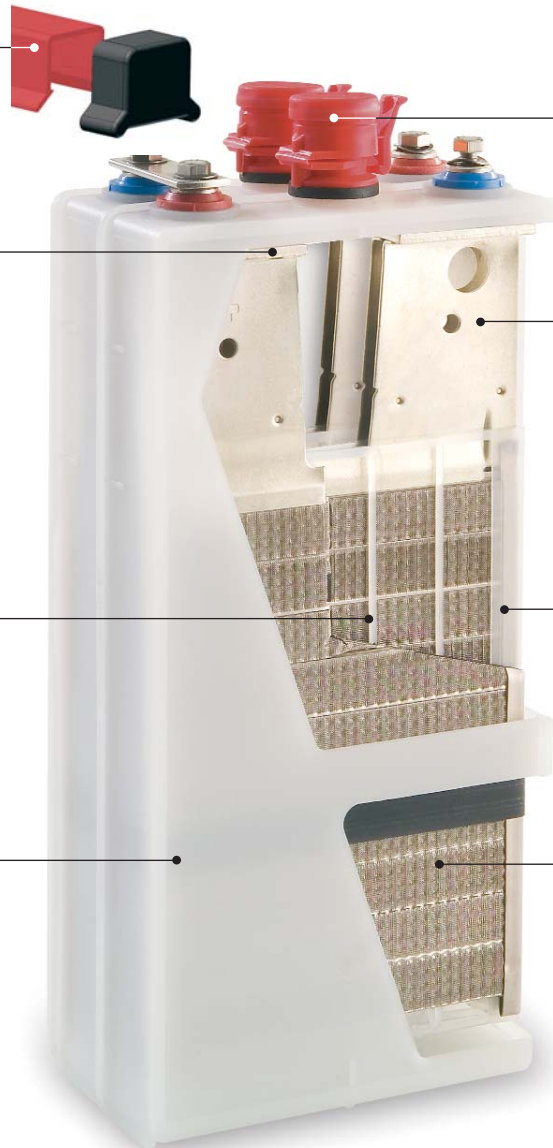
Separating grids

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

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.



Flame-arresting vents

Material: polypropylene.

Plate tab

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

Plate frame

Seals the plate pockets and serves as a current collector.

Plate

Horizontal pockets of double-perforated steel strips.

Saft cells fully comply and exceed the requirements of the IEC 60623 standard.

### Performance Data

Many nickel-cadmium batteries are used in stationary standby power applications where discharges occur infrequently and the battery is continuously charged by a float or constant potential charge.

Under these circumstances there is a modification in the level of the

discharge curve and allowances must be made for this when sizing the battery.

In order to simplify this process, the data Saft supplies in this publication has both the fully charged data to IEC 60623 and the fully charged data after prolonged float charge, which can be used directly in battery sizing calculations.

This phenomenon occurs with all nickel-cadmium batteries, but some other manufacturers of nickel-cadmium batteries may not take this effect into account in published data.

When calculating for deep discharges (0.65 V and 0.85 V) it is not necessary to take this effect into account.

# Dimensions

## Dimensions LE range

Cell type	Capacity at the 5hr rate (Ah)	Block dimensions (mm)								Approx. weight per cell (kg)	Approx. electrolyte volume between level marks (cm <sup>3</sup> )	Electrolyte per cell		Internal resistance** (mOhm)	Cell connection bolt per pole
		H	W	L(1)	L(2)	L(3)	L(4)	L(5)	L(6)			Solid*	Liquid (l)		
SBLE 7.5	7.5	194	123	-	-	-	101	125	148	0.8	80	0.08	0.24	15.3	M 6
SBLE 15	15	264	123	-	-	-	101	125	148	1.1	80	0.11	0.35	9.60	M 6
SBLE 22	22	264	123	-	-	-	143	177	211	1.7	120	0.17	0.53	6.55	M 6
SBLE 30	30	264	123	-	-	-	143	177	211	1.8	120	0.15	0.46	4.80	M 6
SBLE 40	40	264	123	-	-	-	239	297	355	3.0	200	0.29	0.90	3.60	M 6
SBLE 47	47	264	123	-	-	-	191	237	283	2.5	160	0.19	0.59	3.06	M 6
SBLE 62	62	264	123	-	-	-	239	297	355	3.2	200	0.23	0.70	2.32	M 6
SBLE 75	75	349	195	-	79	115	-	-	-	4.1	280	0.32	1.0	2.33	M 8
SBLE 95	95	405	195	-	79	115	-	-	-	4.9	280	0.39	1.2	1.91	M 8
SBLE 110	110	349	195	-	103	151	-	-	-	5.6	380	0.39	1.2	1.59	M 10
SBLE 140	140	405	195	-	103	151	-	-	-	6.7	380	0.49	1.5	1.29	M 10
SBLE 185	185	405	195	-	127	187	-	-	-	8.4	500	0.65	2.0	0.98	M 10
SBLE 230	230	405	195	-	159	232	-	-	-	9.9	590	0.74	2.3	0.79	M 10
SBLE 275	275	405	195	-	183	268	-	-	-	11.5	700	0.94	2.9	0.66	M 10
SBLE 325	325	405	195	-	228	336	-	-	-	15.1	880	1.13	3.5	0.56	2 x M 10
SBLE 375	375	405	195	-	252	372	-	-	-	16.8	1000	1.29	4.0	0.48	2 x M 10
SBLE 415	415	405	195	146	278	-	-	-	-	18.3	1100	1.39	4.3	0.44	2 x M 10
SBLE 460	460	405	195	159	304	-	-	-	-	19.8	1200	1.49	4.6	0.39	2 x M 10
SBLE 510	510	405	195	171	328	-	-	-	-	21.4	1300	1.68	5.2	0.35	2 x M 10
SBLE 550	550	405	195	183	-	-	-	-	-	23.0	1400	1.88	5.8	0.33	2 x M 10
SBLE 600	600	405	195	206	-	-	-	-	-	26.7	1600	2.04	6.3	0.30	3 x M 10
SBLE 650	650	405	195	219	-	-	-	-	-	28.2	1700	2.14	6.6	0.28	3 x M 10
SBLE 700	700	405	195	232	-	-	-	-	-	29.7	1800	2.23	6.9	0.26	3 x M 10
SBLE 750	750	405	195	244	-	-	-	-	-	31.3	1900	2.43	7.5	0.24	3 x M 10
SBLE 830	830	405	195	268	-	-	-	-	-	34.5	2100	2.81	8.7	0.22	3 x M 10
SBLE 925	925	405	195	304	-	-	-	-	-	39.6	2400	2.98	9.2	0.20	4 x M 10
SBLE 1020	1020	405	195	328	-	-	-	-	-	42.8	2600	3.36	10.4	0.18	4 x M 10
SBLE 1100	1100	405	195	352	-	-	-	-	-	46.0	2800	3.75	11.6	0.16	4 x M 10
SBLE 1200	1200	405	195	389	-	-	-	-	-	51.1	3100	3.91	12.1	0.15	5 x M 10
SBLE 1300	1300	405	195	413	-	-	-	-	-	54.3	3300	4.30	13.3	0.14	5 x M 10
SBLE 1400	1400	405	195	437	-	-	-	-	-	57.5	3500	4.69	14.5	0.13	5 x M 10
SBLE 1500	1500	405	195	486	-	-	-	-	-	64.2	3900	5.05	15.6	0.12	6 x M 10
SBLE 1600	1600	405	195	510	-	-	-	-	-	67.4	4100	5.44	16.8	0.11	6 x M 10
SBLE 1660	1660	405	195	522	-	-	-	-	-	69.0	4200	5.63	17.4	0.11	6 x M 10

\* Value for initial filling (E22).

\*\* Rigid connector included.

## Dimensions M range

Cell type	Capacity at the 5hr rate (Ah)	Block dimensions (mm)					Approx. weight per cell (kg)	Approx. electrolyte volume between level marks (cm <sup>3</sup> )	Electrolyte per cell		Cell connection bolt per pole
		H	W	L(1)	L(2)	L(3)			Solid* (kg)	Liquid (l)	
SBM 11	11	194	123		64	94	0.90	110	0.10	0.30	M 6
SBM 15	15	194	123		74	108	1.20	120	0.11	0.33	M 6
SBM 22	22	264	123		64	94	1.50	110	0.15	0.46	M 6
SBM 30	30	264	123		74	108	1.80	120	0.15	0.46	M 6
SBM 43	43	349	195		69	100	3.40	240	0.31	0.95	M 6
SBM 56	56	405	195		69	100	4.00	240	0.36	1.1	M 6
SBM 65	65	349	195		79	115	4.10	280	0.32	1.0	M 8
SBM 84	84	405	195		79	115	4.90	280	0.39	1.2	M 8
SBM 112	112	405	195		94	137	6.30	330	0.45	1.4	M 8
SBM 138	138	405	195		115	169	7.60	430	0.55	1.7	M 10
SBM 161	161	405	195		127	187	8.40	500	0.61	1.9	M 10
SBM 184	184	405	195		159	232	9.90	590	0.78	2.4	M 10
SBM 208	208	405	195		183	268	11.5	700	0.94	2.9	M 10
SBM 231	231	405	195		183	268	12.0	700	0.94	2.9	M 10
SBM 277	277	405	195		228	336	14.5	860	1.13	3.5	2 x M 10
SBM 300	300	405	195		240	354	15.5	860	1.20	3.7	2 x M 10
SBM 323	323	405	195		252	372	16.5	1000	1.26	3.9	2 x M 10
SBM 346	346	405	195	146	278		17.5	1100	1.42	4.4	2 x M 10
SBM 369	369	405	195	159	304		19.5	1200	1.55	4.8	2 x M 10
SBM 392	392	405	195	171	328		21.0	1300	1.72	5.3	2 x M 10
SBM 415	415	405	195	183			23.0	1400	1.88	5.8	2 x M 10
SBM 438	438	405	195	183			23.5	1400	1.88	5.8	2 x M 10
SBM 461	461	405	195	183			24.0	1400	1.84	5.7	2 x M 10
SBM 505	505	405	195	213			27.5	1600	2.10	6.5	3 x M 10
SBM 555	555	405	195	232			30.0	1800	2.33	7.2	3 x M 10
SBM 625	625	405	195	268			34.5	2100	2.82	8.7	3 x M 10
SBM 690	690	405	195	268			36.0	2100	2.78	8.6	3 x M 10
SBM 740	740	405	195	304			40.0	2400	3.11	9.6	4 x M 10
SBM 830	830	405	195	352			46.0	2800	3.79	11.7	4 x M 10
SBM 920	920	405	195	352			48.0	2800	3.82	11.8	4 x M 10
SBM 965	965	405	195	372			50.5	3000	3.69	11.4	6 x M 10
SBM 1040	1040	405	195	437			57.5	3500	4.72	14.6	5 x M 10
SBM 1150	1150	405	195	437			60.0	3500	4.66	14.4	5 x M 10
SBM 1220	1220	405	195	510			67.5	4100	5.50	17.0	6 x M 10
SBM 1390	1390	405	195	522			72.0	4200	5.60	17.3	6 x M 10

\* Value for initial filling (E22).



## Dimensions H range

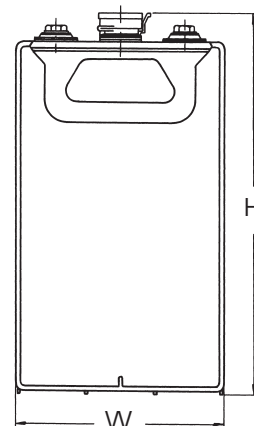
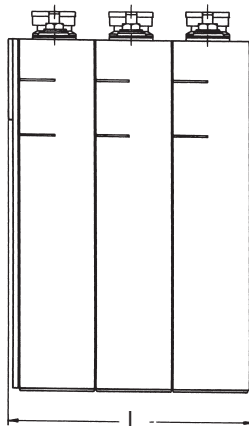
Cell type	Capacity at the 5hr rate (Ah)	Block dimensions (mm)					Approx. weight per cell (kg)	Approx. electrolyte volume between level marks (cm <sup>3</sup> )	Electrolyte per cell		Cell connection bolt per pole
		H	W	L(1)	L(2)	L(3)			Solid*	Liquid (l)	
SBH 8.3	8.3	264	123		53	77	1.10	80	0.12	0.36	M 6
SBH 12	12	264	123		64	94	1.50	110	0.14	0.44	M 6
SBH 16	16	264	123		74	108	1.80	120	0.16	0.48	M 6
SBH 19	19	349	195		57	82	2.60	190	0.25	0.77	M 6
SBH 29	29	349	195		69	100	3.40	240	0.31	0.95	M 6
SBH 39	39	349	195		79	115	4.10	280	0.36	1.1	M 8
SBH 49	49	349	195		94	137	5.20	330	0.42	1.3	M 8
SBH 59	59	349	195		103	151	5.60	380	0.49	1.5	M 10
SBH 69	69	349	195		127	187	6.40	500	0.58	1.8	M 10
SBH 79	79	349	195		127	187	7.00	500	0.58	1.8	M 10
SBH 88	88	349	195		159	232	7.90	590	0.74	2.3	M 10
SBH 98	98	349	195		159	232	8.50	590	0.71	2.2	M 10
SBH 118	118	349	195		183	268	9.60	700	0.87	2.7	M 10
SBH 137	137	349	195		252	372	12.0	1000	1.20	3.7	2 x M 10
SBH 157	157	349	195		252	372	13.5	1000	1.20	3.7	2 x M 10
SBH 177	177	349	195	159			16.5	1200	1.46	4.5	2 x M 10
SBH 196	196	349	195	159			17.0	1200	1.42	4.4	2 x M 10
SBH 236	236	349	195	183			20.0	1400	1.84	5.7	2 x M 10
SBH 265	265	349	195	232			25.5	1800	2.20	6.8	3 x M 10
SBH 294	294	349	195	232			26.0	1700	2.10	6.5	3 x M 10
SBH 353	353	349	195	268			31.5	2100	2.78	8.6	3 x M 10
SBH 393	393	349	195	304			36.0	2300	2.82	8.7	4 x M 10
SBH 471	471	349	195	352			40.5	2800	3.69	11.4	4 x M 10
SBH 491	491	349	195	377			45.5	2900	3.53	10.9	5 x M 10
SBH 590	590	349	195	437			50.5	3500	4.63	14.3	5 x M 10
SBH 640	640	405	195	377			52.5	2900	4.21	13.0	5 x M 10
SBH 705	705	405	195	437			57.5	3500	5.31	16.4	5 x M 10
SBH 765	765	405	195	437			60.0	3500	5.24	16.2	5 x M 10
SBH 865	865	405	195	497			68.5	4000	5.92	18.3	6 x M 10
SBH 920	920	405	195	522			72.0	4200	6.28	19.4	6 x M 10

\* Value for initial filling (E22).

The dimensions of all available cell types are listed in the tables. There are two different cell widths, each of which comes in two heights. The block length is determined by the cell length and the number of cells in the block.

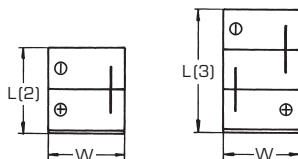
**Please note:**

- all the tabulated dimensions are maximum values.
  - all block types with a cell weight exceeding 8.4 kg (18.5 lbs) have handles.
- The tabulated block length includes 6 mm for handles for these types.
- for series connection of blocks on racks, always use blocks with an even number of cells. This gives short, straight interblock connectors. When a block with odd number of cells is necessary, it should be placed at the end of a cell row.

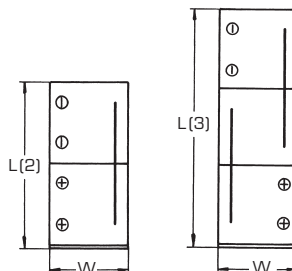


**Position of terminals**

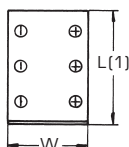
- Blocks of cells with single pole bolts  
 SBLE 7.5 → 275  
 SBM 11 → 231  
 SBH 8.3 → 118



- Blocks of cells with double pole bolts  
 SBLE 325 → 510  
 SBM 277 → 392  
 SBH 137,157



- Blocks of cells with 2 - 6 poles bolts per pole.  
 Crosswise mounted on the racks  
 SBLE 550 → 1660  
 SBM 415 → 1390  
 SBH 177 → 920



# Dimensions (Imperial units)

## Dimensions LE range (Imperial units)

Cell type	Capacity at the 5hr rate (Ah)	Block dimensions (in)								Approx. weight per cell (lbs.)	Approx. electrolyte volume between level marks (in <sup>3</sup> )	Electrolyte per cell		Internal resistance** (mOhm)	Cell connection bolt per pole
		H	W	L(1)	L(2)	L(3)	L(4)	L(5)	L(6)			Solid* (lbs.)	Liquid (US gal.)		
SBLE 7.5	7.5	7.64	4.84	-	-	-	3.98	4.92	5.83	1.76	4.88	0.17	0.06	15.33	M 6
SBLE 15	15	10.40	4.84	-	-	-	3.98	4.92	5.83	2.42	4.88	0.25	0.09	9.60	M 6
SBLE 22	22	10.40	4.84	-	-	-	5.63	6.95	8.31	3.74	7.32	0.38	0.13	6.55	M 6
SBLE 30	30	10.40	4.84	-	-	-	5.63	6.95	8.31	3.96	7.32	0.33	0.12	4.80	M 6
SBLE 40	40	10.40	4.84	-	-	-	9.41	11.68	13.98	6.60	12.2	0.64	0.23	3.60	M 6
SBLE 47	47	10.40	4.84	-	-	-	7.52	9.31	11.14	5.50	9.76	0.42	0.15	3.06	M 6
SBLE 62	62	10.40	4.84	-	-	-	9.41	11.68	13.98	7.04	12.2	0.50	0.18	2.32	M 6
SBLE 75	75	13.74	7.68	-	3.11	4.53	-	-	-	9.02	17.1	0.71	0.25	2.33	M 8
SBLE 95	95	15.95	7.68	-	3.11	4.53	-	-	-	10.8	17.1	0.85	0.30	1.91	M 8
SBLE 110	110	13.74	7.68	-	4.06	5.95	-	-	-	12.3	23.2	0.85	0.30	1.59	M 10
SBLE 140	140	15.95	7.68	-	4.06	5.95	-	-	-	14.7	23.2	1.07	0.38	1.29	M 10
SBLE 185	185	15.95	7.68	-	5.00	7.36	-	-	-	18.5	30.5	1.42	0.50	0.98	M 10
SBLE 230	230	15.95	7.68	-	6.26	9.14	-	-	-	21.8	36.0	1.64	0.58	0.79	M 10
SBLE 275	275	15.95	7.68	-	7.21	10.55	-	-	-	25.3	42.7	2.06	0.73	0.66	M 10
SBLE 325	325	15.95	7.68	-	8.98	13.23	-	-	-	33.2	53.7	2.49	0.88	0.56	2 x M 10
SBLE 375	375	15.95	7.68	-	9.92	14.65	-	-	-	37.0	61.0	2.85	1.00	0.48	2 x M 10
SBLE 415	415	15.95	7.68	5.75	10.95	-	-	-	-	40.3	67.1	3.06	1.08	0.44	2 x M 10
SBLE 460	460	15.95	7.68	6.26	11.97	-	-	-	-	43.6	73.2	3.27	1.15	0.39	2 x M 10
SBLE 510	510	15.95	7.68	6.73	12.92	-	-	-	-	47.1	79.3	3.70	1.30	0.35	2 x M 10
SBLE 550	550	15.95	7.68	7.21	-	-	-	-	-	50.6	85.4	4.13	1.45	0.33	2 x M 10
SBLE 600	600	15.95	7.68	8.11	-	-	-	-	-	58.7	97.6	4.48	1.58	0.30	3 x M 10
SBLE 650	650	15.95	7.68	8.62	-	-	-	-	-	62.0	104	4.70	1.65	0.28	3 x M 10
SBLE 700	700	15.95	7.68	9.14	-	-	-	-	-	65.3	110	4.91	1.73	0.26	3 x M 10
SBLE 750	750	15.95	7.68	9.61	-	-	-	-	-	68.9	116	5.34	1.88	0.24	3 x M 10
SBLE 830	830	15.95	7.68	10.55	-	-	-	-	-	75.9	128	6.19	2.18	0.22	3 x M 10
SBLE 925	925	15.95	7.68	11.97	-	-	-	-	-	87.1	146	6.55	2.30	0.20	4 x M 10
SBLE 1020	1020	15.95	7.68	12.92	-	-	-	-	-	94.2	159	7.40	2.60	0.18	4 x M 10
SBLE 1100	1100	15.95	7.68	13.86	-	-	-	-	-	101	171	8.26	2.90	0.16	4 x M 10
SBLE 1200	1200	15.95	7.68	15.32	-	-	-	-	-	112	189	8.61	3.03	0.15	5 x M 10
SBLE 1300	1300	15.95	7.68	16.26	-	-	-	-	-	119	201	9.47	3.33	0.14	5 x M 10
SBLE 1400	1400	15.95	7.68	17.21	-	-	-	-	-	127	214	10.32	3.63	0.13	5 x M 10
SBLE 1500	1500	15.95	7.68	19.14	-	-	-	-	-	141	238	11.10	3.90	0.12	6 x M 10
SBLE 1600	1600	15.95	7.68	20.08	-	-	-	-	-	148	250	11.96	4.20	0.11	6 x M 10
SBLE 1660	1660	15.95	7.68	20.56	-	-	-	-	-	152	256	12.38	4.35	0.11	6 x M 10

\* Value for initial filling (E22).

\*\* Rigid connector included.

## Dimensions M range (Imperial units)

Cell type	Capacity at the 5hr rate (Ah)	Block dimensions (in)					Approx. weight per cell (lbs.)	Approx. electrolyte volume between level marks (in <sup>3</sup> )	Electrolyte per cell		Cell connection bolt per pole
		H	W	L(1)	L(2)	L(3)			Solid* (lbs.)	Liquid (US gal.)	
SBM 11	11	7.64	4.85		2.52	3.70	1.98	6.71	0.22	0.08	M 6
SBM 15	15	7.64	4.85		2.92	4.26	2.65	7.32	0.24	0.09	M 6
SBM 22	22	10.40	4.85		2.52	3.70	3.31	6.71	0.33	0.12	M 6
SBM 30	30	10.40	4.85		2.92	4.26	3.97	7.32	0.33	0.12	M 6
SBM 43	43	13.80	7.68		2.72	3.94	7.50	14.6	0.68	0.25	M 6
SBM 56	56	16.00	7.68		2.72	3.94	8.82	14.6	0.79	0.29	M 6
SBM 65	65	13.80	7.68		3.11	4.53	9.04	17.1	0.71	0.26	M 8
SBM 84	84	16.00	7.68		3.11	4.53	10.8	17.1	0.86	0.32	M 8
SBM 112	112	16.00	7.68		3.70	5.40	13.9	20.1	0.99	0.37	M 8
SBM 138	138	16.00	7.68		4.53	6.66	16.8	26.2	1.21	0.45	M 10
SBM 161	161	16.00	7.68		5.00	7.37	18.5	30.5	1.35	0.50	M 10
SBM 184	184	16.00	7.68		6.26	9.14	21.8	36.0	1.72	0.63	M 10
SBM 208	208	16.00	7.68		7.21	10.60	25.4	42.7	2.07	0.77	M 10
SBM 231	231	16.00	7.68		7.21	10.60	26.5	42.7	2.07	0.77	M 10
SBM 277	277	16.00	7.68		8.98	13.20	32.0	52.5	2.49	0.92	2 x M 10
SBM 300	300	16.00	7.68		9.46	13.90	34.2	52.5	2.65	0.98	2 x M 10
SBM 323	323	16.00	7.68		9.93	14.70	36.4	61.0	2.78	1.03	2 x M 10
SBM 346	346	16.00	7.68	5.75	11.00		38.6	67.1	3.13	1.16	2 x M 10
SBM 369	369	16.00	7.68	6.26	12.00		43.0	73.2	3.42	1.27	2 x M 10
SBM 392	392	16.00	7.68	6.74	12.90		46.3	79.3	3.79	1.40	2 x M 10
SBM 415	415	16.00	7.68	7.21			50.7	85.4	4.15	1.53	2 x M 10
SBM 438	438	16.00	7.68	7.21			51.8	85.4	4.15	1.53	2 x M 10
SBM 461	461	16.00	7.68	7.21			52.9	85.4	4.06	1.50	2 x M 10
SBM 505	505	16.00	7.68	8.39			60.6	97.6	4.63	1.72	3 x M 10
SBM 555	555	16.00	7.68	9.14			66.2	110	5.14	1.90	3 x M 10
SBM 625	625	16.00	7.68	10.60			76.1	128	6.22	2.30	3 x M 10
SBM 690	690	16.00	7.68	10.60			79.4	128	6.13	2.27	3 x M 10
SBM 740	740	16.00	7.68	12.00			88.2	146	6.86	2.53	4 x M 10
SBM 830	830	16.00	7.68	13.90			101	171	8.36	3.09	4 x M 10
SBM 920	920	16.00	7.68	13.90			106	171	8.42	3.12	4 x M 10
SBM 965	965	16.00	7.68	14.70			111	183	8.14	3.01	6 x M 10
SBM 1040	1040	16.00	7.68	17.20			127	214	10.41	3.85	5 x M 10
SBM 1150	1150	16.00	7.68	17.20			132	214	10.28	3.80	5 x M 10
SBM 1220	1220	16.00	7.68	20.10			149	250	12.1	4.49	6 x M 10
SBM 1390	1390	16.00	7.68	20.60			159	256	12.3	4.57	6 x M 10

\* Value for initial filling (E22).

## Dimensions H range (Imperial units)

Cell type	Capacity at the 5hr rate (Ah)	Block dimensions (in)					Approx. weight per cell (lbs.)	Approx. electrolyte volume between level marks (in <sup>3</sup> )	Electrolyte per cell		Cell connection bolt per pole
		H	W	L(1)	L(2)	L(3)			Solid* (lbs.)	Liquid (US gal.)	
SBH 8.3	8.3	10.40	4.85		2.09	3.03	2.43	4.88	0.26	0.10	M 6
SBH 12	12	10.40	4.85		2.52	3.70	3.31	6.71	0.31	0.12	M 6
SBH 16	16	10.40	4.85		2.92	4.26	3.97	7.32	0.35	0.13	M 6
SBH 19	19	13.80	7.68		2.25	3.23	5.73	11.6	0.55	0.20	M 6
SBH 29	29	13.80	7.68		2.72	3.94	7.50	14.6	0.68	0.25	M 6
SBH 39	39	13.80	7.68		3.11	4.53	9.04	17.1	0.79	0.29	M 8
SBH 49	49	13.80	7.68		3.70	5.40	11.5	20.1	0.93	0.34	M 8
SBH 59	59	13.80	7.68		4.06	5.95	12.3	23.2	1.08	0.40	M 10
SBH 69	69	13.80	7.68		5.00	7.37	14.1	30.5	1.28	0.48	M 10
SBH 79	79	13.80	7.68		5.00	7.37	15.4	30.5	1.28	0.48	M 10
SBH 88	88	13.80	7.68		6.26	9.14	17.4	36.0	1.63	0.61	M 10
SBH 98	98	13.80	7.68		6.26	9.14	18.7	36.0	1.57	0.58	M 10
SBH 118	118	13.80	7.68		7.21	10.60	21.2	42.7	1.92	0.71	M 10
SBH 137	137	13.80	7.68		9.93	14.70	26.5	61.0	2.65	0.98	2 x M 10
SBH 157	157	13.80	7.68		9.93	14.70	29.8	61.0	2.65	0.98	2 x M 10
SBH 177	177	13.80	7.68	6.26			36.4	73.2	3.22	1.19	2 x M 10
SBH 196	196	13.80	7.68	6.26			37.5	73.2	3.13	1.16	2 x M 10
SBH 236	236	13.80	7.68	7.21			44.1	85.4	4.06	1.50	2 x M 10
SBH 265	265	13.80	7.68	9.14			56.2	110	4.85	1.80	3 x M 10
SBH 294	294	13.80	7.68	9.14			57.3	104	4.63	1.72	3 x M 10
SBH 353	353	13.80	7.68	10.60			69.5	128	6.13	2.27	3 x M 10
SBH 393	393	13.80	7.68	12.00			79.4	140	6.22	2.30	4 x M 10
SBH 471	471	13.80	7.68	13.90			89.3	171	8.14	3.01	4 x M 10
SBH 491	491	13.80	7.68	14.90			100	177	7.78	2.88	5 x M 10
SBH 590	590	13.80	7.68	17.20			111	214	10.21	3.78	5 x M 10
SBH 640	640	16.00	7.68	14.90			116	177	9.28	3.43	5 x M 10
SBH 705	705	16.00	7.68	17.20			127	214	11.7	4.33	5 x M 10
SBH 765	765	16.00	7.68	17.20			132	214	11.6	4.28	5 x M 10
SBH 865	865	16.00	7.68	19.60			151	244	13.1	4.83	6 x M 10
SBH 920	920	16.00	7.68	20.60			159	256	13.8	5.12	6 x M 10

\* Value for initial filling (E22).

# LE Range

Performance **LE** range 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	C <sub>5</sub> Ah	Hours							Minutes					Seconds			
		10	8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
SBLE 7.5	7.5	0.74	0.86	1.15	1.69	2.10	2.37	2.66	3.26	3.67	3.92	4.31	4.97	6.76	7.21	8.45	8.71
SBLE 15	15	1.47	1.73	2.48	3.52	4.20	4.64	5.63	7.01	7.78	8.36	8.82	10.1	14.3	16.5	21.6	24.8
SBLE 22	22	2.16	2.53	3.64	5.17	6.16	6.80	8.25	10.3	11.4	12.3	12.9	14.8	20.9	24.2	31.7	36.3
SBLE 30	30	2.94	3.46	4.97	7.05	8.40	9.27	11.3	14.0	15.6	16.7	17.6	20.2	28.5	33.0	43.3	49.6
SBLE 40	40	3.92	4.61	6.62	9.40	11.2	12.4	15.0	18.7	20.7	22.3	23.5	26.9	38.0	44.0	57.7	66.1
SBLE 47	47	4.61	5.41	7.78	11.0	13.2	14.5	17.6	22.0	24.4	26.2	27.6	31.6	44.7	51.8	67.8	77.6
SBLE 62	62	6.08	7.14	10.3	14.6	17.4	19.2	23.3	29.0	32.1	34.5	36.5	41.7	58.9	68.3	89.4	102
SBLE 75	75	7.20	8.46	12.3	17.2	20.4	22.4	25.9	31.8	35.6	35.7	41.0	44.1	60.0	66.4	85.1	96
SBLE 95	95	9.31	10.9	15.7	21.5	24.7	27.0	31.4	38.8	41.0	42.6	47.9	55.9	71.0	77.8	96.5	107
SBLE 110	110	10.6	12.4	18.0	25.2	29.9	32.9	38.0	46.6	52.3	52.4	60.1	64.7	88.0	97.3	125	141
SBLE 140	140	13.7	16.1	23.2	31.7	36.4	39.7	46.2	57.2	60.5	62.7	70.6	82.3	105	115	142	158
SBLE 185	185	18.1	21.3	30.6	41.8	48.1	52.5	61.1	75.6	79.9	82.9	93.2	109	138	152	188	209
SBLE 230	230	22.5	26.5	38.1	52.0	59.8	65.3	75.9	94.0	99.4	103	116	135	172	188	234	259
SBLE 275	275	27.0	31.7	45.5	62.2	71.5	78.0	90.8	112	119	123	139	162	205	225	279	310
SBLE 325	325	31.9	37.4	53.8	73.5	84.5	92.2	107	133	140	146	164	191	243	266	330	366
SBLE 375	375	36.8	43.2	62.1	84.8	97.5	106	124	153	162	168	189	221	280	307	381	423
SBLE 415	415	40.7	47.8	68.7	93.9	108	118	137	170	179	186	209	244	310	340	422	468
SBLE 460	460	45.1	53.0	76.2	104	120	131	152	188	199	206	232	270	344	377	467	519
SBLE 510	510	50.0	58.8	84.5	115	133	145	168	208	220	228	257	300	381	418	518	575
SBLE 550	550	53.9	63.4	91.1	124	143	156	182	225	238	246	277	323	411	451	559	620
SBLE 600	600	58.8	69.1	99.4	136	156	170	198	245	259	269	302	353	448	492	610	676
SBLE 650	650	63.7	74.9	108	147	169	184	215	266	281	291	328	382	486	533	660	733
SBLE 700	700	68.6	80.6	116	158	182	199	231	286	302	314	353	412	523	574	711	789
SBLE 750	750	73.5	86.4	124	170	195	213	248	307	324	336	378	441	560	615	762	846
SBLE 830	830	81.3	95.6	137	188	216	235	274	339	359	372	418	488	620	680	843	936
SBLE 925	925	90.7	107	153	209	241	262	305	378	400	414	466	544	691	758	940	1043
SBLE 1020	1020	100	118	169	231	265	289	337	417	441	457	514	600	762	836	1036	1150
SBLE 1100	1100	108	127	182	249	286	312	363	450	475	493	554	647	822	901	1118	1240
SBLE 1200	1200	118	138	199	271	312	340	396	491	518	538	605	706	897	983	1219	1353
SBLE 1300	1300	127	150	215	294	338	369	429	531	562	582	655	764	971	1065	1321	1466
SBLE 1400	1400	137	161	232	317	364	397	462	572	605	627	706	823	1046	1147	1422	1578
SBLE 1500	1500	147	173	248	339	390	426	495	613	648	672	756	882	1121	1229	1524	1691
SBLE 1600	1600	157	184	265	362	416	454	528	654	691	717	806	941	1196	1311	1626	1804
SBLE 1660	1660	163	191	275	375	432	471	548	679	717	744	837	976	1240	1360	1687	1872

## Performance LE range 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	C <sub>5</sub> Ah	Hours							Minutes						Seconds		
		10	8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
SBLE 7.5	7.5	0.75	0.90	1.31	1.92	2.53	2.89	3.31	4.05	4.60	4.92	5.38	6.25	8.33	9.10	10.1	10.4
SBLE 15	15	1.50	1.84	2.82	4.00	5.04	5.82	6.96	8.78	9.7	10.4	11.7	13.6	17.4	20.0	26.2	29.8
SBLE 22	22	2.20	2.70	4.14	5.87	7.39	8.54	10.2	12.9	14.3	15.2	17.1	20.0	25.6	29.3	38.4	43.6
SBLE 30	30	3.00	3.68	5.64	8.01	10.1	11.6	13.9	17.6	19.5	20.7	23.3	27.2	34.9	40.0	52.3	59.5
SBLE 40	40	4.00	4.90	7.53	10.7	13.4	15.5	18.6	23.4	26.0	27.6	31.1	36.3	46.5	53.4	69.8	79.3
SBLE 47	47	4.70	5.76	8.84	12.5	15.8	18.2	21.8	27.5	30.5	32.4	36.5	42.6	54.7	62.7	82.0	93.2
SBLE 62	62	6.20	7.60	11.7	16.5	20.8	24.1	28.8	36.3	40.3	42.8	48.2	56.2	72.1	82.7	108	123
SBLE 75	75	7.43	9.10	14.0	20.0	24.9	28.3	33.6	40.4	44.5	45.0	50.0	58.3	73.4	82.1	103	115
SBLE 95	95	9.50	11.6	17.9	24.8	30.7	34.3	41.0	48.3	52.0	57.0	63.3	65.7	87.1	94.9	116	127
SBLE 110	110	10.9	13.3	20.5	29.4	36.5	41.5	49.3	59.3	65.2	66.0	73.3	85.5	108	120	150	169
SBLE 140	140	14.0	17.2	26.3	36.5	45.2	50.5	60.5	71.1	76.6	84.0	93.2	96.8	128	140	170	187
SBLE 185	185	18.5	22.7	34.8	48.3	59.8	66.7	79.9	94.0	101	111	123	128	170	185	225	247
SBLE 230	230	23.0	28.2	43.3	60.0	74.3	83.0	99.4	117	126	138	153	159	211	230	280	307
SBLE 275	275	27.5	33.7	51.7	71.7	88.8	99.2	119	140	150	165	183	190	252	275	335	367
SBLE 325	325	32.5	39.8	61.2	84.8	105	117	140	165	178	195	216	225	298	325	396	433
SBLE 375	375	37.5	45.9	70.6	97.8	121	135	162	191	205	225	250	259	344	374	457	500
SBLE 415	415	41.5	50.8	78.1	108	134	150	179	211	227	249	276	287	380	414	505	554
SBLE 460	460	46.0	56.4	86.6	120	149	166	199	234	252	276	306	318	422	459	560	614
SBLE 510	510	51.0	62.5	96.0	133	165	184	220	259	279	306	340	353	467	509	621	680
SBLE 550	550	55.0	67.4	103	143	178	198	238	280	301	330	366	380	504	549	670	734
SBLE 600	600	60.0	73.5	113	157	194	216	259	305	328	360	400	415	550	599	731	800
SBLE 650	650	65.0	79.6	122	170	210	235	281	330	356	390	433	449	596	649	791	867
SBLE 700	700	70.0	85.8	132	183	226	253	302	356	383	420	466	484	642	699	852	934
SBLE 750	750	75.0	91.9	141	196	242	271	324	381	410	450	500	518	687	749	913	1000
SBLE 830	830	83.0	102	156	217	268	299	359	422	454	498	553	574	761	829	1011	1107
SBLE 925	925	92.5	113	174	241	299	334	400	470	506	555	616	639	848	924	1126	1234
SBLE 1020	1020	102	125	192	266	329	368	441	518	558	612	679	705	935	1019	1242	1360
SBLE 1100	1100	110	135	207	287	355	397	475	559	602	660	733	760	1008	1099	1339	1467
SBLE 1200	1200	120	147	226	313	388	433	518	610	657	720	799	829	1100	1198	1461	1601
SBLE 1300	1300	130	159	245	339	420	469	562	661	711	780	866	899	1192	1298	1583	1734
SBLE 1400	1400	140	172	263	365	452	505	605	711	766	840	932	968	1283	1398	1705	1867
SBLE 1500	1500	150	184	282	391	485	541	648	762	821	900	999	1037	1375	1498	1826	2001
SBLE 1600	1600	160	196	301	417	517	577	691	813	876	960	1066	1106	1466	1598	1948	2134
SBLE 1660	1660	166	203	312	433	536	599	717	844	908	996	1106	1147	1521	1658	2021	2214

**Performance LE range 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	C <sub>5</sub> Ah	Hours							Minutes						Seconds		
		10	8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
SBLE 7.5	7.5	0.77	0.95	1.49	2.17	2.89	3.48	4.07	5.03	5.61	6.04	6.73	7.88	10.3	11.1	12.8	13.3
SBLE 15	15	1.53	1.89	2.94	4.65	5.90	6.79	8.43	11.0	12.8	13.8	15.2	16.0	21.6	24.3	31.6	35.6
SBLE 22	22	2.24	2.78	4.31	6.82	8.66	10.0	12.4	16.2	18.8	20.2	22.4	23.4	31.7	35.6	46.4	52.3
SBLE 30	30	3.06	3.79	5.88	9.30	11.8	13.6	16.9	22.1	25.6	27.6	30.5	32.0	43.2	48.5	63.3	71.3
SBLE 40	40	4.08	5.05	7.84	12.4	15.7	18.1	22.5	29.4	34.1	36.8	40.7	42.6	57.6	64.7	84.4	95.0
SBLE 47	47	4.79	5.93	9.21	14.6	18.5	21.3	26.4	34.6	40.1	43.3	47.8	50.1	67.7	76.0	99.1	112
SBLE 62	62	6.32	7.83	12.2	19.2	24.4	28.1	34.8	45.6	52.9	57.1	63.0	66.1	89.4	100	131	147
SBLE 75	75	7.50	9.38	14.7	23.5	29.3	33.5	39.4	50.4	56.9	60.8	65.8	73.3	90.7	100	127	140
SBLE 95	95	9.69	12.1	18.8	29.5	36.7	41.4	49.1	62.3	68.7	71.1	79.0	92.8	107	117	140	152
SBLE 110	110	11.0	13.8	21.6	34.5	43.0	49.2	57.7	73.9	83.4	89.2	96.6	107	133	147	186	205
SBLE 140	140	14.3	17.8	27.7	43.4	54.1	61.0	72.3	91.8	101	105	116	137	157	172	207	224
SBLE 185	185	18.9	23.5	36.6	57.4	71.5	80.6	95.6	121	134	139	154	181	208	228	273	297
SBLE 230	230	23.5	29.2	45.5	71.3	89.0	100	119	151	166	172	191	225	259	283	340	369
SBLE 275	275	28.1	34.9	54.5	85.3	106	120	142	180	199	206	229	269	309	338	406	441
SBLE 325	325	33.2	41.2	64.4	101	126	142	168	213	235	243	270	317	366	400	480	521
SBLE 375	375	38.3	47.6	74.3	116	145	163	194	246	271	281	312	366	422	461	554	601
SBLE 415	415	42.3	52.7	82.2	129	161	181	214	272	300	311	345	405	467	511	613	665
SBLE 460	460	46.9	58.4	91.1	143	178	200	238	302	333	344	383	449	517	566	679	737
SBLE 510	510	52.0	64.7	101	158	197	222	263	335	369	382	424	498	574	627	753	817
SBLE 550	550	56.1	69.8	109	171	213	240	284	361	398	412	457	537	619	677	812	882
SBLE 600	600	61.2	76.1	119	186	232	261	310	394	434	449	499	586	675	738	886	962
SBLE 650	650	66.3	82.5	129	202	251	283	336	426	470	487	541	635	731	800	960	1042
SBLE 700	700	71.4	88.8	139	217	271	305	362	459	506	524	582	684	787	861	1033	1122
SBLE 750	750	76.5	95.2	149	233	290	327	387	492	542	562	624	733	844	923	1107	1202
SBLE 830	830	84.7	105	164	257	321	362	429	544	600	622	690	811	934	1021	1225	1330
SBLE 925	925	94.4	117	183	287	358	403	478	607	669	693	769	904	1040	1138	1366	1483
SBLE 1020	1020	104	129	202	316	394	444	527	669	737	764	848	996	1147	1255	1506	1635
SBLE 1100	1100	112	140	218	341	425	479	568	722	795	824	915	1074	1237	1353	1624	1763
SBLE 1200	1200	122	152	238	372	464	523	620	787	867	899	998	1172	1350	1476	1772	1923
SBLE 1300	1300	133	165	257	403	503	566	672	853	940	973	1081	1270	1462	1599	1919	2084
SBLE 1400	1400	143	178	277	434	541	610	723	918	1012	1048	1164	1368	1575	1722	2067	2244
SBLE 1500	1500	153	190	297	465	580	654	775	984	1084	1123	1247	1465	1687	1845	2214	2404
SBLE 1600	1600	163	203	317	496	619	697	827	1050	1157	1198	1331	1563	1800	1968	2362	2565
SBLE 1660	1660	169	211	329	515	642	723	858	1089	1200	1243	1380	1621	1867	2042	2451	2661



**Performance LE range 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	C <sub>5</sub> Ah	Hours							Minutes					Seconds			
		10	8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
SBLE 7.5	7.5	0.77	0.95	1.50	2.42	3.30	3.94	4.89	6.04	6.82	7.29	8.10	9.54	12.4	13.7	15.5	15.9
SBLE 15	15	1.54	1.91	3.00	4.80	6.35	7.65	9.69	13.4	15.1	16.3	18.0	21.6	26.8	29.7	38.3	43.1
SBLE 22	22	2.26	2.81	4.40	7.04	9.31	11.2	14.2	19.7	22.2	23.9	26.4	31.7	39.3	43.6	56.1	63.2
SBLE 30	30	3.08	3.83	6.00	9.60	12.7	15.3	19.4	26.9	30.3	32.6	36.0	43.2	53.6	59.4	76.6	86.2
SBLE 40	40	4.10	5.10	8.00	12.8	16.9	20.4	25.8	35.9	40.3	43.5	48.0	57.6	71.4	79.3	102	115
SBLE 47	47	4.82	5.99	9.40	15.0	19.9	24.0	30.4	42.1	47.4	51.1	56.4	67.7	83.9	93.1	120	135
SBLE 62	62	6.36	7.91	12.4	19.8	26.2	31.6	40.1	55.6	62.5	67.5	74.4	89.3	111	123	158	178
SBLE 75	75	7.58	9.47	15.0	24.0	32.1	37.8	46.5	61.6	69.3	73.2	79.2	90.0	113	121	154	171
SBLE 95	95	9.79	12.1	19.0	30.4	39.8	46.8	57.3	76.5	85.4	91.2	100	109	133	143	171	184
SBLE 110	110	11.1	13.9	22.0	35.2	47.1	55.5	68.3	90.4	101.6	107.4	116	132	166	177	226	251
SBLE 140	140	14.4	17.9	28.0	44.8	58.6	68.9	84.5	113	126	134	148	161	196	210	252	271
SBLE 185	185	19.1	23.6	37.0	59.2	77.4	91.1	112	149	166	178	195	213	259	278	333	358
SBLE 230	230	23.7	29.3	46.0	73.6	96.3	113	139	185	207	221	243	265	322	345	414	445
SBLE 275	275	28.3	35.1	55.0	88.0	115	135	166	221	247	264	290	317	385	413	495	532
SBLE 325	325	33.5	41.4	65.0	104	136	160	196	262	292	312	343	374	454	488	585	629
SBLE 375	375	38.6	47.8	75.0	120	157	185	226	302	337	360	396	432	524	563	675	726
SBLE 415	415	42.7	52.9	83.0	133	174	204	250	334	373	398	438	478	580	623	747	804
SBLE 460	460	47.4	58.7	92.0	147	193	227	278	370	414	442	486	530	643	690	829	891
SBLE 510	510	52.5	65.0	102	163	213	251	308	411	459	490	539	588	713	766	919	988
SBLE 550	550	56.7	70.1	110	176	230	271	332	443	495	528	581	634	769	826	991	1065
SBLE 600	600	61.8	76.5	120	192	251	295	362	483	539	576	634	691	839	901	1081	1162
SBLE 650	650	67.0	82.9	130	208	272	320	392	523	584	624	686	749	909	976	1171	1259
SBLE 700	700	72.1	89.3	140	224	293	345	422	564	629	672	739	806	979	1051	1261	1355
SBLE 750	750	77.3	95.6	150	240	314	369	453	604	674	720	792	864	1049	1126	1351	1452
SBLE 830	830	85.5	106	166	266	347	409	501	668	746	797	876	956	1161	1246	1495	1607
SBLE 925	925	95.3	118	185	296	387	456	558	745	832	888	977	1066	1294	1388	1666	1791
SBLE 1020	1020	105	130	204	326	427	502	616	821	917	979	1077	1175	1426	1531	1837	1975
SBLE 1100	1100	113	140	220	352	460	542	664	886	989	1056	1162	1267	1538	1651	1981	2130
SBLE 1200	1200	124	153	240	384	502	591	724	966	1079	1152	1267	1382	1678	1801	2161	2324
SBLE 1300	1300	134	166	260	416	544	640	785	1047	1169	1248	1373	1498	1818	1951	2342	2517
SBLE 1400	1400	144	179	280	448	586	689	845	1127	1259	1344	1478	1613	1958	2101	2522	2711
SBLE 1500	1500	155	191	300	480	628	739	905	1208	1349	1440	1584	1728	2098	2252	2702	2904
SBLE 1600	1600	165	204	320	512	670	788	966	1288	1439	1536	1690	1843	2237	2402	2882	3098
SBLE 1660	1660	171	212	332	531	695	817	1002	1336	1493	1594	1753	1912	2321	2492	2990	3214

# M Range

Performance **M** range 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	C <sub>5</sub> Ah	Hours							Minutes					Seconds			
		10	8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
SBM 11	11	1.06	1.32	2.07	2.79	3.48	4.06	4.75	6.07	7.03	7.74	8.84	10.8	16.1	18.3	21.8	24.2
SBM 15	15	1.45	1.80	2.82	3.80	4.75	5.54	6.48	8.28	9.59	10.6	12.1	14.8	22.0	24.9	29.8	33.0
SBM 22	22	2.13	2.64	4.14	5.59	7.01	8.25	9.50	12.3	14.1	15.3	17.5	21.1	29.8	33.4	38.9	40.2
SBM 30	30	2.90	3.60	5.64	7.62	9.56	11.2	13.0	16.8	19.2	20.9	23.9	28.7	40.6	45.6	53.1	54.8
SBM 43	43	4.16	5.16	8.08	11.0	13.9	16.6	19.5	25.2	29.0	32.0	36.3	43.8	62.8	70.3	82.1	85.5
SBM 56	56	5.42	6.72	10.5	14.3	18.1	21.6	25.4	32.5	37.3	40.5	46.2	55.2	77.2	85.9	99.1	102
SBM 65	65	6.29	7.80	12.2	16.6	21.1	25.1	29.5	38.1	43.8	48.3	54.9	66.2	94.9	106	124	129
SBM 84	84	8.12	10.1	15.8	21.4	27.2	32.4	38.1	48.7	56.0	60.8	69.2	82.8	116	129	149	153
SBM 112	112	10.8	13.4	21.1	28.6	36.2	43.2	50.8	64.9	74.6	81.0	92.3	110	154	172	198	204
SBM 138	138	13.3	16.6	25.9	35.2	44.6	53.2	62.6	80.0	91.9	99.9	114	136	190	212	244	252
SBM 161	161	15.6	19.3	30.3	41.1	52.1	62.1	73.0	93.3	107	116	133	159	222	247	285	294
SBM 184	184	17.8	22.1	34.6	46.9	59.5	70.9	83.4	107	123	133	152	181	254	282	326	336
SBM 208	208	20.1	25.0	39.1	53.0	67.3	80.2	94.3	121	139	151	171	205	287	319	368	380
SBM 231	231	22.3	27.7	43.4	58.9	74.7	89.1	105	134	154	167	190	228	319	354	409	422
SBM 277	277	26.8	33.2	52.1	70.6	89.6	107	126	161	185	200	228	273	382	425	490	505
SBM 300	300	29.0	36.0	56.4	76.5	97.0	116	136	174	200	217	247	296	414	460	531	547
SBM 323	323	31.2	38.8	60.7	82.4	104	125	146	187	215	234	266	318	446	495	572	589
SBM 346	346	33.5	41.5	65.0	88.2	112	133	157	201	231	250	285	341	477	531	612	631
SBM 369	369	35.7	44.3	69.4	94.1	119	142	167	214	246	267	304	364	509	566	653	673
SBM 392	392	37.9	47.0	73.7	99.9	127	151	178	227	261	284	323	386	541	601	694	715
SBM 415	415	40.1	49.8	78.0	106	134	160	188	241	276	300	342	409	572	637	735	757
SBM 438	438	42.4	52.6	82.3	112	142	169	199	254	292	317	361	432	604	672	775	799
SBM 461	461	44.6	55.3	86.7	118	149	178	209	267	307	334	380	454	636	707	816	841
SBM 505	505	48.8	60.6	94.9	129	163	195	229	293	336	365	416	498	697	775	894	922
SBM 555	555	53.7	66.6	104	142	179	214	252	322	370	402	458	547	766	851	982	1013
SBM 625	625	60.4	75.0	118	159	202	241	283	362	416	452	515	616	862	959	1106	1141
SBM 690	690	66.7	82.8	130	176	223	266	313	400	460	499	569	680	952	1058	1221	1259
SBM 740	740	71.6	88.8	139	189	239	285	336	429	493	535	610	729	1021	1135	1310	1350
SBM 830	830	80.3	99.6	156	212	268	320	376	481	553	601	684	818	1145	1273	1469	1515
SBM 920	920	89.0	110	173	235	298	355	417	533	613	666	758	906	1269	1411	1628	1679
SBM 965	965	93.3	116	181	246	312	372	438	559	643	698	796	951	1331	1480	1708	1761
SBM 1040	1040	101	125	196	265	336	401	472	603	693	753	857	1025	1434	1595	1841	1898
SBM 1150	1150	111	138	216	293	372	443	522	667	766	832	948	1133	1586	1764	2035	2099
SBM 1220	1220	118	146	229	311	395	470	553	707	813	883	1006	1202	1683	1871	2159	2226
SBM 1390	1390	134	167	261	354	450	536	630	806	926	1006	1146	1369	1917	2132	2460	2536

## Performance M range 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	C <sub>5</sub> Ah	Hours							Minutes					Seconds			
		10	8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
SBM 11	11	1.09	1.35	2.15	3.19	4.08	4.82	5.84	7.57	8.75	9.58	10.9	13.4	19.7	22.6	27.6	29.3
SBM 15	15	1.49	1.85	2.93	4.35	5.56	6.58	7.97	10.3	11.9	13.1	14.9	18.3	26.9	30.8	37.7	39.9
SBM 22	22	2.18	2.71	4.29	6.38	8.19	9.72	11.9	15.3	17.7	19.2	21.5	26.1	37.0	41.4	49.2	52.4
SBM 30	30	2.97	3.69	5.85	8.71	11.2	13.3	16.2	20.9	24.1	26.1	29.4	35.6	50.5	56.5	67.1	71.4
SBM 43	43	4.26	5.29	8.39	12.5	16.1	19.4	24.2	31.5	36.7	39.9	44.9	54.4	76.9	87.0	103	119
SBM 56	56	5.55	6.89	10.9	16.3	21.0	25.3	31.5	40.6	47.0	50.8	57.3	68.4	95.4	106	126	133
SBM 65	65	6.44	8.00	12.7	18.9	24.4	29.3	36.5	47.6	55.5	60.4	67.8	82.2	116	132	156	180
SBM 84	84	8.32	10.3	16.4	24.5	31.5	37.9	47.2	60.9	70.5	76.2	85.9	103	143	160	188	200
SBM 112	112	11.1	13.8	21.8	32.6	42.1	50.5	63.0	81.2	94.0	102	115	137	191	213	251	267
SBM 138	138	13.7	17.0	26.9	40.2	51.8	62.3	77.6	100	116	125	141	168	235	262	309	329
SBM 161	161	16.0	19.8	31.4	46.9	60.5	72.7	90.5	117	135	146	165	197	274	306	361	383
SBM 184	184	18.2	22.6	35.9	53.6	69.1	83.0	103	133	154	167	188	225	313	350	413	438
SBM 208	208	20.6	25.6	40.6	60.6	78.1	93.9	117	151	175	189	213	254	354	395	466	495
SBM 231	231	22.9	28.4	45.0	67.2	86.7	104	130	168	194	210	236	282	394	439	518	550
SBM 277	277	27.4	34.1	54.0	80.6	104	125	156	201	233	251	283	338	472	527	621	660
SBM 300	300	29.7	36.9	58.5	87.3	113	135	169	218	252	272	307	366	511	570	673	714
SBM 323	323	32.0	39.7	63.0	94.0	121	146	182	234	271	293	330	394	550	614	724	769
SBM 346	346	34.3	42.6	67.5	101	130	156	194	251	291	314	354	422	589	658	776	824
SBM 369	369	36.6	45.4	72.0	107	139	167	207	268	310	335	377	451	629	702	827	879
SBM 392	392	38.8	48.2	76.4	114	147	177	220	284	329	356	401	479	668	745	879	933
SBM 415	415	41.1	51.0	80.9	121	156	187	233	301	348	377	424	507	707	789	930	988
SBM 438	438	43.4	53.9	85.4	128	164	198	246	318	368	397	448	535	746	833	982	1043
SBM 461	461	45.7	56.7	89.9	134	173	208	259	334	387	418	471	563	785	876	1034	1098
SBM 505	505	50.0	62.1	98.5	147	190	228	284	366	424	458	516	617	860	960	1132	1202
SBM 555	555	55.0	68.3	108	162	208	250	312	402	466	504	567	678	945	1055	1244	1321
SBM 625	625	61.9	76.9	122	182	235	282	351	453	525	567	639	763	1065	1188	1401	1488
SBM 690	690	68.4	84.9	135	201	259	311	388	500	579	626	706	842	1175	1312	1547	1643
SBM 740	740	73.3	91.0	144	215	278	334	416	537	621	672	757	904	1261	1407	1659	1762
SBM 830	830	82.2	102	162	242	312	375	467	602	697	753	849	1013	1414	1578	1861	1976
SBM 920	920	91.2	113	179	268	345	415	517	667	772	835	941	1123	1567	1749	2063	2190
SBM 965	965	95.6	119	188	281	362	435	542	700	810	876	987	1178	1644	1835	2164	2298
SBM 1040	1040	103	128	203	303	391	469	585	754	873	944	1063	1270	1772	1977	2332	2476
SBM 1150	1150	114	141	224	335	432	519	646	834	966	1044	1176	1404	1959	2186	2578	2738
SBM 1220	1220	121	150	238	355	458	551	686	885	1024	1107	1247	1490	2078	2319	2735	2905
SBM 1390	1390	138	171	271	405	522	627	781	1008	1167	1261	1421	1697	2368	2643	3117	3310

**Performance M range 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	C <sub>5</sub> Ah	Hours							Minutes						Seconds		
		10	8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
SBM 11	11	1.11	1.38	2.18	3.54	4.59	5.50	7.04	9.18	10.5	11.7	13.5	16.4	24.2	27.9	34.4	37.2
SBM 15	15	1.51	1.88	2.97	4.83	6.26	7.50	9.60	12.5	14.4	16.0	18.4	22.4	33.0	38.1	46.9	50.7
SBM 22	22	2.22	2.75	4.36	7.08	9.23	11.1	14.2	18.7	21.2	23.6	26.9	32.2	45.4	51.5	61.1	65.9
SBM 30	30	3.02	3.75	5.94	9.66	12.6	15.1	19.4	25.5	29.0	32.2	36.7	43.9	61.9	70.3	83.3	89.8
SBM 43	43	4.33	5.38	8.51	13.9	18.1	21.9	28.9	38.9	44.1	48.7	56.2	67.4	95.1	108	130	139
SBM 56	56	5.64	7.00	11.1	18.1	23.6	28.6	37.7	50.2	57.0	63.0	71.5	84.8	118	132	156	168
SBM 65	65	6.55	8.13	12.9	21.0	27.4	33.1	43.7	58.8	66.7	73.6	85.0	102	144	163	196	210
SBM 84	84	8.46	10.5	16.6	27.1	35.4	42.8	56.5	75.3	85.5	94.5	107	127	176	199	234	252
SBM 112	112	11.3	14.0	22.2	36.2	47.2	57.1	75.3	100	114	126	143	170	235	265	312	336
SBM 138	138	13.9	17.3	27.3	44.6	58.1	70.4	92.8	124	141	155	176	209	290	326	384	414
SBM 161	161	16.2	20.1	31.9	52.0	67.8	82.1	108	144	164	181	206	244	338	381	448	483
SBM 184	184	18.5	23.0	36.4	59.4	77.5	93.8	124	165	187	207	235	279	387	435	513	553
SBM 208	208	20.9	26.0	41.2	67.2	87.6	106	140	187	212	234	266	315	437	492	579	625
SBM 231	231	23.3	28.9	45.7	74.6	97.3	118	155	207	235	260	295	350	485	546	643	694
SBM 277	277	27.9	34.6	54.8	89.5	117	141	186	248	282	312	354	420	582	655	772	832
SBM 300	300	30.2	37.5	59.4	96.9	126	153	202	269	305	337	383	455	630	709	836	901
SBM 323	323	32.5	40.4	63.9	104	136	165	217	290	329	363	413	489	679	764	900	970
SBM 346	346	34.8	43.3	68.5	112	146	176	233	310	352	389	442	524	727	818	964	1039
SBM 369	369	37.2	46.1	73.1	119	155	188	248	331	376	415	471	559	775	872	1028	1108
SBM 392	392	39.5	49.0	77.6	127	165	200	264	352	399	441	501	594	824	927	1092	1177
SBM 415	415	41.8	51.9	82.2	134	175	212	279	372	423	467	530	629	872	981	1156	1246
SBM 438	438	44.1	54.8	86.7	141	184	223	295	393	446	493	559	664	920	1035	1220	1315
SBM 461	461	46.4	57.6	91.3	149	194	235	310	413	469	519	589	698	968	1090	1284	1384
SBM 505	505	50.9	63.1	100	163	213	258	340	453	514	568	645	765	1061	1194	1407	1517
SBM 555	555	55.9	69.4	110	179	234	283	373	498	565	624	709	841	1166	1312	1546	1667
SBM 625	625	62.9	78.1	124	202	263	319	420	561	636	703	798	947	1313	1478	1741	1877
SBM 690	690	69.5	86.3	137	223	291	352	464	619	703	776	881	1045	1450	1631	1922	2072
SBM 740	740	74.5	92.5	147	239	312	377	498	664	754	832	945	1121	1555	1749	2061	2222
SBM 830	830	83.6	104	164	268	350	423	558	744	845	934	1060	1258	1744	1962	2312	2492
SBM 920	920	92.6	115	182	297	388	469	619	825	937	1035	1175	1394	1933	2175	2563	2763
SBM 965	965	97.2	121	191	312	406	492	649	865	983	1085	1232	1462	2027	2281	2688	2898
SBM 1040	1040	105	130	206	336	438	530	699	933	1059	1170	1328	1576	2185	2459	2897	3123
SBM 1150	1150	116	144	228	371	484	586	773	1031	1171	1294	1469	1742	2416	2719	3203	3453
SBM 1220	1220	123	153	242	394	514	622	820	1094	1242	1372	1558	1848	2563	2884	3398	3664
SBM 1390	1390	140	174	275	449	586	709	935	1247	1415	1564	1775	2106	2920	3286	3872	4174

**Performance M range 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	C <sub>5</sub> Ah	Hours							Minutes					Seconds			
		10	8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
SBM 11	11	1.12	1.39	2.20	3.60	5.24	6.27	8.04	10.8	12.7	14.0	15.9	19.8	29.3	33.6	42.3	46.6
SBM 15	15	1.52	1.89	3.00	4.91	7.14	8.55	11.0	14.8	17.3	19.1	21.7	27.0	40.0	45.9	57.7	63.6
SBM 22	22	2.23	2.77	4.40	7.19	10.5	12.6	16.3	22.0	25.8	28.2	31.8	38.9	55.4	62.5	75.3	79.7
SBM 30	30	3.04	3.78	6.00	9.81	14.3	17.2	22.2	30.0	35.2	38.4	43.4	53.0	75.6	85.2	103	109
SBM 43	43	4.36	5.42	8.60	14.1	20.6	24.8	32.2	45.8	53.6	58.8	66.8	81.6	115	131	159	169
SBM 56	56	5.68	7.06	11.2	18.3	26.8	32.3	41.9	59.3	69.3	75.8	85.6	104	144	161	192	204
SBM 65	65	6.60	8.19	13.0	21.3	31.1	37.5	48.6	69.3	81.0	88.9	101	123	174	198	240	256
SBM 84	84	8.53	10.6	16.8	27.5	40.2	48.4	62.8	88.9	104	114	128	155	216	242	289	305
SBM 112	112	11.4	14.1	22.4	36.6	53.5	64.6	83.8	119	139	152	171	207	289	323	385	407
SBM 138	138	14.0	17.4	27.6	45.1	66.0	79.6	103	146	171	187	211	255	356	398	474	502
SBM 161	161	16.3	20.3	32.2	52.6	77.0	92.8	120	170	199	218	246	298	415	464	553	585
SBM 184	184	18.7	23.2	36.8	60.2	88.0	106	138	195	228	249	281	340	474	530	632	669
SBM 208	208	21.1	26.2	41.6	68.0	99.4	120	156	220	257	281	318	384	536	599	715	756
SBM 231	231	23.4	29.1	46.2	75.5	110	133	173	244	286	313	353	427	595	666	794	840
SBM 277	277	28.1	34.9	55.4	90.6	132	160	207	293	343	375	424	512	714	798	952	1007
SBM 300	300	30.4	37.8	60.0	98.1	143	173	224	317	371	406	459	555	773	865	1031	1091
SBM 323	323	32.8	40.7	64.6	106	154	186	242	342	400	437	494	597	832	931	1110	1175
SBM 346	346	35.1	43.6	69.2	113	165	200	259	366	428	468	529	640	892	997	1189	1258
SBM 369	369	37.5	46.5	73.8	121	176	213	276	390	457	499	564	682	951	1063	1268	1342
SBM 392	392	39.8	49.4	78.4	128	187	226	293	415	485	530	599	725	1010	1130	1347	1425
SBM 415	415	42.1	52.3	83.0	136	198	239	310	439	514	562	635	767	1070	1196	1426	1509
SBM 438	438	44.5	55.2	87.6	143	209	253	328	463	542	593	670	810	1129	1262	1505	1593
SBM 461	461	46.8	58.1	92.2	151	220	266	345	488	571	624	705	852	1188	1329	1584	1676
SBM 505	505	51.3	63.6	101	165	241	291	378	534	625	683	772	933	1302	1455	1735	1836
SBM 555	555	56.3	69.9	111	181	265	320	415	587	687	751	849	1026	1430	1599	1907	2018
SBM 625	625	63.4	78.7	125	204	299	360	467	661	774	846	956	1155	1611	1801	2148	2273
SBM 690	690	70.0	86.9	138	226	330	398	516	730	854	934	1055	1275	1778	1988	2371	2509
SBM 740	740	75.1	93.2	148	242	354	427	553	783	916	1001	1131	1368	1907	2133	2543	2691
SBM 830	830	84.2	105	166	271	397	479	621	878	1027	1123	1269	1534	2139	2392	2852	3018
SBM 920	920	93.4	116	184	301	440	531	688	974	1139	1245	1407	1701	2371	2651	3162	3345
SBM 965	965	97.9	122	193	316	461	557	722	1021	1194	1306	1476	1784	2487	2781	3316	3509
SBM 1040	1040	106	131	208	340	497	600	778	1101	1287	1407	1590	1922	2680	2997	3574	3782
SBM 1150	1150	117	145	230	376	550	663	860	1217	1423	1556	1758	2126	2964	3314	3952	4182
SBM 1220	1220	124	154	244	399	583	704	912	1291	1510	1651	1865	2255	3144	3516	4192	4436
SBM 1390	1390	141	175	278	455	664	802	1040	1471	1720	1881	2125	2569	3582	4006	4777	5055

# H Range

Performance **H** range 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	C <sub>5</sub> Ah	Hours						Minutes						Seconds		
		8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
SBH 8.3	8.3	0.97	1.54	2.51	3.66	4.74	6.24	8.32	9.68	10.7	11.9	14.6	22.7	26.4	32.2	38.6
SBH 12	12	1.40	2.22	3.62	5.29	6.86	9.02	12.0	14.0	15.4	17.2	21.1	32.8	38.2	46.5	55.8
SBH 16	16	1.87	2.96	4.83	7.05	9.14	12.0	16.0	18.7	20.6	22.9	28.1	43.7	51.0	62.0	74.4
SBH 19	19	2.22	3.52	5.76	8.42	10.9	14.5	19.5	22.8	25.1	27.8	33.9	52.6	60.9	76.0	79.8
SBH 29	29	3.39	5.37	8.79	12.8	16.6	22.1	29.8	34.8	38.3	42.4	51.8	80.3	92.9	116.0	122
SBH 39	39	4.56	7.22	11.8	17.3	22.3	29.7	40.1	46.8	51.5	57.0	69.6	108	125	156	164
SBH 49	49	5.73	9.07	14.8	21.7	28.1	37.3	50.4	58.8	64.6	71.6	87.5	136	157	196	206
SBH 59	59	6.90	10.9	17.9	26.1	33.8	44.9	60.7	70.7	77.8	86.3	105	163	189	236	248
SBH 69	69	8.07	12.8	20.9	30.6	39.5	52.6	71.0	82.7	91.0	101	123	191	221	276	290
SBH 79	79	9.24	14.6	23.9	35.0	45.3	60.2	81.3	94.7	104	115	141	219	253	316	332
SBH 88	88	10.3	16.3	26.7	39.0	50.4	67.0	90.5	106	116	129	157	244	282	352	370
SBH 98	98	11.5	18.1	29.7	43.4	56.2	74.6	101	118	129	143	175	271	314	392	412
SBH 118	118	13.8	21.8	35.8	52.3	67.6	89.9	121	141	156	173	211	327	378	472	496
SBH 137	137	16.0	25.3	41.5	60.7	78.5	104	141	164	181	200	245	380	439	548	576
SBH 157	157	18.4	29.0	47.6	69.6	90.0	120	162	188	207	230	280	435	503	628	660
SBH 177	177	20.7	32.7	53.6	78.4	101	135	182	212	234	259	316	490	567	708	744
SBH 196	196	22.9	36.3	59.4	86.8	112	149	202	235	259	287	350	543	628	784	824
SBH 236	236	27.6	43.7	71.5	105	135	180	243	283	311	345	421	654	756	944	992
SBH 265	265	31.0	49.0	80.3	117	152	202	273	318	350	387	473	734	849	1060	1113
SBH 294	294	34.4	54.4	89.1	130	168	224	302	353	388	430	525	814	942	1176	1235
SBH 353	353	41.3	65.3	107	156	202	269	363	423	466	516	630	978	1131	1412	1483
SBH 393	393	46.0	72.7	119	174	225	299	404	471	518	575	702	1089	1260	1572	1651
SBH 471	471	55.1	87.1	143	209	270	359	485	565	621	689	841	1305	1510	1884	1979
SBH 491	491	57.4	90.8	149	218	281	374	505	589	648	718	877	1360	1574	1964	2063
SBH 590	590	69.0	109	179	261	338	449	607	707	778	863	1054	1634	1891	2360	2479
SBH 640	640	74.9	118	193	283	366	481	645	744	814	890	1085	1614	1850	2177	2254
SBH 705	705	82.5	130	213	312	403	530	710	820	897	981	1195	1778	2038	2399	2483
SBH 765	765	89.5	142	231	338	438	575	770	890	973	1064	1297	1929	2212	2603	2694
SBH 865	865	101	160	261	382	495	650	871	1006	1100	1203	1467	2181	2501	2943	3046
SBH 920	920	108	170	278	407	526	692	927	1070	1170	1280	1560	2320	2660	3130	3240

**Performance H range 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	C <sub>5</sub> Ah	Hours						Minutes						Seconds		
		8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
SBH 8.3	8.3	1.00	1.59	2.61	3.84	5.02	7.06	10.8	12.4	13.8	15.5	18.6	28.2	32.8	41.5	43.7
SBH 12	12	1.45	2.30	3.78	5.56	7.26	10.2	15.6	18.0	20.0	22.3	26.9	40.8	47.4	60.0	63.2
SBH 16	16	1.94	3.07	5.04	7.41	9.68	13.6	20.8	24.0	26.7	29.8	35.9	54.4	63.2	80.0	84.2
SBH 19	19	2.30	3.65	5.99	8.80	11.5	16.4	25.3	29.3	32.6	36.3	43.5	65.7	76.0	93.1	104
SBH 29	29	3.51	5.57	9.14	13.4	17.6	25.0	38.7	44.7	49.8	55.4	66.4	100	116	142	159
SBH 39	39	4.72	7.49	12.3	18.1	23.6	33.6	52.0	60.1	67.0	74.6	89.2	135	156	191	214
SBH 49	49	5.93	9.41	15.4	22.7	29.7	42.2	65.3	75.5	84.2	93.7	112	170	196	240	269
SBH 59	59	7.14	11.3	18.6	27.3	35.8	50.8	78.7	90.9	101	113	135	204	236	289	324
SBH 69	69	8.35	13.2	21.7	31.9	41.8	59.4	92.0	106	119	132	158	239	276	338	379
SBH 79	79	9.56	15.2	24.9	36.6	47.9	68.0	105	122	136	151	181	273	316	387	434
SBH 88	88	10.6	16.9	27.7	40.7	53.3	75.8	117	136	151	168	201	304	352	431	484
SBH 98	98	11.9	18.8	30.9	45.4	59.4	84.4	131	151	168	187	224	339	392	480	538
SBH 118	118	14.3	22.7	37.2	54.6	71.5	102	157	182	203	226	270	408	472	578	648
SBH 137	137	16.6	26.3	43.2	63.4	83.0	118	183	211	235	262	314	474	548	672	753
SBH 157	157	19.0	30.1	49.5	72.7	95.2	135	209	242	270	300	359	543	628	770	863
SBH 177	177	21.4	34.0	55.8	82.0	107	152	236	273	304	338	405	612	708	868	973
SBH 196	196	23.7	37.6	61.7	90.7	119	169	261	302	337	375	449	678	784	961	1077
SBH 236	236	28.6	45.3	74.3	109	143	203	315	364	405	451	540	817	944	1157	1297
SBH 265	265	32.1	50.9	83.5	123	161	228	353	408	455	507	606	917	1060	1299	1456
SBH 294	294	35.6	56.4	92.6	136	178	253	392	453	505	562	673	1017	1176	1441	1615
SBH 353	353	42.7	67.8	111	163	214	304	471	544	607	675	808	1221	1412	1730	1940
SBH 393	393	47.6	75.5	124	182	238	339	524	606	675	751	899	1360	1572	1926	2159
SBH 471	471	57.0	90.4	148	218	285	406	628	726	809	901	1078	1630	1884	2309	2588
SBH 491	491	59.4	94.3	155	227	298	423	655	757	844	939	1124	1699	1964	2407	2698
SBH 590	590	71.4	113	186	273	358	508	787	909	1014	1128	1350	2042	2360	2892	3242
SBH 640	640	77.4	123	202	296	387	551	842	953	1057	1169	1370	2024	2303	2741	2880
SBH 705	705	85.3	135	222	326	427	607	927	1050	1165	1287	1510	2230	2536	3019	3173
SBH 765	765	92.6	147	241	354	463	659	1006	1139	1264	1397	1638	2420	2752	3276	3443
SBH 865	865	105	166	272	400	523	745	1138	1288	1429	1580	1852	2736	3112	3704	3893
SBH 920	920	111	177	290	426	557	792	1210	1370	1520	1680	1970	2910	3310	3940	4140

**Performance H range 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	C <sub>5</sub> Ah	Hours						Minutes						Seconds		
		8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
SBH 8.3	8.3	1.03	1.64	2.69	3.97	5.21	7.55	13.4	16.1	17.7	20.0	23.9	35.5	41.7	50.9	55.0
SBH 12	12	1.49	2.36	3.89	5.74	7.54	10.9	19.3	23.3	25.6	28.9	34.5	51.3	60.3	73.6	79.5
SBH 16	16	1.98	3.15	5.18	7.65	10.1	14.6	25.8	31.0	34.1	38.6	46.0	68.4	80.4	98.2	106
SBH 19	19	2.36	3.74	6.16	9.10	11.9	17.3	31.0	38.1	41.8	47.3	56.0	83.3	95.0	117	126
SBH 29	29	3.60	5.71	9.40	13.9	18.2	26.4	47.3	58.1	63.7	72.1	85.5	127	145	179	192
SBH 39	39	4.84	7.68	12.6	18.7	24.5	35.5	63.6	78.2	85.7	97.0	115	171	195	241	258
SBH 49	49	6.08	9.65	15.9	23.5	30.8	44.6	79.9	98.2	108	122	145	215	245	302	325
SBH 59	59	7.32	11.6	19.1	28.3	37.1	53.7	96.2	118	130	147	174	259	295	364	391
SBH 69	69	8.56	13.6	22.4	33.1	43.4	62.8	113	138	152	172	204	303	345	426	457
SBH 79	79	9.80	15.6	25.6	37.8	49.7	71.9	129	158	174	197	233	346	395	488	523
SBH 88	88	10.9	17.3	28.5	42.2	55.3	80.1	144	176	193	219	260	386	440	543	583
SBH 98	98	12.2	19.3	31.8	46.9	61.6	89.2	160	196	215	244	289	430	490	605	649
SBH 118	118	14.6	23.2	38.2	56.5	74.2	107	192	236	259	294	348	518	590	728	781
SBH 137	137	17.0	27.0	44.4	65.6	86.2	125	223	275	301	341	404	601	685	846	907
SBH 157	157	19.5	30.9	50.9	75.2	98.7	143	256	315	345	391	463	689	785	969	1040
SBH 177	177	21.9	34.9	57.3	84.8	111	161	289	355	389	440	522	776	885	1093	1172
SBH 196	196	24.3	38.6	63.5	93.9	123	178	320	393	431	488	578	860	980	1210	1298
SBH 236	236	29.3	46.5	76.5	113	148	215	385	473	519	587	696	1035	1180	1457	1563
SBH 265	265	32.9	52.2	85.9	127	167	241	432	531	582	659	782	1162	1325	1636	1755
SBH 294	294	36.5	57.9	95.3	141	185	268	480	589	646	731	867	1289	1470	1815	1947
SBH 353	353	43.8	69.5	114	169	222	321	576	707	776	878	1041	1548	1765	2179	2338
SBH 393	393	48.7	77.4	127	188	247	358	641	788	864	978	1159	1724	1965	2426	2603
SBH 471	471	58.4	92.8	153	226	296	429	768	944	1035	1172	1389	2066	2355	2907	3119
SBH 491	491	60.9	96.7	159	235	309	447	801	984	1079	1221	1448	2154	2455	3031	3252
SBH 590	590	73.2	116	191	283	371	537	962	1182	1297	1468	1740	2588	2950	3642	3907
SBH 640	640	79.4	126	207	307	402	582	1037	1259	1363	1530	1781	2539	2866	3457	3603
SBH 705	705	87.4	139	228	338	443	642	1142	1387	1502	1686	1962	2797	3157	3809	3969
SBH 765	765	94.9	151	248	366	480	696	1239	1505	1630	1829	2129	3035	3426	4133	4307
SBH 865	865	107	170	280	414	543	787	1401	1702	1843	2068	2407	3432	3874	4673	4870
SBH 920	920	114	181	298	441	578	837	1490	1810	1960	2200	2560	3650	4120	4970	5180



**Performance H range 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	C <sub>5</sub> Ah	Hours						Minutes						Seconds		
		8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
SBH 8.3	8.3	1.04	1.66	2.73	4.05	5.33	7.80	14.1	18.8	21.2	24.1	29.1	43.0	48.5	61.5	65.4
SBH 12	12	1.50	2.40	3.95	5.86	7.70	11.3	20.4	27.2	30.7	34.9	42.1	62.2	70.2	88.9	94.5
SBH 16	16	2.00	3.20	5.26	7.81	10.3	15.0	27.2	36.3	40.9	46.5	56.1	82.9	93.6	119	126
SBH 19	19	2.38	3.80	6.25	9.27	12.2	17.9	32.7	44.1	50.1	57.1	68.8	97.9	112	141	154
SBH 29	29	3.63	5.80	9.54	14.2	18.6	27.3	49.9	67.3	76.5	87.1	105	149	171	215	236
SBH 39	39	4.88	7.80	12.8	19.0	25.1	36.7	67.1	90.5	103	117	141	201	229	289	317
SBH 49	49	6.13	9.80	16.1	23.9	31.5	46.1	84.3	114	129	147	178	253	288	363	398
SBH 59	59	7.38	11.8	19.4	28.8	37.9	55.5	102	137	156	177	214	304	347	437	480
SBH 69	69	8.63	13.8	22.7	33.7	44.4	64.8	119	160	182	207	250	356	406	511	561
SBH 79	79	9.88	15.8	26.0	38.6	50.8	74.2	136	183	208	237	286	407	465	585	642
SBH 88	88	11.0	17.6	29.0	42.9	56.6	82.7	151	204	232	264	319	454	518	652	715
SBH 98	98	12.3	19.6	32.2	47.8	63.0	92.1	169	227	259	294	355	505	576	726	797
SBH 118	118	14.8	23.6	38.8	57.6	75.9	111	203	274	311	354	428	608	694	874	959
SBH 137	137	17.1	27.4	45.1	66.9	88.1	129	236	318	361	411	496	706	806	1015	1114
SBH 157	157	19.6	31.4	51.7	76.6	101	148	270	364	414	471	569	809	924	1163	1276
SBH 177	177	22.1	35.4	58.2	86.4	114	166	305	411	467	532	641	912	1041	1311	1439
SBH 196	196	24.5	39.2	64.5	95.6	126	184	337	455	517	589	710	1010	1153	1452	1593
SBH 236	236	29.5	47.2	77.6	115	152	222	406	548	623	709	855	1216	1388	1748	1919
SBH 265	265	33.1	53.0	87.2	129	170	249	456	615	699	796	960	1366	1559	1963	2154
SBH 294	294	36.8	58.8	96.7	143	189	276	506	682	776	883	1065	1515	1729	2178	2390
SBH 353	353	44.1	70.6	116	172	227	332	608	819	931	1060	1279	1820	2076	2615	2870
SBH 393	393	49.1	78.6	129	192	253	369	676	912	1037	1180	1424	2026	2312	2911	3195
SBH 471	471	58.9	94.2	155	230	303	443	811	1093	1243	1414	1707	2428	2771	3489	3829
SBH 491	491	61.4	98.2	162	240	316	461	845	1139	1296	1474	1779	2531	2888	3637	3992
SBH 590	590	73.8	118	194	288	379	555	1015	1369	1557	1772	2138	3041	3471	4370	4797
SBH 640	640	80.0	128	211	312	411	602	1092	1468	1649	1857	2191	3026	3416	4153	4417
SBH 705	705	88.1	141	232	344	453	663	1203	1617	1816	2046	2414	3333	3763	4575	4866
SBH 765	765	95.6	153	252	373	491	719	1305	1755	1971	2220	2619	3617	4083	4964	5280
SBH 865	865	108	173	285	422	555	813	1476	1984	2228	2510	2962	4090	4616	5613	5970
SBH 920	920	115	184	303	449	591	865	1570	2110	2370	2670	3150	4350	4910	5970	6350

# Charge and discharge characteristics

## Charging

The battery can be charged by all normal methods. Generally, batteries in parallel operation with charger and load are charged with constant voltage.

In operations where the battery is charged separated from the load, charging with constant current or declining current is recommended. High-rate or overcharge will not damage the battery, but excessive charging will increase water consumption to some degree.

## Initial charging

First charge of batteries delivered discharged: the whole charge should preferably be carried out at constant current. When the charger maximum voltage setting is too low to supply constant current charging, divide the battery into two parts to be charged individually.

The charging time is inversely proportional to the current which is set by the current limit of the charging equipment. See installation and maintenance instructions for recommended rates for the first charging.

## Constant voltage charging (+20°C to +25°C or +68°F to +77°F)

■ *Continuous parallel operation*, with occasional battery discharge. Recommended charging voltage:

- For two level charge:
  - Float level:  
1.42 ± 0.01 V/cell for SBLE  
1.40 ± 0.01 V/cell for SBM and SBH
  - High level:  
1.47 - 1.70 V/cell for SBLE  
1.45 - 1.70 V/cell for SBM and SBH

A high voltage will increase the speed and efficiency of the recharging.

- For single level charge:  
1.43 - 1.50 V/cell.
- *Buffer operation*, where the load exceeds the charger rating.  
Recommended charging voltage:  
1.50 - 1.60 V/cell.

## Constant current charging

- Normal charging: 0.2 C<sub>5</sub>A for 10 h.

## Discharge performance

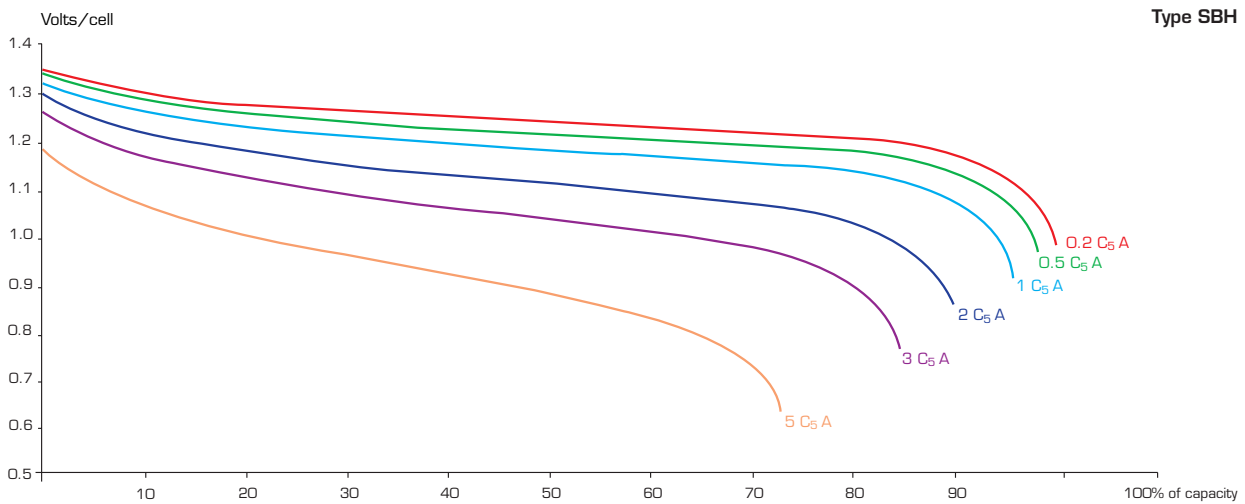
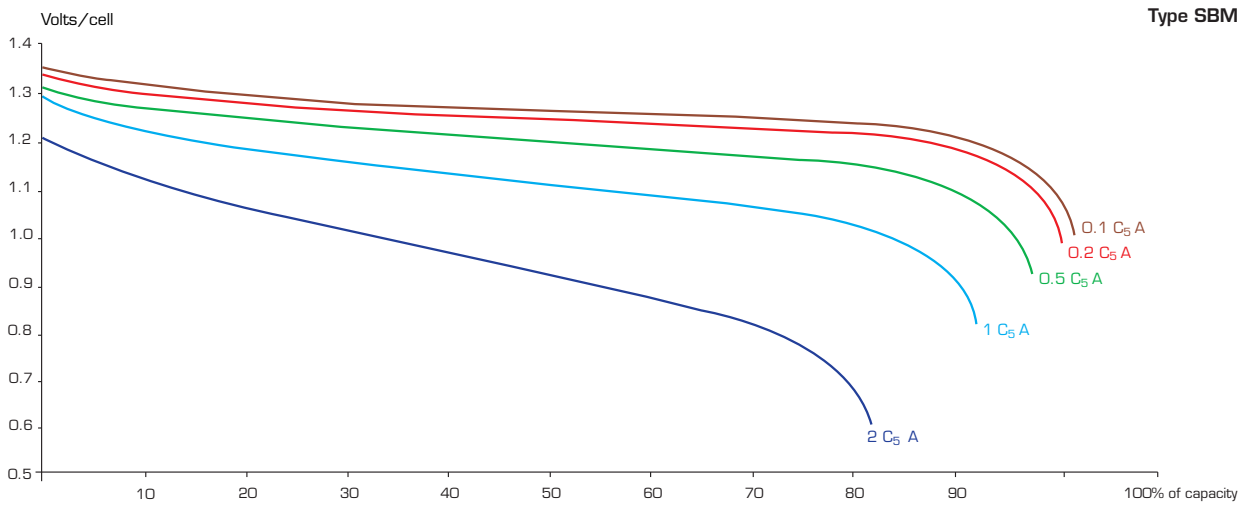
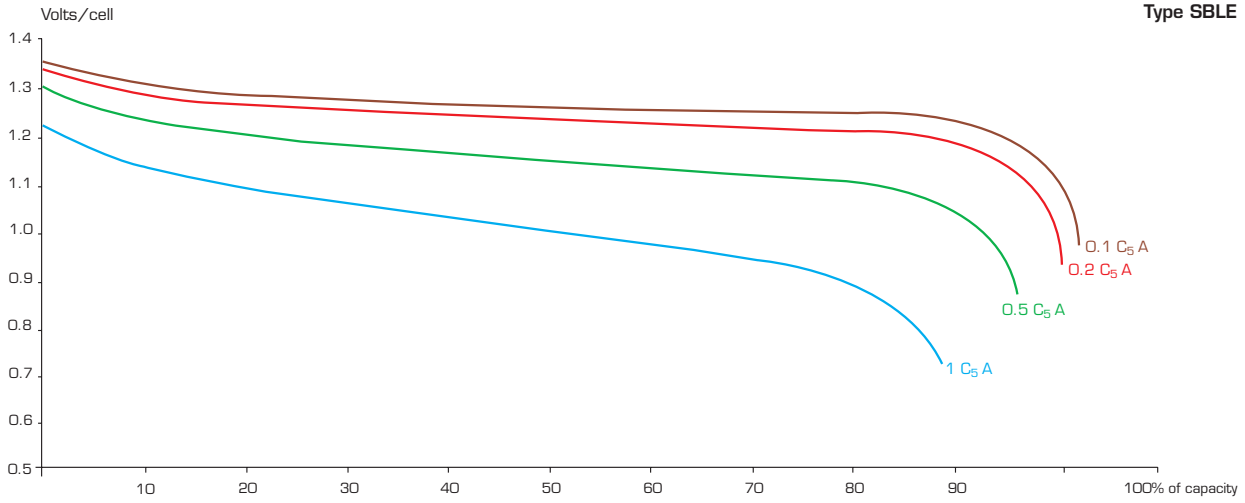
- *Nominal voltage*: 1.2 V/cell.
- *Discharge performance*: see tabulated data pages 14 to 25, 28, 29, and 36 to 47.
- *Typical discharge performance diagrams*: see page 27.  
The tabulated discharge performance data and the rated capacities C<sub>5</sub> are valid for cells fully charged in accordance with IEC, publication 60623, clause 4.
- *Rated (nominal) capacity*: for all cell types the rated capacity C<sub>5</sub> is defined as available ampere-hours (Ah) at 5 hours discharge to an end voltage of 1.0 V/cell.

## Important:

the rated capacity C<sub>5</sub> is no measure of performance. The performance depends on the battery construction. For example, a high-rate cell at 15 minutes discharge can deliver about twice the discharge current compared to a capacity cell of equal rated capacity.

Therefore always use the discharge performance tables to find the proper alternative for a specific application. The final choice of cell type should be done by comparison of prices, dimensions, etc.

Typical discharge characteristics at +20°C (+68°F)  
 These illustrative curves should not be used for precise calculation



# H Range

Performance **H** range for engine starting applications:

Performance for fully charged cells by a constant current charge according to IEC 60623 standard

Available amperes for fully charged cells at +20°C ± 5°C (+68°F ± 9°F)

Final voltage: 0.65 V/cell

Cell type	C <sub>5</sub> Ah	Minutes		Seconds			
		1.5	1	30	15	5	1
SBH 8.3	8.3	79.0	88.6	102	119	132	149
SBH 12	12	114	128	147	172	192	216
SBH 16	16	152	171	197	229	255	288
SBH 19	19	186	208	238	275	307	342
SBH 29	29	284	318	364	420	468	522
SBH 39	39	383	427	489	565	630	702
SBH 49	49	481	537	615	710	791	882
SBH 59	59	579	647	740	855	953	1060
SBH 69	69	677	756	866	1000	1110	1240
SBH 79	79	775	866	991	1140	1280	1420
SBH 88	88	863	964	1100	1260	1420	1580
SBH 98	98	961	1070	1230	1420	1580	1760
SBH 118	118	1160	1290	1480	1710	1910	2120
SBH 137	137	1340	1500	1720	1990	2210	2470
SBH 157	157	1540	1720	1970	2270	2540	2830
SBH 177	177	1740	1940	2220	2560	2860	3190
SBH 196	196	1920	2150	2460	2840	3170	3530
SBH 236	236	2320	2590	2960	3420	3810	4250
SBH 265	265	2600	2900	3330	3840	4280	4770
SBH 294	294	2880	3220	3690	4260	4750	5290
SBH 353	353	3460	3870	4430	5110	5700	6350
SBH 393	393	3860	4310	4930	5690	6350	7070
SBH 471	471	4620	5160	5910	6820	7610	8480
SBH 491	491	4820	5380	6160	7110	7930	8840
SBH 590	590	5790	6470	7400	8550	9530	10600
SBH 640	640	5960	6590	7400	8470	9270	10000
SBH 705	705	6560	7260	8160	9330	10200	11100
SBH 765	765	7120	7880	8850	10100	11100	12000
SBH 865	865	8050	8910	10000	11400	12500	13600
SBH 920	920	8560	9480	10600	12200	13300	14400

## Performance H range for engine starting applications:

Performance for fully charged cells by a constant current charge according to IEC 60623 standard

Available amperes for fully charged cells at +20°C ± 5°C (+68°F ± 9°F)

Final voltage: 0.85 V/cell

Cell type	C <sub>5</sub> Ah	Minutes		Seconds			
		1.5	1	30	15	5	1
SBH 8.3	8.3	61.3	68.2	77.6	91.1	101	111
SBH 12	12	88.7	98.6	112	132	146	161
SBH 16	16	118	132	150	176	195	214
SBH 19	19	144	159	181	210	234	255
SBH 29	29	220	243	277	321	357	389
SBH 39	39	296	327	372	431	480	523
SBH 49	49	371	411	468	542	603	658
SBH 59	59	447	495	563	653	726	792
SBH 69	69	523	579	659	763	849	926
SBH 79	79	599	663	754	874	972	1060
SBH 88	88	667	738	840	973	1080	1180
SBH 98	98	743	822	936	1080	1210	1320
SBH 118	118	894	990	1130	1310	1450	1580
SBH 137	137	1040	1150	1310	1520	1690	1840
SBH 157	157	1190	1320	1500	1740	1930	2110
SBH 177	177	1340	1490	1690	1960	2180	2380
SBH 196	196	1490	1640	1870	2170	2410	2630
SBH 236	236	1790	1980	2250	2610	2900	3170
SBH 265	265	2010	2220	2530	2930	3260	3560
SBH 294	294	2230	2470	2810	3250	3620	3960
SBH 353	353	2680	2960	3370	3900	4340	4740
SBH 393	393	2980	3300	3750	4350	4830	5270
SBH 471	471	3570	3950	4500	5210	5790	6320
SBH 491	491	3720	4120	4690	5430	6040	6590
SBH 590	590	4470	4950	5630	6630	7260	7920
SBH 640	640	4540	4970	5550	6300	6840	7440
SBH 705	705	5000	5470	6110	6940	7540	8190
SBH 765	765	5420	5940	6630	7530	8180	8890
SBH 865	865	6130	6710	7500	8510	9250	10100
SBH 920	920	6520	7140	7980	9050	9830	10700

# Battery layout

## Standard layouts

Saft has developed a series of standard layouts by which a battery may be ordered. Whether the battery is being installed on a rack, in a cabinet or is simply free-standing, the same configuration principals can be applied.

There are two ways to configure the battery.

- The first one, called "normal connection" is shown in figure 1. The cell's length is used to calculate the row length.
- The second method is shown in figure 2. The cell is turned through 90° and then connected width-to-width. This is referred to as "crosswise" mounted and its purpose is to minimize the installation's over-all length. The cell's width is used to calculate the row length.

Figure 1. Normal connection

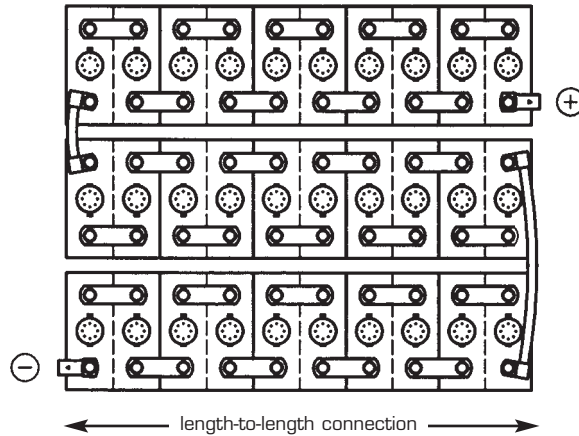
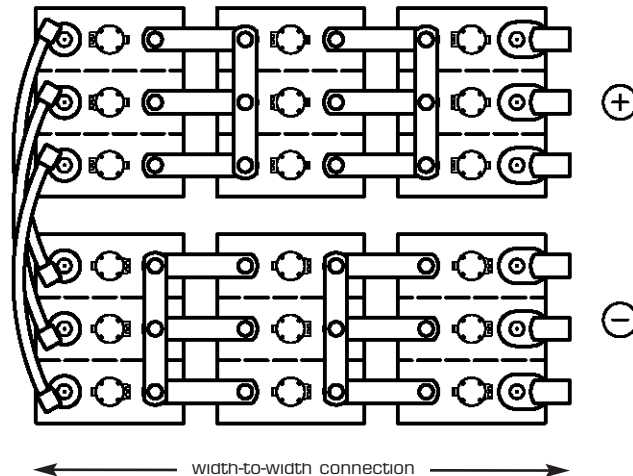


Figure 2. Crosswise connection



**Table 1** demonstrates the connection method for Saft's extended range of batteries. All other designations utilize the normal method of connection (length-to-length).

Connection Type	SBLE	SBM	SBH
Normal	7.5 to 510	11 to 392	8.3 to 157
Crosswise	550 to 1660	415 to 1390	177 to 920

### Assembly method

Whatever your installation, use these simple guidelines when calculating your preferred configuration.

1. From the data in this publication, define the total number of cells in the battery.
2. Divide the length of the available installation area by the cell length (normal mount) or width (crosswise mount). This gives the maximum number of cells per row.
3. Divide the width (depth) of the available area by the cell width (normal mount) or length (crosswise mount). This will give the maximum number of rows.

#### For example

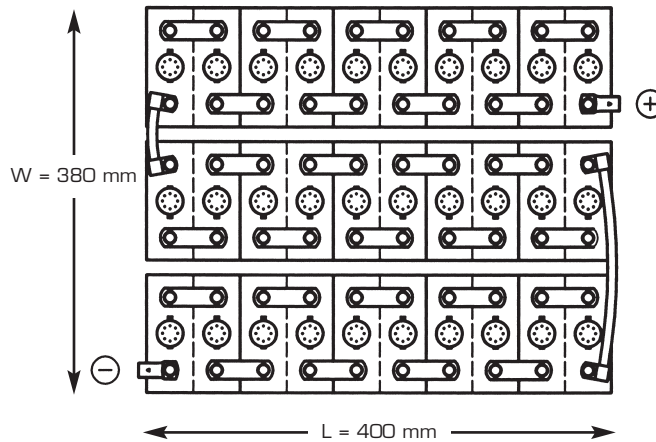
If we consider a cabinet with three shelves: each shelf has a length of 400 mm and a width 380 mm. The battery comprises of 90 cells type SBM 15 (figure 3):

- The SBM 15-2 (two cell blocks) has a length of 74 mm and a width of 123 mm.
- Each shelf can have in its length  $400/74 = 5$  of the 15-2 two cell blocks.
- Each shelf can have in its width  $380/123 = 3$  rows of cell blocks.
- Thus each shelf can have  $5 \times 3 = 15$  two cell blocks = 30 cells.

Whilst this is an ideal example, the calculation formula can be applied to all rack, cabinet and free-standing installations. For engineering assistance on complex layouts, please contact the company or its agent.

When ordering a battery rack, please specify the battery type and the preferred rack configuration (see pages 31-32). If your battery is being assembled in a cabinet, or is free-standing, please specify the number of rows, cells per row and total number of cells. This will ensure that all necessary inter-row and inter-tier flexible connectors are provided.

Figure 3



# Battery racks

Saft's product portfolio includes standard and anti-Seismic battery racks (conforming to Uniform Building Code, Seismic Zone 4). These have been designed for all cell types in the Saft range and are supplied unassembled to allow for easy installation. The purpose-built racks are strong, adaptable and provide good alkali protection.

Dimensions are given below for the range of rack layouts. Rack lengths are available in increments of 150 mm from 600 mm to a maximum of 6,000 mm. Calculate the required length using the cell length on page 5, 6 or 7 for normal connection, and by using the cell width 195 mm for crosswise connection.

## Dimensions (mm) for single tier, standard floor mounted racks, normal connection

Cell type			1 tier rack					
			Depth (D) No. of steps			Height (H) No. of steps		
SBLE	SBM	SBH	2	3	4	2	3	4
7.5	11, 15	-	430	645	860	480	580	680
15 to 62	22, 30	8.3 to 16	430	645	860	550	650	750
75 and 110	43, 65	19 to 157	430	645	860	635	735	835
95, 140 to 510	56, 84 to 392	-	430	645	860	690	790	890

## Dimensions (mm) for double tier, standard floor mounted racks, normal connection

Cell type			2 tier rack					
			Depth (D) No. of steps			Height (H) No. of steps		
SBLE	SBM	SBH	2	3	4	2	3	4
7.5	11, 15	-	500	715	930	1485	1585	1685
15 to 62	22, 30	8.3 to 16	500	715	930	1555	1655	1755
75 and 110	43, 65	19 to 157	500	715	930	1640	1740	1840
95, 140 to 510	56, 84 to 392	-	500	715	930	1695	1795	1895

## Dimensions (mm) for single tier, standard floor mounted racks, crosswise connection

Cell type			1 tier rack							
			Depth (D) No. of steps				Height (H) No. of steps			
SBLE	SBM	SBH	1	2	3	4	1	2	3	4
-	-	177 to 236	-	430	645	860	-	635	735	835
-	-	265 to 353	-	580	870	-	-	635	735	-
550	415 to 461	-	-	430	645	860	-	690	790	890
600 to 830	505 to 690	-	-	580	870	-	-	690	790	-
-	-	393 to 491	-	860	-	-	-	635	-	-
-	-	590	580	1160	-	-	535	635	-	-
925 to 1300	740 to 965	640	-	860	-	-	-	690	-	-
1400 to 1660	1040 to 1390	705 to 920	580	1160	-	-	590	690	-	-



**Dimensions (mm) for double tier, standard floor mounted racks, crosswise connection**

Cell type			2 tier rack							
			Depth (D) No. of steps				Height (H) No. of steps			
SBLE	SBM	SBH	1	2	3	4	1	2	3	4
-	-	177 to 236	-	500	715	930	-	1640	1740	1840
-	-	265 to 353	-	650	940	-	-	1640	1740	-
550	415 to 461	-	-	500	715	930	-	1695	1795	1895
600 to 830	505 to 690	-	-	650	940	-	-	1695	1795	-
-	-	393 to 491	-	930	-	-	-	1640	-	-
-	-	590	650	1230	-	-	1540	1640	-	-
925 to 1300	740 to 965	640	-	930	-	-	-	1695	-	-
1400 to 1660	1040 to 1390	705 to 920	650	1230	-	-	1595	1695	-	-

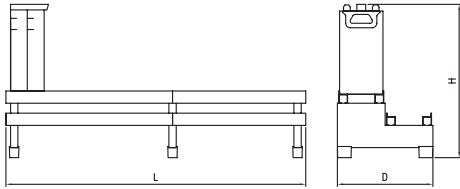
**Designations for single and double tier, standard floor mounted racks, normal connection (diagrams 1 to 6)**

Cell type			1 tier			2 tier		
			No. of steps			No. of steps		
SBLE	SBM	SBH	2	3	4	2	3	4
7.5	11, 15	-	SGL 2	SGL 3	SGL 4	ESGL 2	ESGL 3	ESGL 4
15 to 62	22, 30	8.3 to 16	SGL 2	SGL 3	SGL 4	ESGL 2	ESGL 3	ESGL 4
75 and 110	43, 65	19 to 157	SGL 2	SGL 3	SGL 4	ESGL 2	ESGL 3	ESGL 4
95, 140 to 510	56, 84 to 392	-	SGL 2	SGL 3	SGL 4	ESGL 2	ESGL 3	ESGL 4

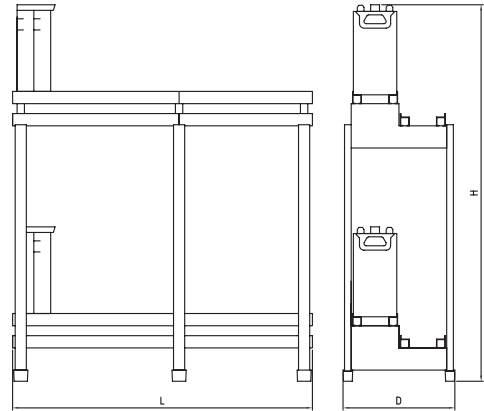
**Designations for single and double tier, standard floor mounted racks, crosswise connection (diagrams 7 to 10)**

Cell type			1 tier				2 tier			
			No. of steps				No. of steps			
SBLE	SBM	SBH	1	2	3	4	1	2	3	4
-	-	177 to 236	-	SGL 2	SGL 3	SGL 4	-	ESGL 2	ESGL 3	ESGL 4
-	-	265 to 353	-	SGS 2	SGS 3	-	-	ESGS 2	ESGS 3	-
550	415 to 461	-	-	SGL 2	SGL 3	SGL 4	-	ESGL 2	ESGL 3	ESGL 4
600 to 830	505 to 690	-	-	SGS 2	SGS 3	-	-	ESGS 2	ESGS 3	-
-	-	393 to 491	-	SGT 2	-	-	-	ESGT 2	-	-
-	-	590	PGS 2	SGU 2	-	-	EPGS 2	ESGU 2	-	-
925 to 1300	740 to 965	640	-	SGT 2	-	-	-	ESGT 2	-	-
1400 to 1660	1040 to 1390	705 to 920	PGS 2	SGU 2	-	-	EPGS 2	ESGU 2	-	-

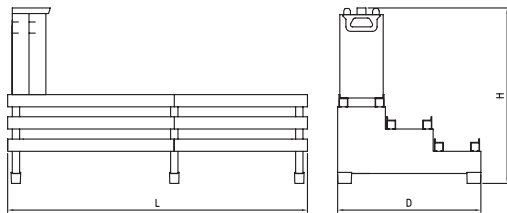
# Battery racks



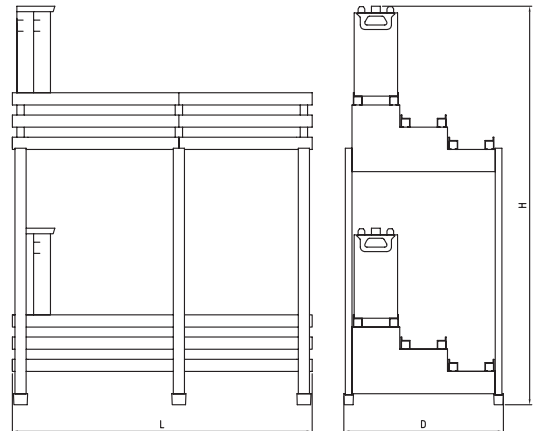
**Diagram 1**  
1 tier, 2 steps, normal connection



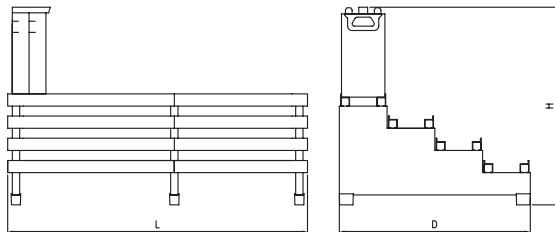
**Diagram 2**  
2 tier, 2 steps, normal connection



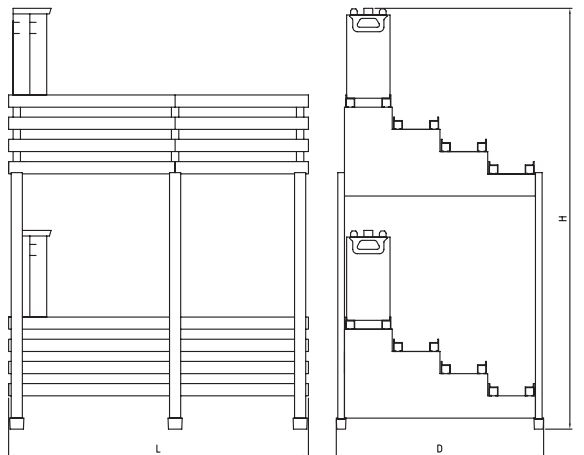
**Diagram 3**  
1 tier, 3 steps, normal connection



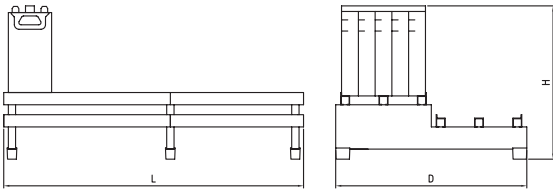
**Diagram 4**  
2 tier, 3 steps, normal connection



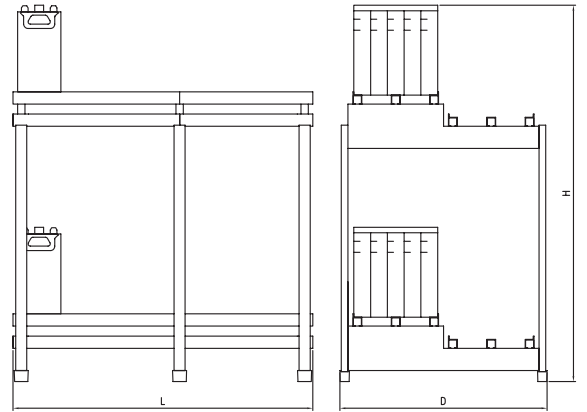
**Diagram 5**  
1 tier, 4 steps, normal connection



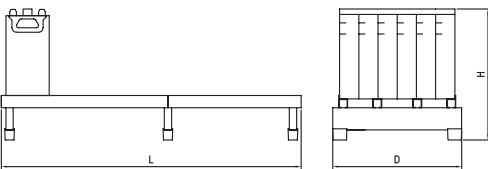
**Diagram 6**  
2 tier, 4 steps, normal connection



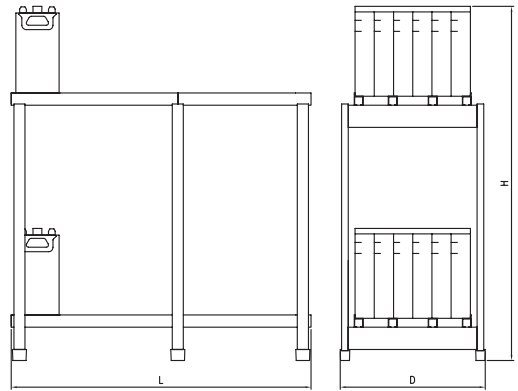
**Diagram 7**  
1 tier, 2 steps, crosswise connection



**Diagram 8**  
2 tier, 2 steps, crosswise connection



**Diagram 9**  
1 tier, 1 step, crosswise connection



**Diagram 10**  
2 tier, 1 step, crosswise connection

# LE Range

Performance **LE** range for railway on-board applications:

Performance for fully charged cells by a constant current charge according to IEC 60623 standard

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

Final voltage: 1.14 V/cell

Cell type	C <sub>5</sub> Ah	Hours							Minutes						Seconds		
		10	8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
SBLE 7.5	7.5	0.74	0.91	1.42	2.22	2.84	3.25	3.75	4.80	5.40	5.85	6.53	7.85	10.4	11.1	13.0	13.4
SBLE 15	15	1.47	1.80	2.70	4.05	5.25	6.10	7.50	9.60	10.8	11.9	12.6	14.4	20.7	23.9	31.4	35.9
SBLE 22	22	2.16	2.64	3.96	5.94	7.70	8.95	11.0	14.1	15.8	17.5	18.5	21.1	30.3	35.1	46.0	52.7
SBLE 30	30	2.94	3.60	5.40	8.10	10.5	12.2	15.0	19.2	21.6	23.9	25.2	28.8	41.3	47.9	62.7	71.8
SBLE 40	40	3.92	4.80	7.20	10.8	14.0	16.3	20.0	25.6	28.8	31.8	33.6	38.4	55.1	63.8	83.6	95.8
SBLE 47	47	4.61	5.64	8.46	12.7	16.5	19.1	23.5	30.1	33.8	37.4	39.5	45.1	64.7	75.0	98.2	113
SBLE 62	62	6.08	7.44	11.2	16.7	21.7	25.2	31.0	39.7	44.6	49.4	52.1	59.5	85.4	99.0	130	148
SBLE 75	75	7.20	8.81	13.4	19.8	25.5	29.5	34.5	43.5	49.5	51	58.5	63	86.9	96.2	123	139
SBLE 95	95	9.31	11.4	17.1	24.7	30.9	35.5	41.8	53.2	57.0	60.8	68.4	79.8	103	113	140	155
SBLE 110	110	10.6	12.9	19.6	29.0	37.4	43.3	50.6	63.8	72.6	74.8	85.8	92.4	127	141	181	204
SBLE 140	140	13.7	16.8	25.2	36.4	45.5	52.3	61.6	78.4	84.0	89.6	101	118	152	166	206	229
SBLE 185	185	18.1	22.2	33.3	48.1	60.1	69.1	81.4	104	111	118	133	155	200	220	272	302
SBLE 230	230	22.5	27.6	41.4	59.8	74.8	85.9	101	129	138	147	166	193	249	273	339	376
SBLE 275	275	27.0	33.0	49.5	71.5	89.4	103	121	154	165	176	198	231	298	327	405	449
SBLE 325	325	31.9	39.0	58.5	84.5	106	121	143	182	195	208	234	273	352	386	479	531
SBLE 375	375	36.8	45.0	67.5	97.5	122	140	165	210	225	240	270	315	406	445	552	613
SBLE 415	415	40.7	49.8	74.7	108	135	155	183	232	249	266	299	349	449	493	611	678
SBLE 460	460	45.1	55.2	82.8	120	150	172	202	258	276	294	331	386	498	546	677	752
SBLE 510	510	50.0	61.2	91.8	133	166	190	224	286	306	326	367	428	552	606	751	833
SBLE 550	550	53.9	66.0	99.0	143	179	205	242	308	330	352	396	462	596	653	810	899
SBLE 600	600	58.8	72.0	108	156	195	224	264	336	360	384	432	504	650	713	884	980
SBLE 650	650	63.7	78.0	117	169	211	243	286	364	390	416	468	546	704	772	957	1062
SBLE 700	700	68.6	84.0	126	182	228	261	308	392	420	448	504	588	758	831	1031	1144
SBLE 750	750	73.5	90.0	135	195	244	280	330	420	450	480	540	630	812	891	1104	1226
SBLE 830	830	81.3	99.6	149	216	270	310	365	465	498	531	598	697	899	986	1222	1356
SBLE 925	925	90.7	111	167	241	301	345	407	518	555	592	666	777	1002	1098	1362	1511
SBLE 1020	1020	100	122	184	265	332	381	449	571	612	653	734	857	1105	1211	1502	1667
SBLE 1100	1100	108	132	198	286	358	411	484	616	660	704	792	924	1191	1306	1620	1797
SBLE 1200	1200	118	144	216	312	390	448	528	672	720	768	864	1008	1300	1425	1767	1961
SBLE 1300	1300	127	156	234	338	423	485	572	728	780	832	936	1092	1408	1544	1914	2124
SBLE 1400	1400	137	168	252	364	455	523	616	784	840	896	1008	1176	1516	1663	2062	2288
SBLE 1500	1500	147	180	270	390	488	560	660	840	900	960	1080	1260	1625	1781	2209	2451
SBLE 1600	1600	157	192	288	416	520	597	704	896	960	1024	1152	1344	1733	1900	2356	2614
SBLE 1660	1660	163	199	299	432	540	620	730	930	996	1062	1195	1394	1798	1971	2444	2712

**Performance LE range for railway on-board applications:**  
**Performance for fully charged cells by a constant current charge**  
**according to IEC 60623 standard**

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

**Final voltage: 1.10 V/cell**

Cell type	C <sub>5</sub> Ah	Hours							Minutes					Seconds			
		10	8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
SBLE 7.5	7.5	0.75	0.93	1.46	2.31	3.16	3.7	4.35	5.55	6.30	6.83	7.58	8.93	11.9	13.0	14.5	14.9
SBLE 15	15	1.50	1.86	2.88	4.40	5.93	7.10	8.70	11.4	12.8	13.8	15.8	18.9	24.2	27.8	36.3	41.3
SBLE 22	22	2.20	2.72	4.22	6.45	8.69	10.4	12.8	16.7	18.8	20.2	23.1	27.7	35.5	40.8	53.3	60.6
SBLE 30	30	3.00	3.71	5.76	8.80	11.9	14.2	17.4	22.8	25.7	27.6	31.5	37.8	48.5	55.6	72.7	82.7
SBLE 40	40	4.00	4.95	7.68	11.7	15.8	18.9	23.2	30.4	34.2	36.8	42.0	50.4	64.6	74.1	96.9	110
SBLE 47	47	4.70	5.82	9.02	13.8	18.6	22.2	27.3	35.7	40.2	43.2	49.4	59.2	75.9	87.1	114	129
SBLE 62	62	6.20	7.67	11.9	18.2	24.5	29.3	36.0	47.1	53.0	57.0	65.1	78.1	100	115	150	171
SBLE 75	75	7.43	9.19	14.3	22.0	29.3	34.5	42.0	52.5	58.5	60.0	67.5	81.0	102	114	143	160
SBLE 95	95	9.50	11.8	18.2	27.2	36.1	41.8	51.3	62.7	68.4	76.0	85.5	91.2	121	132	161	176
SBLE 110	110	10.9	13.5	20.9	32.3	42.9	50.6	61.6	77.0	85.8	88.0	99.0	119	149	167	209	235
SBLE 140	140	14.0	17.3	26.9	40.1	53.2	61.6	75.6	92.4	101	112	126	134	178	194	237	259
SBLE 185	185	18.5	22.9	35.5	53.0	70.3	81.4	99.9	122	133	148	167	178	236	257	313	343
SBLE 230	230	23.0	28.5	44.2	65.9	87.4	101	124	152	166	184	207	221	293	319	389	426
SBLE 275	275	27.5	34.0	52.8	78.8	105	121	149	182	198	220	248	264	350	381	465	509
SBLE 325	325	32.5	40.2	62.4	93.2	124	143	176	215	234	260	293	312	414	451	550	602
SBLE 375	375	37.5	46.4	72.0	108	143	165	203	248	270	300	338	360	477	520	634	695
SBLE 415	415	41.5	51.4	79.7	119	158	183	224	274	299	332	374	398	528	576	702	769
SBLE 460	460	46.0	56.9	88.3	132	175	202	248	304	331	368	414	442	586	638	778	852
SBLE 510	510	51.0	63.1	97.9	146	194	224	275	337	367	408	459	490	649	707	862	945
SBLE 550	550	55.0	68.1	106	158	209	242	297	363	396	440	495	528	700	763	930	1019
SBLE 600	600	60.0	74.3	115	172	228	264	324	396	432	480	540	576	764	832	1015	1112
SBLE 650	650	65.0	80.4	125	186	247	286	351	429	468	520	585	624	827	902	1099	1204
SBLE 700	700	70.0	86.6	134	201	266	308	378	462	504	560	630	672	891	971	1184	1297
SBLE 750	750	75.0	92.8	144	215	285	330	405	495	540	600	675	720	955	1040	1268	1389
SBLE 830	830	83.0	103	159	238	315	365	448	548	598	664	747	797	1057	1151	1404	1538
SBLE 925	925	92.5	114	178	265	352	407	500	611	666	740	833	888	1178	1283	1564	1714
SBLE 1020	1020	102	126	196	292	388	449	551	673	734	816	918	979	1298	1415	1725	1890
SBLE 1100	1100	110	136	211	315	418	484	594	726	792	880	990	1056	1400	1526	1860	2038
SBLE 1200	1200	120	149	230	344	456	528	648	792	864	960	1080	1152	1528	1664	2029	2223
SBLE 1300	1300	130	161	250	373	494	572	702	858	936	1040	1170	1248	1655	1803	2198	2408
SBLE 1400	1400	140	173	269	401	532	616	756	924	1008	1120	1260	1344	1782	1942	2367	2594
SBLE 1500	1500	150	186	288	430	570	660	810	990	1080	1200	1350	1440	1910	2081	2537	2779
SBLE 1600	1600	160	198	307	459	608	704	864	1056	1152	1280	1440	1536	2037	2219	2706	2964
SBLE 1660	1660	166	205	319	476	631	730	896	1096	1195	1328	1494	1594	2113	2302	2807	3075

**Performance LE range for railway on-board applications:**  
**Performance for fully charged cells by a constant current charge**  
**according to IEC 60623 standard**

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

**Final voltage: 1.05 V/cell**

Cell type	C <sub>5</sub> Ah	Hours							Minutes					Seconds			
		10	8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
SBLE 7.5	7.5	0.77	0.95	1.49	2.38	3.36	4.14	5.03	6.45	7.28	7.95	8.85	10.5	13.9	15	17.3	17.9
SBLE 15	15	1.53	1.89	2.94	4.65	6.49	7.90	10.3	13.8	16.2	17.7	19.8	21.6	29.2	32.8	42.8	48.2
SBLE 22	22	2.24	2.78	4.31	6.82	9.52	11.6	15.1	20.2	23.8	26.0	29.0	31.7	42.8	48.1	62.7	70.6
SBLE 30	30	3.06	3.79	5.88	9.30	13.0	15.8	20.6	27.6	32.4	35.4	39.6	43.2	58.4	65.6	85.5	96.3
SBLE 40	40	4.08	5.05	7.84	12.4	17.3	21.1	27.4	36.8	43.2	47.2	52.8	57.6	77.9	87.4	114	128
SBLE 47	47	4.79	5.93	9.21	14.6	20.3	24.8	32.2	43.2	50.8	55.5	62.0	67.7	91.5	103	134	151
SBLE 62	62	6.32	7.83	12.2	19.2	26.8	32.7	42.5	57.0	67.0	73.2	81.8	89.3	121	135	177	199
SBLE 75	75	7.50	9.38	14.7	23.5	32.3	39.0	48.0	63.0	72.0	78.0	85.5	99.0	123	135	171	189
SBLE 95	95	9.69	12.1	18.8	29.5	40.4	48.1	59.9	77.9	86.9	91.2	103	125	144	158	190	206
SBLE 110	110	11.0	13.8	21.6	34.5	47.3	57.2	70.4	92.4	106	114	125	145	180	199	251	277
SBLE 140	140	14.3	17.8	27.7	43.4	59.5	70.9	88.2	115	128	134	151	185	213	233	279	303
SBLE 185	185	18.9	23.5	36.6	57.4	78.6	93.7	117	152	169	178	200	244	281	308	369	401
SBLE 230	230	23.5	29.2	45.5	71.3	97.8	117	145	189	210	221	248	304	350	382	459	498
SBLE 275	275	28.1	34.9	54.5	85.3	117	139	173	226	252	264	297	363	418	457	549	596
SBLE 325	325	33.2	41.2	64.4	101	138	165	205	267	297	312	351	429	494	540	648	704
SBLE 375	375	38.3	47.6	74.3	116	159	190	236	308	343	360	405	495	570	623	748	812
SBLE 415	415	42.3	52.7	82.2	129	176	210	261	340	380	398	448	548	631	690	828	899
SBLE 460	460	46.9	58.4	91.1	143	196	233	290	377	421	442	497	607	699	765	918	996
SBLE 510	510	52.0	64.7	101	158	217	258	321	418	467	490	551	673	775	848	1017	1105
SBLE 550	550	56.1	69.8	109	171	234	279	347	451	503	528	594	726	836	914	1097	1191
SBLE 600	600	61.2	76.1	119	186	255	304	378	492	549	576	648	792	912	998	1197	1300
SBLE 650	650	66.3	82.5	129	202	276	329	410	533	595	624	702	858	988	1081	1297	1408
SBLE 700	700	71.4	88.8	139	217	298	355	441	574	641	672	756	924	1064	1164	1397	1516
SBLE 750	750	76.5	95.2	149	233	319	380	473	615	686	720	810	990	1140	1247	1496	1625
SBLE 830	830	84.7	105	164	257	353	421	523	681	759	797	896	1096	1262	1380	1656	1798
SBLE 925	925	94.4	117	183	287	393	469	583	759	846	888	999	1221	1406	1538	1845	2004
SBLE 1020	1020	104	129	202	316	434	517	643	836	933	979	1102	1346	1550	1696	2035	2209
SBLE 1100	1100	112	140	218	341	468	557	693	902	1007	1056	1188	1452	1672	1829	2195	2383
SBLE 1200	1200	122	152	238	372	510	608	756	984	1098	1152	1296	1584	1824	1995	2394	2599
SBLE 1300	1300	133	165	257	403	553	659	819	1066	1190	1248	1404	1716	1976	2161	2594	2816
SBLE 1400	1400	143	178	277	434	595	709	882	1148	1281	1344	1512	1848	2128	2328	2793	3032
SBLE 1500	1500	153	190	297	465	638	760	945	1230	1373	1440	1620	1980	2280	2494	2993	3249
SBLE 1600	1600	163	203	317	496	680	811	1008	1312	1464	1536	1728	2112	2432	2660	3192	3466
SBLE 1660	1660	169	211	329	515	706	841	1046	1361	1519	1594	1793	2191	2523	2760	3312	3596

**Performance LE range for railway on-board applications:**  
**Performance for fully charged cells by a constant current charge**  
**according to IEC 60623 standard**

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

**Final voltage: 1.00 V/cell**

Cell type	C <sub>5</sub> Ah	Hours							Minutes						Seconds		
		10	8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
SBLE 7.5	7.5	0.77	0.95	1.50	2.42	3.47	4.38	5.62	7.28	8.32	9.00	10.10	11.9	15.7	17.3	19.7	20.1
SBLE 15	15	1.54	1.91	3.00	4.80	6.83	8.60	11.4	16.2	18.7	20.4	22.5	27.0	33.5	37.6	48.5	54.6
SBLE 22	22	2.26	2.81	4.40	7.04	10.0	12.6	16.7	23.8	27.4	29.9	33.0	39.6	49.1	55.2	71.1	80.0
SBLE 30	30	3.08	3.83	6.00	9.60	13.7	17.2	22.8	32.4	37.4	40.8	45.0	54.0	67.0	75.2	96.9	109
SBLE 40	40	4.10	5.10	8.00	12.8	18.2	22.9	30.4	43.2	49.8	54.4	60.0	72.0	89.3	100	129	146
SBLE 47	47	4.82	5.99	9.40	15.0	21.4	26.9	35.7	50.8	58.5	63.9	70.5	84.6	105	118	152	171
SBLE 62	62	6.36	7.91	12.4	19.8	28.2	35.5	47.1	67.0	77.2	84.3	93.0	112	138	155	200	226
SBLE 75	75	7.58	9.47	15.0	24.0	34.5	42.5	54.8	74.3	85.5	91.5	99.0	113	141	153	195	217
SBLE 95	95	9.79	12.1	19.0	30.4	42.8	52.6	67.5	92.2	105	114	125	137	166	181	217	233
SBLE 110	110	11.1	13.9	22.0	35.2	50.6	62.3	80.3	109	125	134	145	165	207	225	286	318
SBLE 140	140	14.4	17.9	28.0	44.8	63.0	77.5	99.4	136	155	168	185	202	245	266	319	343
SBLE 185	185	19.1	23.6	37.0	59.2	83.3	102	131	179	205	222	244	266	323	352	422	453
SBLE 230	230	23.7	29.3	46.0	73.6	104	127	163	223	255	276	304	331	402	437	524	564
SBLE 275	275	28.3	35.1	55.0	88.0	124	152	195	267	305	330	363	396	481	523	627	674
SBLE 325	325	33.5	41.4	65.0	104	146	180	231	315	361	390	429	468	568	618	741	797
SBLE 375	375	38.6	47.8	75.0	120	169	208	266	364	416	450	495	540	656	713	855	919
SBLE 415	415	42.7	52.9	83.0	133	187	230	295	403	461	498	548	598	725	789	946	1017
SBLE 460	460	47.4	58.7	92.0	147	207	255	327	446	511	552	607	662	804	874	1049	1127
SBLE 510	510	52.5	65.0	102	163	230	282	362	495	566	612	673	734	891	969	1163	1250
SBLE 550	550	56.7	70.1	110	176	248	304	391	534	611	660	726	792	961	1045	1254	1348
SBLE 600	600	61.8	76.5	120	192	270	332	426	582	666	720	792	864	1049	1140	1368	1471
SBLE 650	650	67.0	82.9	130	208	293	360	462	631	722	780	858	936	1136	1235	1482	1593
SBLE 700	700	72.1	89.3	140	224	315	387	497	679	777	840	924	1008	1224	1330	1596	1716
SBLE 750	750	77.3	95.6	150	240	338	415	533	728	833	900	990	1080	1311	1425	1710	1838
SBLE 830	830	85.5	106	166	266	374	459	589	805	921	996	1096	1195	1451	1577	1892	2034
SBLE 925	925	95.3	118	185	296	416	512	657	897	1027	1110	1221	1332	1617	1758	2109	2267
SBLE 1020	1020	105	130	204	326	459	564	724	989	1132	1224	1346	1469	1783	1938	2326	2500
SBLE 1100	1100	113	140	220	352	495	609	781	1067	1221	1320	1452	1584	1923	2090	2508	2696
SBLE 1200	1200	124	153	240	384	540	664	852	1164	1332	1440	1584	1728	2098	2280	2736	2941
SBLE 1300	1300	134	166	260	416	585	719	923	1261	1443	1560	1716	1872	2272	2470	2964	3186
SBLE 1400	1400	144	179	280	448	630	775	994	1358	1554	1680	1848	2016	2447	2660	3192	3431
SBLE 1500	1500	155	191	300	480	675	830	1065	1455	1665	1800	1980	2160	2622	2850	3420	3677
SBLE 1600	1600	165	204	320	512	720	885	1136	1552	1776	1920	2112	2304	2797	3040	3648	3922
SBLE 1660	1660	171	212	332	531	747	919	1179	1610	1843	1992	2191	2390	2902	3154	3785	4069

# M Range

Performance **M** range for railway on-board applications:

Performance for fully charged cells by a constant current charge according to IEC 60623 standard

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

Final voltage: 1.14 V/cell

Cell type	C <sub>5</sub> Ah	Hours							Minutes						Seconds		
		10	8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
SBM 11	11	1.06	1.32	2.07	3.28	4.52	5.41	6.60	8.80	10.3	11.6	13.2	16.2	24.1	27.3	32.6	36.1
SBM 15	15	1.45	1.80	2.82	4.47	6.16	7.38	9.00	12.0	14.1	15.8	18.0	22.1	32.8	37.2	44.4	49.2
SBM 22	22	2.13	2.64	4.14	6.58	9.11	11.0	13.2	17.8	20.7	22.9	26.2	31.5	44.4	49.9	58.1	60.0
SBM 30	30	2.90	3.60	5.64	8.97	12.4	15.0	18.0	24.3	28.2	31.2	35.7	42.9	60.6	68.0	79.2	81.9
SBM 43	43	4.16	5.16	8.08	12.9	18.1	22.1	27.1	36.6	42.6	47.7	54.2	65.4	93.7	105	122	128
SBM 56	56	5.42	6.72	10.5	16.8	23.5	28.8	35.3	47.0	54.9	60.5	68.9	82.3	115	128	148	153
SBM 65	65	6.29	7.80	12.2	19.5	27.4	33.5	40.9	55.3	64.4	72.1	81.9	98.8	142	159	185	193
SBM 84	84	8.12	10.1	15.8	25.2	35.3	43.2	52.9	70.6	82.3	90.7	103	124	173	192	222	229
SBM 112	112	10.8	13.4	21.1	33.6	47.0	57.6	70.5	94.1	110	121	138	165	231	256	296	305
SBM 138	138	13.3	16.6	25.9	41.4	58.0	70.9	86.9	116	135	149	170	203	284	316	365	376
SBM 161	161	15.6	19.3	30.3	48.3	67.6	82.8	101	135	158	174	198	237	331	369	425	439
SBM 184	184	17.8	22.1	34.6	55.2	77.3	94.6	116	155	180	199	226	271	379	421	486	501
SBM 208	208	20.1	25.0	39.1	62.4	87.4	107	131	175	204	225	256	306	428	476	549	567
SBM 231	231	22.3	27.7	43.4	69.3	97.0	119	146	194	226	249	284	340	476	529	610	629
SBM 277	277	26.8	33.2	52.1	83.1	116	142	174	233	271	299	341	407	570	634	732	754
SBM 300	300	29.0	36.0	56.4	90.0	126	154	189	252	294	324	369	441	618	687	792	817
SBM 323	323	31.2	38.8	60.7	96.9	136	166	203	271	316	349	397	475	665	739	853	880
SBM 346	346	33.5	41.5	65.0	104	145	178	218	291	339	374	426	509	712	792	914	942
SBM 369	369	35.7	44.3	69.4	111	155	190	232	310	362	399	454	543	760	845	975	1005
SBM 392	392	37.9	47.0	73.7	118	165	201	247	329	384	423	482	576	807	897	1036	1068
SBM 415	415	40.1	49.8	78.0	124	174	213	261	349	407	448	511	610	854	950	1096	1130
SBM 438	438	42.4	52.6	82.3	131	184	225	276	368	429	473	539	644	902	1003	1157	1193
SBM 461	461	44.6	55.3	86.7	138	194	237	290	387	452	498	567	678	949	1055	1218	1256
SBM 505	505	48.8	60.6	94.9	151	212	260	318	424	495	545	621	743	1040	1156	1334	1375
SBM 555	555	53.7	66.6	104	166	233	285	350	466	544	599	683	816	1143	1270	1466	1512
SBM 625	625	60.4	75.0	118	187	263	321	394	525	612	675	769	919	1287	1431	1651	1702
SBM 690	690	66.7	82.8	130	207	290	355	435	580	676	745	849	1015	1420	1580	1823	1879
SBM 740	740	71.6	88.8	139	222	311	380	466	622	725	799	911	1088	1523	1694	1955	2015
SBM 830	830	80.3	99.6	156	249	349	427	523	697	813	896	1021	1220	1709	1900	2193	2261
SBM 920	920	89.0	110	173	276	386	473	579	773	901	994	1132	1353	1894	2106	2430	2506
SBM 965	965	93.3	116	181	289	405	496	608	811	945	1042	1187	1419	1987	2209	2549	2628
SBM 1040	1040	101	125	196	312	437	535	655	874	1019	1123	1280	1529	2141	2381	2747	2833
SBM 1150	1150	111	138	216	345	483	591	724	966	1127	1242	1415	1691	2367	2633	3038	3132
SBM 1220	1220	118	146	229	366	512	627	768	1025	1195	1318	1501	1794	2512	2793	3223	3323
SBM 1390	1390	134	167	261	417	584	714	876	1168	1362	1501	1710	2044	2862	3182	3672	3786



**Performance M range for railway on-board applications:**  
**Performance for fully charged cells by a constant current charge**  
**according to IEC 60623 standard**

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

**Final voltage: 1.10 V/cell**

Cell type	C <sub>5</sub> Ah	Hours							Minutes					Seconds			
		10	8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
SBM 11	11	1.09	1.35	2.15	3.43	4.85	6.03	7.59	10.2	12.0	13.3	15.4	18.9	27.8	31.8	38.9	41.2
SBM 15	15	1.49	1.85	2.93	4.68	6.62	8.22	10.4	14.0	16.3	18.1	21.0	25.8	37.9	43.4	53.1	56.2
SBM 22	22	2.18	2.71	4.29	6.86	9.75	12.1	15.4	20.7	24.2	26.6	30.3	36.8	52.2	58.4	69.3	73.8
SBM 30	30	2.97	3.69	5.85	9.36	13.3	16.6	21.0	28.2	33.0	36.3	41.4	50.1	71.1	79.6	94.5	101
SBM 43	43	4.26	5.29	8.39	13.5	19.2	24.3	31.4	42.6	50.3	55.5	63.2	76.6	108	123	145	168
SBM 56	56	5.55	6.89	10.9	17.5	25.0	31.6	40.9	54.9	64.4	70.6	80.6	96.3	134	150	177	188
SBM 65	65	6.44	8.00	12.7	20.3	29.1	36.7	47.5	64.4	76.0	83.8	95.6	116	164	185	220	254
SBM 84	84	8.32	10.3	16.4	26.3	37.6	47.4	61.3	82.3	96.6	106	121	144	202	225	265	282
SBM 112	112	11.1	13.8	21.8	35.1	50.1	63.2	81.8	110	129	141	161	193	269	300	354	376
SBM 138	138	13.7	17.0	26.9	43.2	61.7	77.8	101	135	159	174	199	237	331	370	436	463
SBM 161	161	16.0	19.8	31.4	50.4	72.0	90.8	118	158	185	203	232	277	386	431	508	540
SBM 184	184	18.2	22.6	35.9	57.6	82.3	104	134	180	212	232	265	316	441	493	581	617
SBM 208	208	20.6	25.6	40.6	65.1	93.0	117	152	204	239	262	300	358	499	557	657	698
SBM 231	231	22.9	28.4	45.0	72.3	103	130	169	226	266	291	333	397	554	619	729	775
SBM 277	277	27.4	34.1	54.0	86.7	124	156	202	271	319	349	399	476	665	742	875	929
SBM 300	300	29.7	36.9	58.5	93.9	134	169	219	294	345	378	432	516	720	803	947	1006
SBM 323	323	32.0	39.7	63.0	101	144	182	236	317	372	407	465	555	775	865	1020	1083
SBM 346	346	34.3	42.6	67.5	108	155	195	253	339	398	436	498	595	830	926	1093	1160
SBM 369	369	36.6	45.4	72.0	116	165	208	269	362	424	465	531	635	885	988	1165	1237
SBM 392	392	38.8	48.2	76.4	123	175	221	286	384	451	494	565	674	941	1050	1238	1315
SBM 415	415	41.1	51.0	80.9	130	186	234	303	407	477	523	598	714	996	1111	1311	1392
SBM 438	438	43.4	53.9	85.4	137	196	247	320	429	504	552	631	753	1051	1173	1383	1469
SBM 461	461	45.7	56.7	89.9	144	206	260	337	452	530	581	664	793	1106	1234	1456	1546
SBM 505	505	50.0	62.1	98.5	158	226	285	369	495	581	636	727	868	1212	1352	1595	1693
SBM 555	555	55.0	68.3	108	174	248	313	405	544	638	699	799	954	1332	1486	1753	1861
SBM 625	625	61.9	76.9	122	196	279	353	456	612	719	788	900	1075	1500	1674	1974	2096
SBM 690	690	68.4	84.9	135	216	308	389	504	676	794	870	994	1187	1656	1848	2179	2314
SBM 740	740	73.3	91.0	144	232	331	417	540	725	851	933	1066	1273	1776	1981	2337	2482
SBM 830	830	82.2	102	162	260	371	468	606	813	955	1046	1195	1427	1992	2222	2621	2783
SBM 920	920	91.2	113	179	288	411	519	672	902	1058	1160	1325	1582	2207	2463	2905	3085
SBM 965	965	95.6	119	188	302	431	544	704	946	1110	1216	1390	1660	2315	2584	3047	3236
SBM 1040	1040	103	128	203	326	465	587	759	1019	1196	1311	1498	1789	2495	2785	3284	3488
SBM 1150	1150	114	141	224	360	514	649	840	1127	1323	1449	1656	1978	2759	3079	3632	3856
SBM 1220	1220	121	150	238	382	545	688	891	1196	1403	1538	1757	2098	2927	3267	3853	4091
SBM 1390	1390	138	171	271	435	621	784	1015	1362	1599	1752	2002	2390	3335	3722	4390	4661

**Performance M range for railway on-board applications:**  
**Performance for fully charged cells by a constant current charge**  
**according to IEC 60623 standard**

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

**Final voltage: 1.05 V/cell**

Cell type	C <sub>5</sub> Ah	Hours							Minutes					Seconds			
		10	8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
SBM 11	11	1.11	1.38	2.18	3.54	5.10	6.47	8.58	11.8	13.9	15.4	17.7	21.9	32.3	37.2	45.8	49.5
SBM 15	15	1.51	1.88	2.97	4.83	6.96	8.82	11.7	16.1	18.9	21.0	24.2	29.9	44.1	50.8	62.5	67.6
SBM 22	22	2.22	2.75	4.36	7.08	10.3	13.0	17.4	24.0	27.9	31.0	35.4	42.9	60.5	68.7	81.5	87.8
SBM 30	30	3.02	3.75	5.94	9.66	14.0	17.8	23.7	32.7	38.1	42.3	48.3	58.5	82.5	93.7	111	120
SBM 43	43	4.33	5.38	8.51	13.9	20.1	25.8	35.3	49.9	58.0	64.1	74.0	89.9	127	144	173	186
SBM 56	56	5.64	7.00	11.1	18.1	26.2	33.6	45.9	64.4	75.0	82.9	94.1	113	157	177	208	224
SBM 65	65	6.55	8.13	12.9	21.0	30.4	39.0	53.3	75.4	87.7	96.9	112	136	192	217	262	280
SBM 84	84	8.46	10.5	16.6	27.1	39.3	50.4	68.9	96.6	113	124	141	170	235	265	312	336
SBM 112	112	11.3	14.0	22.2	36.2	52.4	67.2	91.9	129	150	166	188	226	314	353	416	448
SBM 138	138	13.9	17.3	27.3	44.6	64.6	82.8	113	159	185	204	232	279	387	435	513	553
SBM 161	161	16.2	20.1	31.9	52.0	75.4	96.6	132	185	216	238	271	325	451	507	598	645
SBM 184	184	18.5	23.0	36.4	59.4	86.1	110	151	212	247	272	309	372	515	580	683	737
SBM 208	208	20.9	26.0	41.2	67.2	97.4	125	171	239	279	308	350	420	583	656	773	833
SBM 231	231	23.3	28.9	45.7	74.6	108	139	189	266	310	342	388	467	647	728	858	925
SBM 277	277	27.9	34.6	54.8	89.5	130	166	227	319	371	410	465	560	776	873	1029	1109
SBM 300	300	30.2	37.5	59.4	96.9	140	180	246	345	402	444	504	606	840	946	1114	1201
SBM 323	323	32.5	40.4	63.9	104	151	194	265	371	433	478	543	653	905	1018	1200	1293
SBM 346	346	34.8	43.3	68.5	112	162	208	284	398	464	512	581	699	969	1091	1285	1385
SBM 369	369	37.2	46.1	73.1	119	173	221	303	424	494	546	620	745	1034	1163	1370	1477
SBM 392	392	39.5	49.0	77.6	127	183	235	321	451	525	580	659	792	1098	1236	1456	1570
SBM 415	415	41.8	51.9	82.2	134	194	249	340	477	556	614	697	838	1162	1308	1541	1662
SBM 438	438	44.1	54.8	86.7	141	205	263	359	504	587	648	736	885	1227	1381	1627	1754
SBM 461	461	46.4	57.6	91.3	149	216	277	378	530	618	682	775	931	1291	1453	1712	1846
SBM 505	505	50.9	63.1	100	163	236	303	414	581	677	747	849	1020	1415	1592	1876	2022
SBM 555	555	55.9	69.4	110	179	260	333	455	638	744	821	933	1121	1555	1749	2061	2222
SBM 625	625	62.9	78.1	124	202	293	375	513	719	837	925	1050	1263	1751	1970	2321	2503
SBM 690	690	69.5	86.3	137	223	323	414	566	793	925	1021	1160	1394	1933	2175	2563	2763
SBM 740	740	74.5	92.5	147	239	346	444	607	851	992	1095	1244	1495	2073	2333	2748	2963
SBM 830	830	83.6	104	164	268	388	498	681	954	1112	1228	1395	1677	2325	2616	3083	3323
SBM 920	920	92.6	115	182	297	431	552	755	1058	1233	1362	1546	1859	2577	2900	3417	3684
SBM 965	965	97.2	121	191	312	452	579	791	1110	1293	1428	1622	1949	2703	3042	3584	3864
SBM 1040	1040	105	130	206	336	487	624	853	1196	1394	1539	1748	2101	2913	3278	3863	4164
SBM 1150	1150	116	144	228	371	538	690	943	1322	1541	1702	1933	2323	3221	3625	4271	4605
SBM 1220	1220	123	153	242	394	571	732	1001	1403	1635	1806	2050	2465	3417	3846	4531	4885
SBM 1390	1390	140	174	275	449	651	834	1140	1598	1862	2057	2336	2808	3894	4381	5162	5566

**Performance M range for railway on-board applications:**  
**Performance for fully charged cells by a constant current charge**  
**according to IEC 60623 standard**

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

**Final voltage: 1.00 V/cell**

Cell type	C <sub>5</sub> Ah	Hours							Minutes						Seconds		
		10	8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
SBM 11	11	1.12	1.39	2.20	3.60	5.24	6.74	9.24	13.2	15.5	17.3	19.9	24.7	36.7	42.0	52.9	58.3
SBM 15	15	1.52	1.89	3.00	4.91	7.14	9.20	12.6	18.0	21.1	23.6	27.1	33.7	50.0	57.3	72.1	79.4
SBM 22	22	2.23	2.77	4.40	7.19	10.5	13.5	18.7	26.8	31.5	34.8	39.8	48.6	69.3	78.1	94.2	99.6
SBM 30	30	3.04	3.78	6.00	9.81	14.3	18.5	25.5	36.6	42.9	47.4	54.3	66.3	94.5	107	128	136
SBM 43	43	4.36	5.42	8.60	14.1	20.6	26.7	37.0	55.9	65.4	72.6	83.5	102	144	163	198	212
SBM 56	56	5.68	7.06	11.2	18.3	26.8	34.7	48.1	72.3	84.5	93.6	107	129	180	202	241	255
SBM 65	65	6.60	8.19	13.0	21.3	31.1	40.3	55.9	84.5	98.8	110	126	154	218	247	300	320
SBM 84	84	8.53	10.6	16.8	27.5	40.2	52.1	72.2	108	127	140	161	194	271	303	361	382
SBM 112	112	11.4	14.1	22.4	36.6	53.5	69.5	96.3	145	169	187	214	259	361	403	481	509
SBM 138	138	14.0	17.4	27.6	45.1	66.0	85.6	119	178	208	231	264	319	445	497	593	627
SBM 161	161	16.3	20.3	32.2	52.6	77.0	99.8	138	208	243	269	308	372	519	580	692	732
SBM 184	184	18.7	23.2	36.8	60.2	88.0	114	158	237	278	307	352	425	593	663	790	836
SBM 208	208	21.1	26.2	41.6	68.0	99.4	129	179	268	314	347	398	481	670	749	893	945
SBM 231	231	23.4	29.1	46.2	75.5	110	143	199	298	349	386	442	534	744	832	992	1050
SBM 277	277	28.1	34.9	55.4	90.6	132	172	238	357	418	463	529	640	892	998	1190	1259
SBM 300	300	30.4	37.8	60.0	98.1	143	186	258	387	453	501	573	693	966	1081	1289	1364
SBM 323	323	32.8	40.7	64.6	106	154	200	278	417	488	540	617	746	1041	1164	1387	1468
SBM 346	346	35.1	43.6	69.2	113	165	215	297	447	522	578	661	799	1115	1246	1486	1573
SBM 369	369	37.5	46.5	73.8	121	176	229	317	476	557	616	705	853	1189	1329	1585	1677
SBM 392	392	39.8	49.4	78.4	128	187	243	337	506	592	655	749	906	1263	1412	1684	1782
SBM 415	415	42.1	52.3	83.0	136	198	257	357	536	626	693	793	959	1337	1495	1783	1886
SBM 438	438	44.5	55.2	87.6	143	209	272	377	565	661	732	837	1012	1411	1578	1881	1991
SBM 461	461	46.8	58.1	92.2	151	220	286	396	595	696	770	881	1065	1485	1661	1980	2095
SBM 505	505	51.3	63.6	101	165	241	313	434	652	762	844	965	1167	1627	1819	2169	2295
SBM 555	555	56.3	69.9	111	181	265	344	477	716	838	927	1061	1282	1788	1999	2384	2523
SBM 625	625	63.4	78.7	125	204	299	388	537	807	943	1044	1195	1444	2014	2251	2685	2841
SBM 690	690	70.0	86.9	138	226	330	428	593	890	1041	1153	1319	1594	2223	2486	2964	3136
SBM 740	740	75.1	93.2	148	242	354	459	636	955	1117	1236	1414	1710	2384	2666	3179	3364
SBM 830	830	84.2	105	166	271	397	515	714	1071	1253	1387	1586	1918	2674	2990	3565	3773
SBM 920	920	93.4	116	184	301	440	571	791	1187	1389	1537	1758	2126	2964	3314	3952	4182
SBM 965	965	97.9	122	193	316	461	598	830	1245	1456	1612	1844	2230	3109	3476	4145	4386
SBM 1040	1040	106	131	208	340	497	645	894	1342	1570	1737	1988	2403	3351	3746	4467	4727
SBM 1150	1150	117	145	230	376	550	713	989	1484	1736	1921	2198	2657	3705	4143	4940	5227
SBM 1220	1220	124	154	244	399	583	757	1049	1574	1841	2038	2332	2819	3930	4395	5241	5545
SBM 1390	1390	141	175	278	455	664	862	1195	1794	2098	2322	2657	3212	4478	5007	5971	6318

# H Range

Performance **H** range for railway on-board applications:

Performance for fully charged cells by a constant current charge according to IEC 60623 standard

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

Final voltage: 1.14 V/cell

Cell type	C <sub>5</sub> Ah	Hours						Minutes						Seconds		
		8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
SBH 8.3	8.3	0.97	1.54	2.51	3.66	4.74	6.64	9.79	12.0	13.5	15.9	20.3	31.9	37.2	45.3	54.4
SBH 12	12	1.40	2.22	3.62	5.29	6.86	9.60	14.2	17.3	19.5	22.9	29.3	46.2	53.8	65.5	78.6
SBH 16	16	1.87	2.96	4.83	7.05	9.14	12.8	18.9	23.0	26.1	30.6	39.1	61.6	71.8	87.3	105
SBH 19	19	2.22	3.52	5.76	8.42	10.9	15.4	23.0	28.1	31.7	37.0	47.1	74.1	85.8	107	112
SBH 29	29	3.39	5.37	8.79	12.8	16.6	23.5	35.1	42.9	48.4	56.5	71.9	113	131	163	172
SBH 39	39	4.56	7.22	11.8	17.3	22.3	31.6	47.2	57.7	65.1	76.0	96.7	152	176	220	231
SBH 49	49	5.73	9.07	14.8	21.7	28.1	39.7	59.3	72.5	81.8	95.5	122	191	221	276	290
SBH 59	59	6.90	10.9	17.9	26.1	33.8	47.8	71.4	87.3	98.5	115	146	230	266	332	349
SBH 69	69	8.07	12.8	20.9	30.6	39.5	55.9	83.5	102	115	135	171	269	311	389	408
SBH 79	79	9.24	14.6	23.9	35.0	45.3	64.0	95.6	117	132	154	196	308	357	445	468
SBH 88	88	10.3	16.3	26.7	39.0	50.4	71.3	107	130	147	172	218	343	397	496	521
SBH 98	98	11.5	18.1	29.7	43.4	56.2	79.4	119	145	164	191	243	382	442	552	580
SBH 118	118	13.8	21.8	35.8	52.3	67.6	95.6	143	175	197	230	293	460	533	665	698
SBH 137	137	16.0	25.3	41.5	60.7	78.5	111	166	203	229	267	340	535	618	772	811
SBH 157	157	18.4	29.0	47.6	69.6	90.0	127	190	232	262	306	389	613	709	885	929
SBH 177	177	20.7	32.7	53.6	78.4	101	143	214	262	296	345	439	691	799	997	1047
SBH 196	196	22.9	36.3	59.4	86.8	112	159	237	290	327	382	486	765	885	1104	1160
SBH 236	236	27.6	43.7	71.5	105	135	191	286	349	394	460	585	921	1065	1330	1397
SBH 265	265	31.0	49.0	80.3	117	152	215	321	392	443	517	657	1034	1196	1493	1568
SBH 294	294	34.4	54.4	89.1	130	168	238	356	435	491	573	729	1147	1327	1656	1740
SBH 353	353	41.3	65.3	107	156	202	286	427	523	589	688	875	1377	1594	1989	2089
SBH 393	393	46.0	72.7	119	174	225	318	476	582	656	766	975	1533	1774	2214	2326
SBH 471	471	55.1	87.1	143	209	270	382	570	697	787	918	1168	1838	2126	2654	2787
SBH 491	491	57.4	90.8	149	218	281	398	594	727	820	957	1218	1916	2217	2766	2906
SBH 590	590	69.0	109	179	261	338	478	714	873	985	1150	1463	2302	2663	3324	3492
SBH 640	640	74.9	118	193	283	366	512	758	919	1030	1187	1507	2273	2606	3067	3175
SBH 705	705	82.5	130	213	312	403	564	835	1012	1135	1308	1660	2504	2871	3378	3497
SBH 765	765	89.5	142	231	338	438	612	906	1098	1231	1419	1802	2717	3115	3666	3795
SBH 865	865	101	160	261	382	495	692	1025	1242	1392	1605	2037	3072	3523	4145	4291
SBH 920	920	108	170	278	407	526	736	1090	1321	1481	1707	2167	3268	3746	4408	4563

**Performance H range for railway on-board applications:**  
**Performance for fully charged cells by a constant current charge**  
**according to IEC 60623 standard**

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

**Final voltage: 1.10 V/cell**

Cell type	C <sub>5</sub> Ah	Hours						Minutes						Seconds		
		8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
SBH 8.3	8.3	1.00	1.59	2.61	3.84	5.02	7.14	11.7	14.3	16.3	19.1	24.2	37.1	43.2	54.6	57.5
SBH 12	12	1.45	2.30	3.78	5.56	7.26	10.3	16.9	20.6	23.5	27.6	34.9	53.7	62.4	78.9	83.1
SBH 16	16	1.94	3.07	5.04	7.41	9.68	13.8	22.6	27.5	31.4	36.8	46.6	71.6	83.2	105	111
SBH 19	19	2.30	3.65	5.99	8.80	11.5	16.5	27.5	33.7	38.4	44.9	56.5	86.5	100	123	137
SBH 29	29	3.51	5.57	9.14	13.4	17.6	25.2	42.0	51.4	58.6	68.5	86.2	132	153	187	210
SBH 39	39	4.72	7.49	12.3	18.1	23.6	33.9	56.5	69.1	78.8	92.1	116	178	205	252	282
SBH 49	49	5.93	9.41	15.4	22.7	29.7	42.6	71.0	86.8	99.0	116	146	223	258	316	354
SBH 59	59	7.14	11.3	18.6	27.3	35.8	51.3	85.5	104	119	139	175	269	311	381	427
SBH 69	69	8.35	13.2	21.7	31.9	41.8	60.0	100	122	139	163	205	314	363	445	499
SBH 79	79	9.56	15.2	24.9	36.6	47.9	68.7	114	140	160	186	235	360	416	510	571
SBH 88	88	10.6	16.9	27.7	40.7	53.3	76.6	128	156	178	208	262	401	463	568	636
SBH 98	98	11.9	18.8	30.9	45.4	59.4	85.3	142	174	198	231	291	446	516	632	709
SBH 118	118	14.3	22.7	37.2	54.6	71.5	103	171	209	239	279	351	537	621	761	853
SBH 137	137	16.6	26.3	43.2	63.4	83	119	199	243	277	323	407	624	721	884	990
SBH 157	157	19.0	30.1	49.5	72.7	95	137	228	278	317	371	467	715	826	1013	1135
SBH 177	177	21.4	34.0	55.8	82.0	107	154	257	313	358	418	526	806	932	1142	1280
SBH 196	196	23.7	37.6	61.7	90.7	119	171	284	347	396	463	582	892	1032	1264	1417
SBH 236	236	28.6	45.3	74.3	109	143	205	342	418	477	557	701	1074	1242	1522	1706
SBH 265	265	32.1	50.9	83.5	123	161	231	384	469	536	626	788	1207	1395	1709	1916
SBH 294	294	35.6	56.4	92.6	136	178	256	426	521	594	694	874	1339	1547	1896	2126
SBH 353	353	42.7	67.8	111	163	214	307	512	625	714	833	1049	1607	1858	2277	2552
SBH 393	393	47.6	75.5	124	182	238	342	570	696	794	928	1168	1789	2068	2535	2841
SBH 471	471	57.0	90.4	148	218	285	410	683	834	952	1112	1400	2144	2479	3038	3405
SBH 491	491	59.4	94.3	155	227	298	427	712	870	993	1159	1459	2235	2584	3167	3550
SBH 590	590	71.4	113	186	273	358	513	855	1045	1193	1393	1753	2686	3105	3805	4265
SBH 640	640	77.4	123	202	296	387	557	915	1095	1244	1443	1780	2664	3030	3606	3789
SBH 705	705	85.3	135	222	326	427	613	1008	1207	1370	1589	1961	2934	3337	3973	4174
SBH 765	765	92.6	147	241	354	463	666	1094	1309	1487	1725	2127	3184	3621	4311	4530
SBH 865	865	105	166	272	400	523	753	1237	1481	1681	1950	2405	3600	4095	4874	5122
SBH 920	920	111	177	290	426	557	800	1315	1575	1788	2074	2558	3829	4355	5184	5447

**Performance H range for railway on-board applications:**  
**Performance for fully charged cells by a constant current charge**  
**according to IEC 60623 standard**

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

**Final voltage: 1.05 V/cell**

Cell type	C <sub>5</sub> Ah	Hours						Minutes						Seconds		
		8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
SBH 8.3	8.3	1.03	1.64	2.69	3.97	5.21	7.55	13.4	16.9	19.2	22.7	28.7	43.8	51.5	62.9	67.9
SBH 12	12	1.49	2.36	3.89	5.74	7.54	10.9	19.3	24.5	27.8	32.9	41.5	63.3	74.4	90.9	98.1
SBH 16	16	1.98	3.15	5.18	7.65	10.1	14.6	25.8	32.6	37.1	43.8	55.4	84.4	99.3	121	131
SBH 19	19	2.36	3.74	6.16	9.10	11.9	17.3	31.0	40.1	45.4	53.7	67.5	103	117	145	155
SBH 29	29	3.60	5.71	9.40	13.9	18.2	26.4	47.3	61.2	69.3	82.0	103	157	179	221	237
SBH 39	39	4.84	7.68	12.6	18.7	24.5	35.5	63.6	82.3	93.2	110	139	211	241	297	319
SBH 49	49	6.08	9.65	15.9	23.5	30.8	44.6	79.9	103	117	139	174	265	302	373	401
SBH 59	59	7.32	11.6	19.1	28.3	37	54	96	124	141	167	210	319	364	450	482
SBH 69	69	8.56	13.6	22.4	33.1	43	63	113	146	165	195	245	374	426	526	564
SBH 79	79	9.80	15.6	25.6	37.8	50	72	129	167	189	223	281	428	488	602	646
SBH 88	88	10.9	17.3	28.5	42.2	55	80	144	186	210	249	313	476	543	671	719
SBH 98	98	12.2	19.3	31.8	46.9	62	89	160	207	234	277	348	531	605	747	801
SBH 118	118	14.6	23.2	38.2	56.5	74	107	192	249	282	334	419	639	728	899	965
SBH 137	137	17.0	27.0	44.4	65.6	86	125	223	289	327	387	487	742	846	1044	1120
SBH 157	157	19.5	30.9	50.9	75.2	99	143	256	331	375	444	558	850	969	1196	1284
SBH 177	177	21.9	34.9	57.3	84.8	111	161	289	373	423	500	629	958	1093	1349	1447
SBH 196	196	24.3	38.6	63.5	93.9	123	178	320	413	468	554	697	1061	1210	1494	1602
SBH 236	236	29.3	46.5	76.5	113	148	215	385	498	564	667	839	1278	1457	1799	1930
SBH 265	265	32.9	52.2	85.9	127	167	241	432	559	633	749	942	1435	1636	2020	2167
SBH 294	294	36.5	57.9	95.3	141	185	268	480	620	702	831	1045	1592	1815	2241	2404
SBH 353	353	43.8	69.5	114	169	222	321	576	745	843	998	1255	1911	2179	2690	2886
SBH 393	393	48.7	77.4	127	188	247	358	641	829	939	1111	1397	2128	2426	2995	3213
SBH 471	471	58.4	92.8	153	226	296	429	768	994	1125	1331	1674	2550	2907	3589	3851
SBH 491	491	60.9	96.7	159	235	309	447	801	1036	1173	1388	1745	2659	3031	3742	4014
SBH 590	590	73.2	116	191	283	371	537	962	1245	1409	1668	2097	3195	3642	4496	4824
SBH 640	640	79.4	126	207	307	402	582	1037	1325	1482	1739	2146	3135	3538	4268	4449
SBH 705	705	87.4	139	228	338	443	642	1142	1460	1633	1916	2364	3453	3898	4702	4901
SBH 765	765	94.9	151	248	366	480	696	1239	1584	1772	2079	2565	3747	4229	5102	5318
SBH 865	865	107	170	280	414	543	787	1401	1791	2003	2351	2900	4237	4782	5769	6013
SBH 920	920	114	181	298	441	578	837	1490	1905	2130	2500	3084	4506	5086	6136	6395

**Performance H range for railway on-board applications:**  
**Performance for fully charged cells by a constant current charge**  
**according to IEC 60623 standard**

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

**Final voltage: 1.00 V/cell**

Cell type	C <sub>5</sub> Ah	Hours						Minutes						Seconds		
		8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
SBH 8.3	8.3	1.04	1.66	2.73	4.05	5.33	7.80	14.1	18.8	21.9	25.9	33.1	51.2	57.8	73.2	77.8
SBH 12	12	1.50	2.40	3.95	5.86	7.70	11.3	20.4	27.2	31.6	37.5	47.8	74.0	83.5	106	112
SBH 16	16	2.00	3.20	5.26	7.81	10.3	15.0	27.2	36.3	42.2	50.0	63.8	98.7	111	141	150
SBH 19	19	2.38	3.80	6.25	9.27	12.2	17.9	32.7	44.1	51.7	61.4	78.2	117	133	168	184
SBH 29	29	3.63	5.80	9.54	14.2	18.6	27.3	49.9	67.3	78.9	93.6	119	178	203	256	281
SBH 39	39	4.88	7.80	12.8	19.0	25.1	36.7	67.1	90.5	106	126	161	239	273	344	377
SBH 49	49	6.13	9.80	16.1	23.9	31.5	46.1	84.3	114	133	158	202	301	343	432	474
SBH 59	59	7.38	11.8	19.4	28.8	37.9	55.5	102	137	160	191	243	362	413	520	571
SBH 69	69	8.63	13.8	22.7	33.7	44.4	64.8	119	160	188	223	284	423	483	608	668
SBH 79	79	9.88	15.8	26.0	38.6	50.8	74.2	136	183	215	255	325	485	553	697	765
SBH 88	88	11.0	17.6	29.0	42.9	56.6	82.7	151	204	239	284	362	540	616	776	852
SBH 98	98	12.3	19.6	32.2	47.8	63.0	92.1	169	227	267	316	403	601	686	864	949
SBH 118	118	14.8	23.6	38.8	57.6	75.9	111	203	274	321	381	486	724	826	1041	1142
SBH 137	137	17.1	27.4	45.1	66.9	88.1	129	236	318	373	442	564	841	959	1208	1326
SBH 157	157	19.6	31.4	51.7	76.6	101	148	270	364	427	507	646	963	1099	1384	1520
SBH 177	177	22.1	35.4	58.2	86.4	114	166	305	411	481	572	729	1086	1239	1561	1713
SBH 196	196	24.5	39.2	64.5	95.6	126	184	337	455	533	633	807	1203	1373	1728	1897
SBH 236	236	29.5	47.2	77.6	115	152	222	406	548	642	762	972	1448	1653	2081	2284
SBH 265	265	33.1	53.0	87.2	129	170	249	456	615	721	856	1091	1626	1856	2337	2565
SBH 294	294	36.8	58.8	96.7	143	189	276	506	682	800	949	1210	1804	2059	2593	2846
SBH 353	353	44.1	70.6	116	172	227	332	608	819	960	1140	1453	2166	2472	3113	3417
SBH 393	393	49.1	78.6	129	192	253	369	676	912	1069	1269	1618	2412	2752	3466	3804
SBH 471	471	58.9	94.2	155	230	303	443	811	1093	1281	1521	1939	2890	3298	4153	4559
SBH 491	491	61.4	98.2	162	240	316	461	845	1139	1336	1585	2022	3013	3438	4330	4752
SBH 590	590	73.8	118	194	288	379	555	1015	1369	1605	1905	2429	3621	4132	5203	5710
SBH 640	640	80.0	128	211	312	411	602	1092	1468	1700	1997	2490	3602	4066	4944	5259
SBH 705	705	88.1	141	232	344	453	663	1203	1617	1872	2200	2743	3968	4479	5446	5793
SBH 765	765	95.6	153	252	373	491	719	1305	1755	2032	2387	2976	4306	4860	5910	6286
SBH 865	865	108	173	285	422	555	813	1476	1984	2297	2699	3366	4869	5496	6682	7108
SBH 920	920	115	184	303	449	591	865	1570	2110	2443	2871	3580	5179	5845	7107	7560



## Soft is committed to the highest standards of environmental stewardship.

Implementing this commitment to minimise the impact of its products and operations on the environment means that Soft gives priority to recycled over unrecycled raw materials, reduces its plant releases into the environment year after year, minimizes water usage, and ensures that its customers have recycling solutions for their batteries at the end of their lives.

Regarding industrial Ni-Cd batteries, Soft has had partnerships for many years with collection companies in most EU countries as well as in North America. This collection network receives and dispatches our customers' batteries at the end of their lives to fully approved recycling facilities, in compliance with the Laws governing transboundary waste shipments. Soft offers these services free of charge to its customers.

Please find a list of our collection points on our web site.

In other countries, Soft assists its customers in finding environmentally sound recycling solutions. Please contact your sales representative for further information.

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