Nickel Cadmium Batteries

BLOCK TYPE

NICA

NICA your long term partner for power back-up challenges

Nica has been a trusted battery for the world's leading industrial players for over 100 years, with a range of well proven solutions that deliver secure energy for stationary applications.

Nica's products are designed to meet the reliability, safety and security challenges of today's industrial landscape where they provide power back-up, starting power and bulk energy storage. Nica's commitment to Research and Development and innovative engineering ensures that our nickel-cadmium (Ni-Cd) batteries offer the very latest in design, quality and industrial process technology. They also come with comprehensive through-life global service support, from initial consultancy to volume delivery, including training, maintenance and expert technical back-up.

Reliable and robust batteries for a wide range of industrial applications

Stationary batteries are used in

- refineries,
- power plants,
- onshore & offshore oil and gas industries,
- substations,
- airports & building infrastructure

Locations where it is absolutely critical to have batteries that will work when they should, even under extreme operating conditions.

Power is absolutely vital to Uninterruptible Power Supply (UPS) systems, switching and transmission functions, emergency and security systems, industrial fire monitors and alarms, process control installations, substation switchgear, signaling systems and more.

If the primary power source for these applications is suddenly unavailable, a back-up system provides a temporary source of power until primary power re-engages or while systems operators perform a controlled shutdown. However, back-up power is only as good as the stationary battery that enables it!

NICA LE/M/H Block battery range

Built with the highest quality, safety and environmental standards

Electrical characteristics:

- Certified IEC 60623 - Secondary cells and batteries containing alkaline or other non-acid electrolytes - vented nickel-cadmium prismatic rechargeable single cells.

Safety:

- Complies with EN 50272-2/ IEC 62485-2 - Safety requirements for secondary batteries and battery installations - Part 2: Stationary batteries - The protective covers for terminals and connectors, the insulated cables are compliant with IP2 level protection against electrical shocks according to safety standard.
- Complies with UL 1989 - Section 7 : Flame arrester vent cap tests - UL standard for safety for standby batteries.

Quality:

- ISO 9001 and ISO 14001
- Nica world class continuous programme

Environment & recycling

- Fully recyclable
- RoHS - Although batteries and accumulators are not within the scope of the RoHS directive, Nica has taken voluntary measures to make sure that the substances forbidden by RoHS are not present in the battery, with the exception of the electro- chemical core.
- REACH - Nica has adopted internal procedures to ensure conformity with the European REACH (Registration, Evaluation, Authorization and Restriction of Chemical Substances) Regulations.

Instant starting power

Cranking up an emergency generator or switching on heaters, pumps or other equipment requires batteries that are very reliable, offer high discharge capabilities and function properly in extreme temperatures. Nica batteries recover their voltage instantaneously, making them the ideal choice for starting applications.

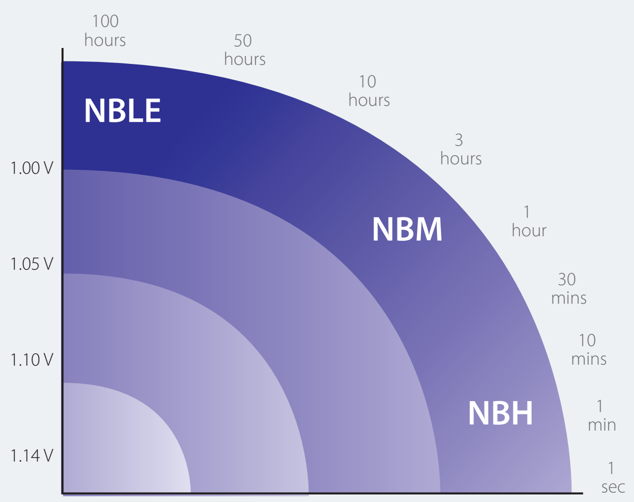
A wide choice of capacity and performance

Nica has developed the NBLE, NBM and MBH ranges of block batteries to offer the optimum, flexible solution for all stationary applications. The choice of low, medium and high capacity types makes it easy to select the ideal battery, based on required discharge time and end of discharge voltage. Thanks to the robust and reliable Nica pocket plate technology they resist electrical abuse, shock and vibrations.

Furthermore, a generous reserves for electrolyte means that the block batteries need only basic maintenance, while operating across a wide range of fluctuating temperatures. This ensures an optimized Total Cost of Ownership (TCO) over a life cycle that can last 20 years or more.

From seconds to hours - every discharge need is covered

Nica has a Block battery range to suit every discharge profile from 1 second to 100 hours



	LE Type	M Type	H Type
Capacity steps	58	68	51
Capacity	7.5 - 1690 Ah	11 - 1445 Ah	8.3 - 920 Ah
Performance	For low rate discharge over long periods between 1 and 100 hours	For varied loads with low and high discharge rates between 30 minutes and 3 hours	For high rate discharge over short periods less than 30 minutes
Applications	Power back-up applications		Power back-up and starting applications

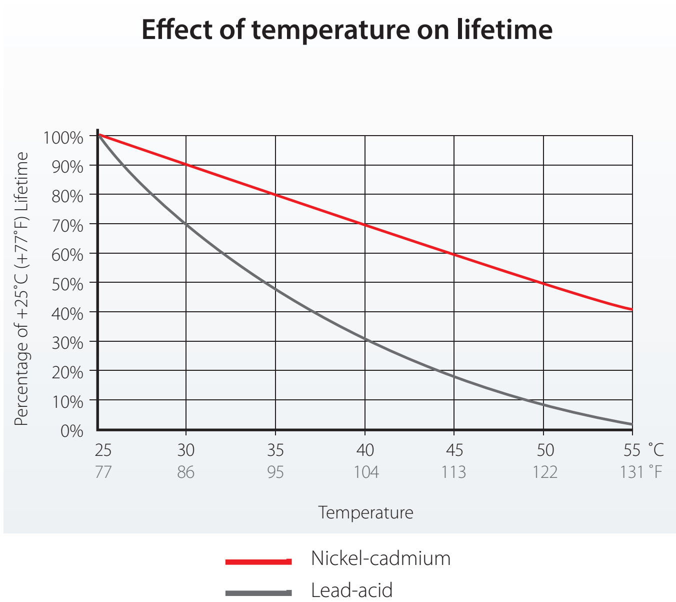
NICA Ni-Cd Technology

the proven advantages of a safe and robust design

Ni-Cd means proven reliability

Nica's robust Ni-Cd technology sets the benchmark for industrial batteries operating in difficult and demanding conditions.

- Delivers performance, reliability, and a long, totally predictable, service life - with no risk of sudden death failure.
- Ensures a 20-year plus service life at +25˚C (+77˚F).
- Even at +35˚C (+95˚F), lifetime falls by just 20% compared with a 50% reduction for a lead-acid battery.



NICA Block battery construction

The ideal battery for every application

- Performance optimized for each application according to plate thickness.

  : **LE type**
  - Thicker plates
  - High energy
  - Low cost per Amp at low rates.

  : **M type**
  - Thinner plates
  - Medium power
  - Optimized between H and L design for mixed loads

  : **H type**
  - Thinnest plate
  - High power
  - Low cost per Amp at high rates

- Optimized design boost electrical performance by up to 10% depending on discharge time.

- Twice the number of capacity steps compared with previous designs enables accurate matching with calculated amp-hour requirements.

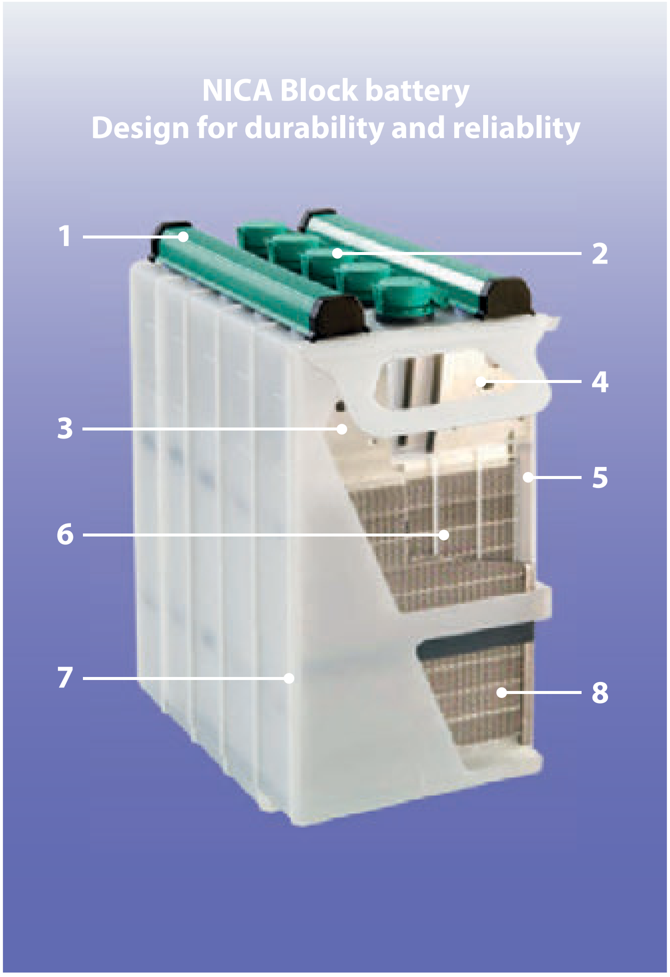
Improved performance and more capacity steps allow you to select the best, cost-effective battery for your application.

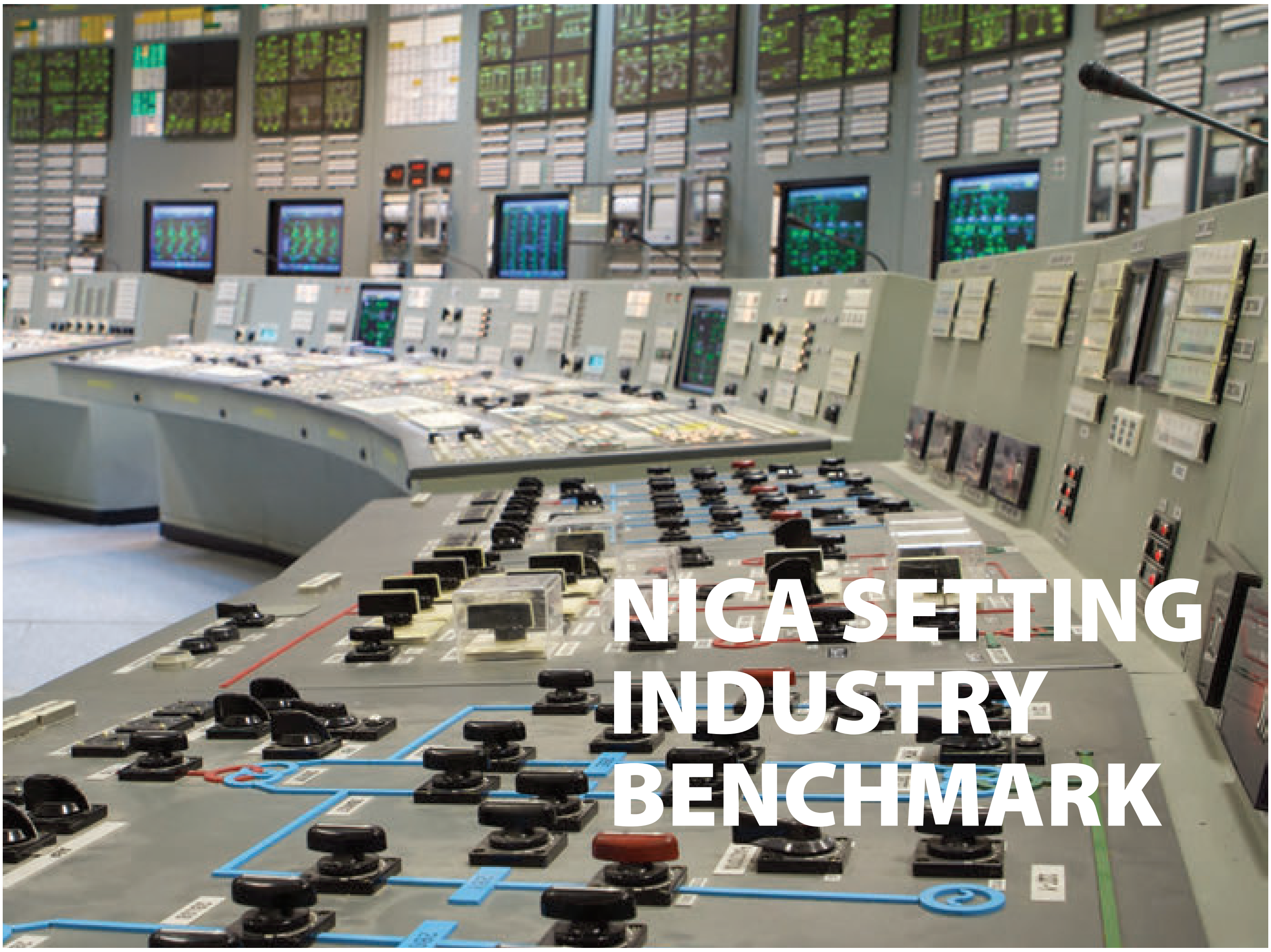
1. **Protective cover**
   In line with IEC 60485-2 / EN 50272-2 (safety) with IP2 level.
2. **Flame-arresting vents**
   Compliant with UL 1989 - Section 7 - Flame arrester vent cap tests.
3. **Plate group bus**
4. **Plate tab**
5. **Plate frame**
6. **Separating grids**
7. **Cell container**
8. **Nica pocket plate technology**

Note : The cells are welded together to form rugged blocks of 1-6 cells depending on the cell size and type. Nica cells fully comply with the requirements of the IEC 60623 standard.

The essential features

- The steel pocket plate structure does not suffer from "sudden death" or internal corrosion since there is no interaction between the active material and electrolyte.
- Tough polypropylene casing ensures structural integrity throughout a long life.
- An engineered electrolyte solution delivers optimum performance without causing degradation of plate materials.
- Plenty of space is allowed for a good reserve of electrolyte.
- A special electrolyte is available for extremely low temperature applications.
- A specially designed flame arresting flip top vent ensures the battery does not produce corrosive emissions.
- The Black battery offers a long shelf life when stored under Nica's recommended conditions and it is easy to install.



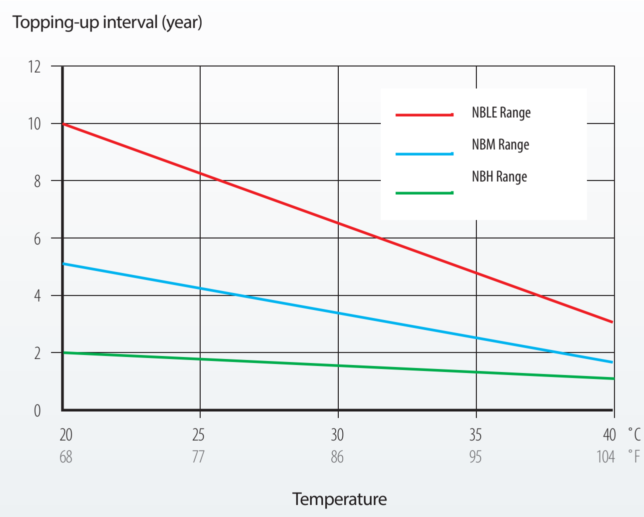


NICA the benchmark
for industrial batteries

Low maintenance means lower lifetime costs

- Topping-up intervals are now up to two times longer under standard conditions at +20˚C (+68˚F) and at float voltage.
- A simple annual maintenance exercise is recommended to check correct functioning of the charging system, battery and the auxilliary electronics.
- Easy maintenance thanks to :
  - Visible electrolyte level
  - Simple bolted connector for fast installation and allowing the battery to be quickly commissioned

Typical topping up intervals at recommended charge voltage



Higher chargeability

minimizes down time

Faster recharge time enables at least 80% recovery of capacity from fully discharged conditions in 15 hours at float voltage level.

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

Continuous parallel operation, with occasional battery discharge. Recommended charging voltages:

a) **For two levels charge**:

- Float level :
  1.42 ± 0.01 V/cell for NBLE
  1.40 ± 0.01 V/cell for NBM and NBH

- High level :
  1.47 - 1.70 V/cell for NBLE
  1.45 - 1.70 V/cell for NBM and NBH
  A high voltage will increase the speed and efficiency of the recharging.

b) **For single level charge** :

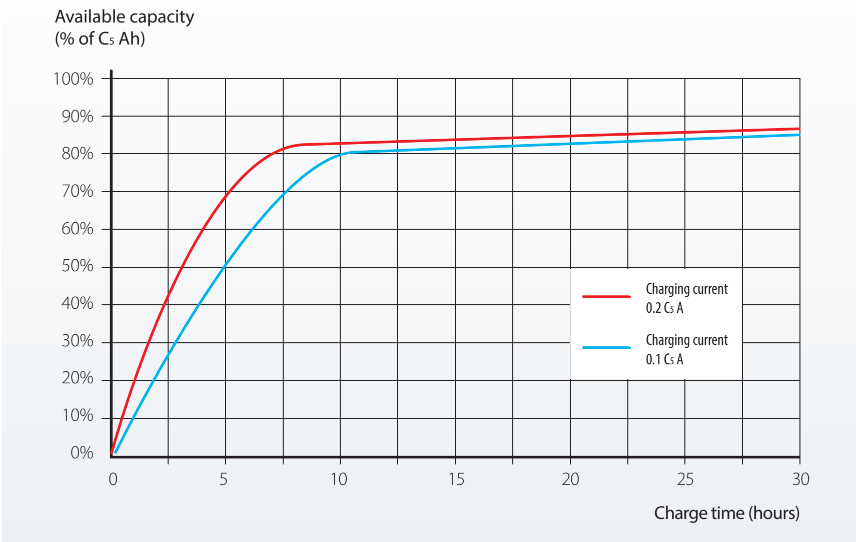
- 1.43 - 1.50 V/cell

Buffer operation, where the load exceeds the charger rating. Recommended charging voltage: 1.50 - 1.60 V/cell.

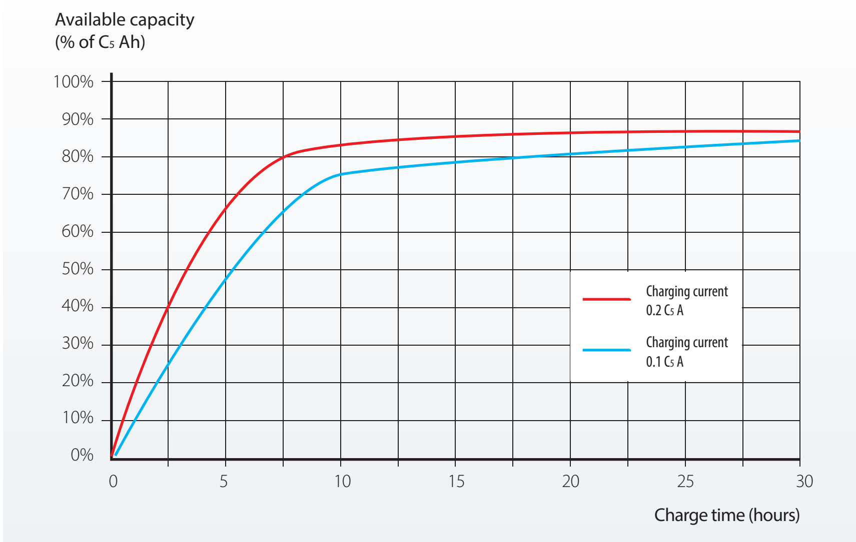
Constant current charging

- Normal charging: 0.2 C5A for 10 hrs.

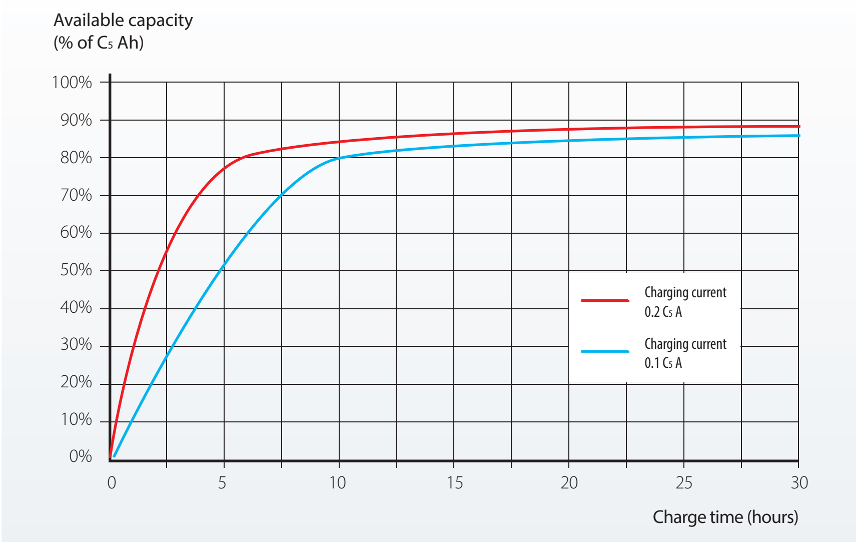
NBLE Range - Available capacity after constant voltage charge at 1,42 V at +20˚C (+68˚F)



NBM Range - Available capacity after constant voltage charge at 1,40 V at +20˚C (+68˚F)



NBH Range - Available capacity after constant voltage charge at 1,40 V at +20˚C (+68˚F)



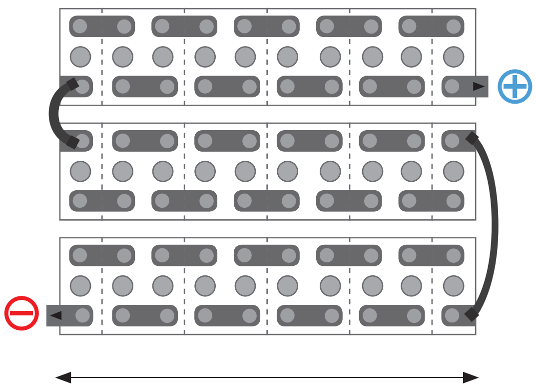
NICA Battery Layout
for optimum efficiency

Standard layouts

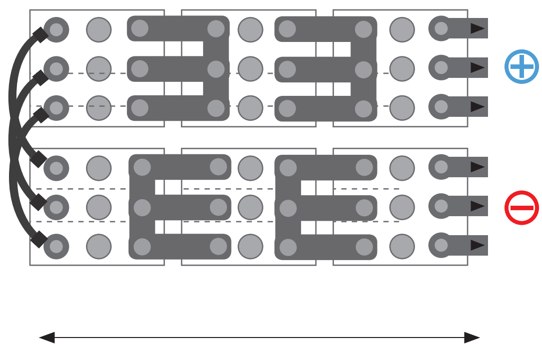
Nica has developed a series of standard layouts for ordering a battery. Whether the battery is being installed on a rack, in a cabinet or is simply freestanding, the same configuration principals can be applied.

Two ways to configure the battery

	Normal connection	Crosswise connection
NBLE	7.5 → 510	550 → 1690
NBM	11 → 392	415 → 1445
NBH	8.3 → 157	177 → 920



Length-to-Length connection



Width-to-Width connection

The cell is turned through 90˚ and then connected width-to-width. This is referrred 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.

Dimensions

The dimensions of all available cell types are listed in the tables. The block length is determined by the cell length and the number of cells in the block.

Notes :

- 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 6mm for handles for these types.
- All the cell heights given in the tables include the height of the IP2X terminal cover.

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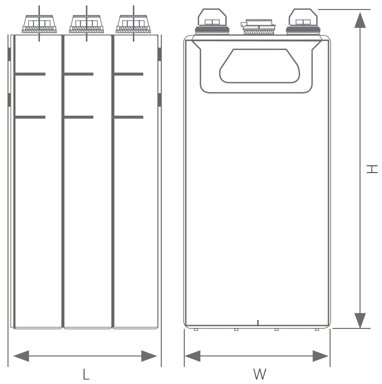
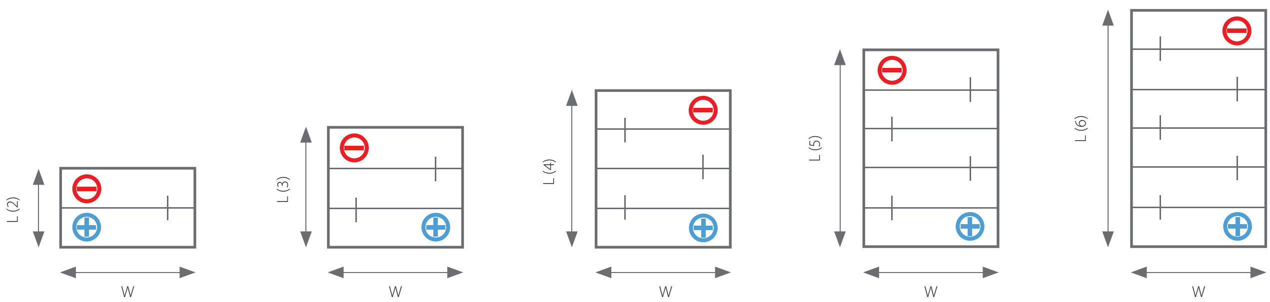


Position of terminals

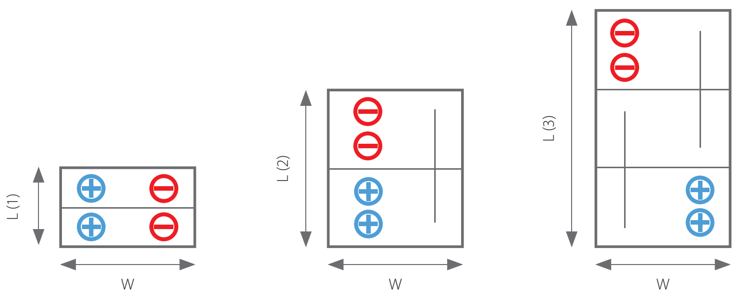
Block of cells with single pole bolt



NBLE 7.5 ➞ 62

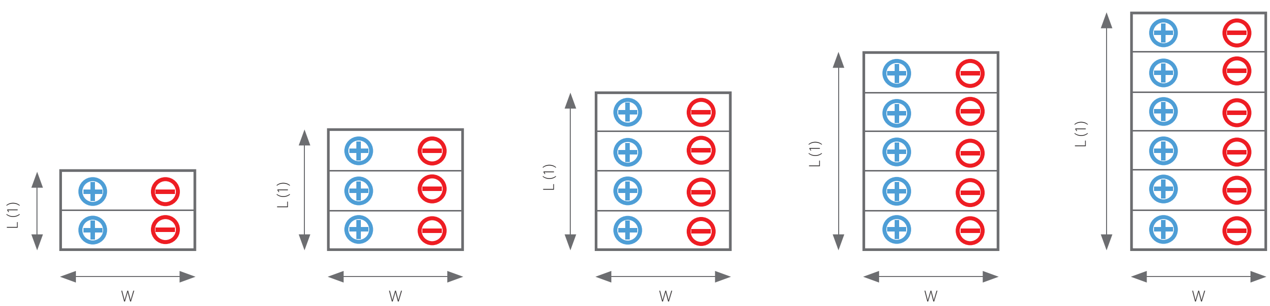
NBLE 75 ➞ 275
NBM 11 ➞ 241
NBH 8.3 ➞ 118

Block of cells with 2 pole bolt per poles



NBLE 300 ➞ 510
NBM 250 ➞ 392
NBH 137 ➞ 157

Block of cells with 2 - 6 poles bolt per poles



NBLE 550
NBM 415 ➞ 482
NBH 177 ➞ 256
NBH 270 ➞ 281
NBH 307

NBLE 600 ➞ 830
NBM 505 ➞ 723
NBH 265 / 294
NBH 323 ➞ 383
NBH 400 ➞ 460

NBLE 890 ➞ 1100
NBM 740 ➞ 940
NBH 393 / 471
NBH 510 ➞ 560
NBH 600 ➞ 615

NBLE 1150 ➞ 1400
NBM 1009 ➞ 1181
NBH 471 / 590NBH
640 ➞ 765

NBLE 1450 ➞ 1690
NBM 965
NBH 1220 ➞1445
NBH 800 ➞ 920

NBLE Capacities and dimensions - **International System of units**

Connection	Cell type	Capacity (C_5 Ah)	Height* (mm)	Width (mm)	Length per bock (mm)						Approx. weight per cell (kg)	Approx. electrolyte volume between level marks (cm^3)	Electrolyte per cell		Internal resistance (mOhm)	Cell connection bolt per pole
					1 cell	2 cells	3 cells	4 cells	5 cells	6 cells			Solid (kg)	Liquid (L)		
NORMAL CONNECTION	**NBLE 7,5**	7.5	190	123	-	-	-	101	125	149	0,80	80	0,08	0,24	14,0	M 6
	NBLE 15	15	260	123	-	-	-	101	125	149	1,10	80	0,11	0,35	8,33	M 6
	NBLE 22	22	260	123	-	-	-	143	178	212	1,70	120	0,17	0,53	5,68	M 6
	NBLE 30	30	260	123	-	-	-	143	178	212	1,80	120	0,15	0,46	4,17	M 6
	NBLE 40	40	260	195	-	-	-	239	298	356	3,00	200	0,29	0,90	3,13	M 6
	NBLE 47	47	260	195	-	-	-	191	238	284	2,50	160	0,19	0,59	2,66	M 6
	NBLE 62	62	260	195	-	-	-	239	298	356	3,20	200	0,23	0,70	2,02	M 6
	NBLE 75	75	350	195	-	79,0	115	-	-	-	4,10	290	0,32	1,00	2,13	M 8
	NBLE 85	85	406	195	-	79,0	115	-	-	-	4,90	290	0,45	1,40	1,94	M 8
	NBLE 95	95	406	195	-	79,0	115	-	-	-	4,90	290	0,45	1,40	1,74	M 8
	NBLE 110	110	350	195	-	103	151	-	-	-	5,60	390	0,49	1,50	1,45	M 10
	NBLE 125	125	406	195	-	103	151	-	-	-	6,70	390	0,58	1,80	1,32	M 10
	NBLE 140	140	406	195	-	103	151	-	-	-	6,70	390	0,58	1,80	1,18	M 10
	NBLE 165	165	406	195	-	127	187	-	-	-	8,40	490	0,71	2,20	1,00	M 10
	NBLE 185	185	406	195	-	127	187	-	-	-	8,40	490	0,71	2,20	0,89	M 10
	NBLE 200	200	406	195	-	159	232	-	-	-	10,2	610	0,84	2,60	0,83	M 10
	NBLE 215	215	406	195	-	159	232	-	-	-	10,2	610	0,84	2,60	0,77	M 10
	NBLE 230	230	406	195	-	159	232	-	-	-	10,2	610	0,84	2,60	0,72	M 10
	NBLE 255	255	406	195	-	183	268	-	-	-	11,9	710	0,97	3,00	0,65	M 10
	NBLE 275	275	406	195	-	183	268	-	-	-	11,9	710	0,97	3,00	0,60	M 10
	NBLE 300	300	406	195	-	229	337	-	-	-	14,8	890	1,26	3,90	0,55	2 × M 10
	NBLE 325	325	406	195	-	229	337	-	-	-	14,8	890	1,26	3,90	0,51	2 × M 10
	NBLE 355	355	406	195	-	253	373	-	-	-	16,5	990	1,39	4,30	0,46	2 × M 10
	NBLE 365	365	406	195	-	253	373	-	-	-	16,5	990	1,39	4,30	0,45	2 × M 10
	NBLE 375	375	406	195	-	253	373	-	-	-	16,5	990	1,39	4,30	0,44	2 × M 10
	NBLE 395	395	406	195	146	279	-	-	-	-	18,0	1110	1,52	4,70	0,42	2 × M 10
	NBLE 415	415	406	195	146	279	-	-	-	-	18,0	1110	1,52	4,70	0,40	2 × M 10
	NBLE 435	435	406	195	159	305	-	-	-	-	19,8	1220	1,68	5,20	0,38	2 × M 10
	NBLE 460	460	406	195	159	305	-	-	-	-	19,8	1220	1,68	5,20	0,36	2 × M 10
	NBLE 475	475	410	195	171	329	-	-	-	-	21,8	1320	1,81	5,60	0,34	2 × M 10
	NBLE 500	500	410	195	171	329	-	-	-	-	21,8	1320	1,81	5,60	0,33	2 × M 10
	NBLE 510	510	410	195	171	329	-	-	-	-	21,8	1320	1,81	5,60	0,32	2 × M 10
CROSSWISE CONNECTION	**NBLE 550**	550	410	195	183	-	-	-	-	-	23,4	1430	1,94	6,00	0,30	2 × M 10
	NBLE 600	600	410	195	206	-	-	-	-	-	26,1	1610	2,20	6,80	0,28	3 × M 10
	NBLE 650	650	410	195	219	-	-	-	-	-	27,6	1720	2,37	7,30	0,25	3 × M 10
	NBLE 700	700	410	195	232	-	-	-	-	-	29,4	1830	2,49	7,70	0,24	3 × M 10
	NBLE 750	750	410	195	244	-	-	-	-	-	31,4	1930	2,62	8,10	0,22	3 × M 10
	NBLE 790	790	410	195	256	-	-	-	-	-	33,4	2040	2,75	8,50	0,21	3 × M 10
	NBLE 830	830	410	195	268	-	-	-	-	-	35,0	2140	2,88	8,90	0,20	3 × M 10
	NBLE 890	890	410	195	292	-	-	-	-	-	37,2	2330	3,18	9,80	0,19	4 × M 10
	NBLE 925	925	410	195	305	-	-	-	-	-	39,0	2440	3,34	10,3	0,18	4 × M 10
	NBLE 980	980	410	195	317	-	-	-	-	-	41,0	2550	3,47	10,7	0,17	4 × M 10
	NBLE 1000	1000	410	195	329	-	-	-	-	-	43,0	2650	3,60	11,1	0,17	4 × M 10
	NBLE 1020	1020	410	195	329	-	-	-	-	-	43,0	2650	3,60	11,1	0,16	4 × M 10
	NBLE 1070	1070	410	195	341	-	-	-	-	-	45,0	2750	3,73	11,5	0,15	4 × M 10
	NBLE 1100	1100	410	195	353	-	-	-	-	-	46,6	2860	3,86	11,9	0,15	4 × M 10
	NBLE 1150	1150	410	195	378	-	-	-	-	-	48,6	3050	4,18	12,9	0,14	5 × M 10
	NBLE 1200	1200	410	195	390	-	-	-	-	-	50,6	3160	4,31	13,3	0,14	5 × M 10
	NBLE 1250	1250	410	195	402	-	-	-	-	-	52,6	3260	4,41	13,6	0,13	5 × M 10
	NBLE 1300	1300	410	195	413	-	-	-	-	-	54,8	3360	4,54	14,0	0,13	5 × M 10
	NBLE 1350	1350	410	195	426	-	-	-	-	-	56,6	3470	4,67	14,4	0,12	5 × M 10
	NBLE 1400	1400	410	195	438	-	-	-	-	-	58,2	3570	4,80	14,8	0,12	5 × M 10
	NBLE 1450	1450	410	195	463	-	-	-	-	-	60,2	3770	5,12	15,8	0,11	6 × M 10
	NBLE 1500	1500	410	195	487	-	-	-	-	-	64,2	3980	5,38	16,6	0,11	6 × M 10
	NBLE 1560	1560	410	195	499	-	-	-	-	-	66,2	4080	5,51	17,0	0,11	6 × M 10
	NBLE 1600	1600	410	195	511	-	-	-	-	-	68,1	4190	5,64	17,4	0,10	6 × M 10
	NBLE 1660	1660	410	195	523	-	-	-	-	-	69,8	4290	5,77	17,8	0,10	6 × M 10
	NBLE 1690	1690	410	195	523	-	-	-	-	-	69,8	4290	5,77	17,8	0,10	6 × M 10

** Height including the IP2X terminal cover - The dark line distinguishes the normal mounted cells from the crosswise cells.*

NBLE Capacities and dimensions - **Imperial units**

Connection	Cell type	Capacity (C_5 Ah)	Height* (in)	Width (in)	Length per bock (in)						Approx. weight per cell (lbs)	Approx. electrolyte volume between level marks (in^3)	Electrolyte per cell		Internal resistance (mOhm)	Cell connection bolt per pole
					1 cell	2 cells	3 cells	4 cells	5 cells	6 cells			Solid (lbs)	Liquid (US Gal.)		
NORMAL CONNECTION	NBLE 7,5	7,5	7,48	4,84	-	-	-	3,98	4,92	5,87	1,76	4,88	0,18	0,06	14,0	M 6
	NBLE 15	15	10,2	4,84	-	-	-	3,98	4,92	5,87	2,43	4,88	0,24	0,09	8,33	M 6
	NBLE 22	22	10,2	4,84	-	-	-	5,63	6,99	8,35	3,75	7,32	0,37	0,14	5,68	M 6
	NBLE 30	30	10,2	4,84	-	-	-	5,63	6,99	8,35	3,97	7,32	0,33	0,12	4,17	M 6
	NBLE 40	40	10,2	7,68	-	-	-	9,41	11,7	14,0	6,61	12,2	0,64	0,24	3,13	M 6
	NBLE 47	47	10,2	7,68	-	-	-	7,52	9,35	11,2	5,51	9,76	0,42	0,16	2,66	M 6
	NBLE 62	62	10,2	7,68	-	-	-	9,41	11,7	14,0	7,05	12,2	0,51	0,18	2,02	M 6
	NBLE 75	75	13,8	7,68	-	3,11	4,53	-	-	-	9,04	17,7	0,71	0,26	2,13	M 8
	NBLE 85	85	16,0	7,68	-	3,11	4,53	-	-	-	10,8	17,7	1,00	0,37	1,94	M 8
	NBLE 95	95	16,0	7,68	-	3,11	4,53	-	-	-	10,8	17,7	1,00	0,37	1,74	M 8
	NBLE 110	110	13,8	7,68	-	4,06	5,94	-	-	-	12,3	23,8	1,07	0,40	1,45	M 10
	NBLE 125	125	16,0	7,68	-	4,06	5,94	-	-	-	14,8	23,8	1,29	0,48	1,32	M 10
	NBLE 140	140	16,0	7,68	-	4,06	5,94	-	-	-	14,8	23,8	1,29	0,48	1,18	M 10
	NBLE 165	165	16,0	7,68	-	5,00	7,36	-	-	-	18,5	29,9	1,57	0,58	1,00	M 10
	NBLE 185	185	16,0	7,68	-	5,00	7,36	-	-	-	18,5	29,9	1,57	0,58	0,89	M10
	NBLE 200	200	16,0	7,68	-	6,26	9,13	-	-	-	22,5	37,2	1,86	0,69	0,83	M 10
	NBLE 215	215	16,0	7,68	-	6,26	9,13	-	-	-	22,5	37,2	1,86	0,69	0,77	M 10
	NBLE 230	230	16,0	7,68	-	6,26	9,13	-	-	-	22,5	37,2	1,86	0,69	0,72	M 10
	NBLE 255	255	16,0	7,68	-	7,20	10,6	-	-	-	26,2	43,3	2,14	0,79	0,65	M 10
	NBLE 275	275	16,0	7,68	-	7,20	10,6	-	-	-	26,2	43,3	2,14	0,79	0,60	M 10
	NBLE 300	300	16,0	7,68	-	9,02	13,3	-	-	-	32,6	54,3	2,79	1,03	0,55	2 × M 10
	NBLE 325	325	16,0	7,68	-	9,02	13,3	-	-	-	32,6	54,3	2,79	1,03	0,51	2 × M 10
	NBLE 355	355	16,0	7,68	-	10,0	14,7	-	-	-	36,4	60,4	3,07	1,14	0,46	2 × M 10
	NBLE 365	365	16,0	7,68	-	10,0	14,7	-	-	-	36,4	60,4	3,07	1,14	0,45	2 × M 10
	NBLE 375	375	16,0	7,68	-	10,0	14,7	-	-	-	36,4	60,4	3,07	1,14	0,44	2 × M 10
	NBLE 395	395	16,0	7,68	5,75	11,0	-	-	-	-	39,7	67,7	3,36	1,24	0,42	2 × M 10
	NBLE 415	415	16,0	7,68	5,75	11,0	-	-	-	-	39,7	67,7	3,36	1,24	0,40	2 × M 10
	NBLE 435	435	16,0	7,68	6,26	12,0	-	-	-	-	43,7	74,4	3,71	1,37	0,38	2 × M 10
	NBLE 460	460	16,0	7,68	6,26	12,0	-	-	-	-	43,7	74,4	3,71	1,37	0,36	2 × M 10
	NBLE 475	475	16,1	7,68	6,73	13,0	-	-	-	-	48,1	80,6	4,00	1,48	0,34	2 × M 10
	NBLE 500	500	16,1	7,68	6,73	13,0	-	-	-	-	48,1	80,6	4,00	1,48	0,33	2 × M 10
	NBLE 510	510	16,1	7,68	6,73	13,0	-	-	-	-	48,1	80,6	4,00	1,48	0,32	2 × M 10
CROSSWISE CONNECTION	NBLE 550	550	16,1	7,68	7,20	-	-	-	-	-	51,6	87,3	4,29	1,59	0,30	2 × M 10
	NBLE 600	600	16,1	7,68	8,11	-	-	-	-	-	57,5	98,2	4,86	1,80	0,28	3 × M 10
	NBLE 650	650	16,1	7,68	8,62	-	-	-	-	-	60,8	105	5,21	1,93	0,25	3 × M 10
	NBLE 700	700	16,1	7,68	9,13	-	-	-	-	-	64,8	112	5,50	2,03	0,24	3 × M 10
	NBLE 750	750	16,1	7,68	9,61	-	-	-	-	-	69,2	118	5,79	2,14	0,22	3 × M 10
	NBLE 790	790	16,1	7,68	10,1	-	-	-	-	-	73,6	124	6,07	2,25	0,21	3 × M 10
	NBLE 830	830	16,1	7,68	10,6	-	-	-	-	-	77,2	131	6,36	2,35	0,20	3 × M 10
	NBLE 890	890	16,1	7,68	11,5	-	-	-	-	-	82,0	142	7,00	2,59	0,19	4 × M 10
	NBLE 925	925	16,1	7,68	12,0	-	-	-	-	-	86,0	149	7,36	2,72	0,18	4 × M 10
	NBLE 980	980	16,1	7,68	12,5	-	-	-	-	-	90,4	156	7,64	2,83	0,17	4 × M 10
	NBLE 1000	1000	16,1	7,68	13,0	-	-	-	-	-	94,8	162	7,93	2,93	0,17	4 × M 10
	NBLE 1020	1020	16,1	7,68	13,0	-	-	-	-	-	94,8	162	7,93	2,93	0,16	4 × M 10
	NBLE 1070	1070	16,1	7,68	13,4	-	-	-	-	-	99,2	168	8,21	3,04	0,15	4 × M 10
	NBLE 1100	1100	16,1	7,68	13,9	-	-	-	-	-	103	175	8,50	3,14	0,15	4 × M 10
	NBLE 1150	1150	16,1	7,68	14,9	-	-	-	-	-	107	186	9,21	3,41	0,14	5 × M 10
	NBLE 1200	1200	16,1	7,68	15,4	-	-	-	-	-	112	193	9,50	3,51	0,14	5 × M 10
	NBLE 1250	1250	16,1	7,68	15,8	-	-	-	-	-	116	199	9,71	3,59	0,13	5 × M 10
	NBLE 1300	1300	16,1	7,68	16,3	-	-	-	-	-	121	205	10,0	3,70	0,13	5 × M 10
	NBLE 1350	1350	16,1	7,68	16,8	-	-	-	-	-	125	212	10,3	3,80	0,12	5 × M 10
	NBLE 1400	1400	16,1	7,68	17,2	-	-	-	-	-	128	218	10,6	3,91	0,12	5 × M 10
	NBLE 1450	1450	16,1	7,68	18,2	-	-	-	-	-	133	230	11,3	4,17	0,11	6 × M 10
	NBLE 1500	1500	16,1	7,68	19,2	-	-	-	-	-	142	243	11,9	4,39	0,11	6 × M 10
	NBLE 1560	1560	16,1	7,68	19,6	-	-	-	-	-	146	249	12,1	4,49	0,11	6 × M 10
	NBLE 1600	1600	16,1	7,68	20,1	-	-	-	-	-	150	256	12,4	4,60	0,10	6 × M 10
	NBLE 1660	1660	16,1	7,68	20,6	-	-	-	-	-	154	262	12,7	4,70	0,10	6 × M 10
	NBLE 1690	1690	16,1	7,68	20,6	-	-	-	-	-	154	262	12,7	4,70	0,10	6 × M 10

** Height including the IP2X terminal cover - The dark line distinguishes the normal mounted cells from the crosswise cells.*

NBLE 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	Capacity (C_5 Ah)	Hours							Minutes						Seconds		
		10	8	5	3	2	1,5	1	30	20	15	10	5	1	30	5	1
NBLE 7,5	7,5	0,77	0,95	1,50	2,42	3,28	4,08	5,22	6,38	7,15	7,67	8,40	10,43	12,40	13,70	15,50	15,90
NBLE 15	15	1,54	1,91	3,00	4,80	6,45	8,00	10,6	14,2	16,0	17,4	18,7	23,7	26,8	29,7	38,3	43,1
NBLE 22	22	2,26	2,81	4,40	7,04	9,45	11,7	15,5	20,8	23,5	25,5	27,4	34,7	39,3	43,6	56,1	63,3
NBLE 30	30	3,08	3,83	6,00	9,60	12,9	16,0	21,2	28,4	32,1	34,8	37,4	47,3	53,6	59,5	76,5	86,3
NBLE 40	40	4,10	5,10	8,00	12,8	17,2	21,3	28,3	37,8	42,8	46,4	49,9	63,1	71,4	79,3	102	115
NBLE 47	47	4,82	5,99	9,40	15,0	20,2	25,1	33,2	44,5	50,3	54,5	58,6	74,1	83,9	93,2	120	135
NBLE 62	62	6,36	7,91	12,4	19,8	26,6	33,0	43,8	58,7	66,3	71,9	77,4	97,8	111	123	158	178
NBLE 75	75	7,58	9,47	15,0	24,0	32,6	39,6	50,9	65,1	73,5	78,0	82,3	99,0	113	121	154	171
NBLE 85	85	8,76	10,8	17,0	27,2	36,3	43,7	56,0	72,2	81,0	86,9	93,4	107	119	128	153	164
NBLE 95	95	9,79	12,1	19,0	30,4	40,6	48,8	62,6	80,7	90,5	97,2	104	120	133	143	171	184
NBLE 110	110	11,1	13,9	22,0	35,2	47,8	58,0	74,7	95,5	108	114	121	145	166	177	226	251
NBLE 125	125	12,9	15,9	25,0	40,0	53,4	64,3	82,3	106	119	128	137	158	175	188	225	242
NBLE 140	140	14,4	17,8	28,0	44,8	59,8	72,0	92,2	119	133	143	154	177	196	210	252	271
NBLE 165	165	17,0	21,0	33,0	52,8	70,5	84,8	109	140	157	169	181	208	231	248	297	319
NBLE 185	185	19,1	23,6	37,0	59,2	79,0	95,1	122	157	176	189	203	233	259	278	333	358
NBLE 200	200	20,6	25,5	40,0	64,0	85,4	103	132	170	190	205	220	252	280	300	360	387
NBLE 215	215	22,2	27,4	43,0	68,8	91,8	111	142	183	205	220	236	271	301	323	387	416
NBLE 230	230	23,7	29,3	46,0	73,6	98,2	118	152	195	219	235	253	290	322	345	414	445
NBLE 255	255	26,3	32,5	51,0	81,6	109	131	168	217	243	261	280	322	357	383	459	493
NBLE 275	275	28,3	35,0	55,0	88,0	117	141	181	234	262	281	302	347	385	413	495	532
NBLE 300	300	30,9	38,2	60,0	96,0	128	154	198	255	286	307	330	378	420	450	540	580
NBLE 325	325	33,5	41,4	65,0	104	139	167	214	276	310	332	357	410	455	488	585	629
NBLE 355	355	36,6	45,2	71,0	114	152	183	234	302	338	363	390	448	497	533	639	687
NBLE 365	365	37,6	46,5	73,0	117	156	188	240	310	348	373	401	460	511	548	657	706
NBLE 375	375	38,6	47,8	75,0	120	160	193	247	319	357	384	412	473	525	563	675	726
NBLE 395	395	40,7	50,3	79,0	126	169	203	260	335	376	404	434	498	553	593	711	764
NBLE 415	415	42,8	52,9	83,0	133	177	213	273	352	395	424	456	523	581	623	747	803
NBLE 435	435	44,8	55,4	87,0	139	186	224	287	369	414	445	478	548	609	653	783	842
NBLE 460	460	47,4	58,6	92,0	147	196	236	303	391	438	471	506	580	644	690	828	890
NBLE 475	475	48,9	60,5	95,0	152	203	244	313	403	452	486	522	599	665	713	855	919
NBLE 500	500	51,5	63,7	100	160	214	257	329	425	476	511	550	630	700	750	900	967
NBLE 510	510	52,6	65,0	102	163	218	262	336	433	486	522	561	643	714	765	918	987
NBLE 550	550	56,7	70,1	110	176	235	283	362	467	524	563	605	693	770	825	990	1064
NBLE 600	600	61,8	76,4	120	192	256	308	395	510	571	614	660	757	840	900	1080	1161
NBLE 650	650	67,0	82,8	130	208	278	334	428	552	619	665	715	820	910	975	1170	1258
NBLE 700	700	72,1	89,2	140	224	299	360	461	595	667	716	770	883	980	1050	1260	1354
NBLE 750	750	77,3	95,5	150	240	320	386	494	637	714	767	825	946	1050	1125	1350	1451
NBLE 790	790	81,4	101	158	253	337	406	520	671	752	808	868	996	1106	1185	1422	1528
NBLE 830	830	85,5	106	166	266	354	427	547	705	791	849	912	1046	1162	1245	1494	1606
NBLE 890	890	91,7	113	178	285	380	458	586	756	848	910	978	1122	1246	1335	1602	1722
NBLE 925	925	95,3	118	185	296	395	476	609	786	881	946	1017	1166	1295	1388	1665	1790
NBLE 980	980	101	125	196	314	418	504	646	832	933	1002	1077	1236	1372	1470	1764	1896
NBLE 1000	1000	103	127	200	320	427	514	659	849	952	1023	1099	1261	1400	1500	1800	1935
NBLE 1020	1020	105	130	204	326	436	524	672	866	972	1043	1121	1286	1428	1530	1836	1973
NBLE 1070	1070	110	136	214	342	457	550	705	909	1019	1094	1176	1349	1498	1605	1926	2070
NBLE 1100	1100	113	140	220	352	470	566	725	934	1048	1125	1209	1387	1540	1650	1980	2128
NBLE 1150	1150	119	147	230	368	491	591	758	977	1095	1176	1264	1450	1610	1725	2070	2225
NBLE 1200	1200	124	153	240	384	512	617	790	1019	1143	1227	1319	1513	1680	1800	2160	2322
NBLE 1250	1250	129	159	250	400	534	643	823	1062	1191	1279	1374	1576	1750	1875	2250	2418
NBLE 1300	1300	134	166	260	416	555	668	856	1104	1238	1330	1429	1639	1820	1950	2340	2515
NBLE 1350	1350	139	172	270	432	576	694	889	1147	1286	1381	1484	1702	1890	2025	2430	2612
NBLE 1400	1400	144	178	280	448	598	720	922	1189	1333	1432	1539	1765	1960	2100	2520	2709
NBLE 1450	1450	149	185	290	464	619	745	955	1232	1381	1483	1594	1828	2030	2175	2610	2805
NBLE 1500	1500	155	191	300	480	641	771	988	1274	1429	1534	1649	1891	2100	2250	2700	2902
NBLE 1560	1560	161	199	312	499	666	802	1028	1325	1486	1596	1715	1967	2184	2340	2808	3018
NBLE 1600	1600	165	204	320	512	683	823	1054	1359	1524	1637	1759	2017	2240	2400	2880	3096
NBLE 1660	1660	171	211	332	531	709	853	1093	1410	1581	1698	1825	2093	2324	2490	2988	3212
NBLE 1690	1690	174	215	338	541	722	869	1113	1435	1610	1729	1858	2131	2366	2535	3042	3270

** Height including the IP2X terminal cover*

NBLE 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	Capacity (C_5 Ah)	Hours							Minutes						Seconds		
		10	8	5	3	2	1,5	1	30	20	15	10	5	1	30	5	1
NBLE 7,5	7,5	0,77	0,95	1,49	2,17	3,00	3,59	4,40	5,64	6,33	6,81	7,51	8,29	10,3	11,1	12,8	13,3
NBLE 15	15	1,53	1,89	2,94	4,65	5,78	6,87	8,98	12,1	14,1	15,2	16,8	17,1	21,6	24,3	31,7	35,6
NBLE 22	22	2,24	2,78	4,31	6,82	8,48	10,1	13,2	17,7	20,7	22,3	24,6	25,0	31,7	35,6	46,4	52,3
NBLE 30	30	3,06	3,79	5,88	9,30	11,6	13,7	18,0	24,1	28,2	30,3	33,6	34,1	43,2	48,5	63,3	71,3
NBLE 40	40	4,08	5,05	7,84	12,4	15,4	18,3	23,9	32,2	37,6	40,5	44,8	45,5	57,6	64,7	84,4	95,0
NBLE 47	47	4,79	5,93	9,21	14,6	18,1	21,5	28,1	37,8	44,1	47,5	52,6	53,5	67,7	76,0	99,2	112
NBLE 62	62	6,32	7,83	12,2	19,2	23,9	28,4	37,1	49,9	58,2	62,7	69,4	70,5	89,3	100	131	147
NBLE 75	75	7,50	9,38	14,7	23,5	28,8	33,9	42,0	55,1	62,6	66,9	72,5	78,2	90,7	100	127	140
NBLE 85	85	8,68	10,8	16,8	26,4	32,9	37,5	46,8	61,1	67,5	70,0	77,8	88,8	95,7	105	126	136
NBLE 95	95	9,71	12,1	18,8	29,5	36,8	41,9	52,3	68,2	75,4	78,2	86,9	99,2	107	117	140	152
NBLE 110	110	11,0	13,8	21,6	34,5	42,2	49,7	61,5	80,8	91,8	98,1	106	115	133	147	186	205
NBLE 125	125	12,8	15,9	24,7	38,8	48,4	55,2	68,9	89,8	99,2	103	114	131	141	154	185	201
NBLE 140	140	14,3	17,8	27,7	43,4	54,2	61,8	77,1	101	111	115	128	146	158	172	207	225
NBLE165	165	16,9	20,9	32,6	51,2	63,8	72,9	90,9	119	131	136	151	172	186	203	244	265
NBLE 185	185	18,9	23,5	36,6	57,4	71,6	81,7	102	133	147	152	169	193	208	228	273	297
NBLE 200	200	20,4	25,4	39,6	62,0	77,4	88,3	110	144	159	165	183	209	225	246	296	321
NBLE 215	215	22,0	27,3	42,5	66,7	83,2	94,9	118	154	171	177	197	224	242	265	318	345
NBLE 230	230	23,5	29,2	45,5	71,3	89,0	102	127	165	183	189	210	240	259	283	340	369
NBLE 255	255	26,1	32,4	50,4	79,1	98,7	113	141	183	202	210	233	266	287	314	377	409
NBLE 275	275	28,1	34,9	54,4	85,3	106	121	152	198	218	227	252	287	310	338	407	441
NBLE 300	300	30,7	38,1	59,3	93,0	116	132	165	216	238	247	274	313	338	369	443	481
NBLE 325	325	33,2	41,3	64,3	101	126	144	179	233	258	268	297	339	366	400	480	521
NBLE 355	355	36,3	45,1	70,2	110	137	157	196	255	282	292	325	371	400	437	525	570
NBLE 365	365	37,3	46,3	72,2	113	141	161	201	262	290	301	334	381	411	449	540	586
NBLE 375	375	38,3	47,6	74,2	116	145	166	207	269	298	309	343	392	422	461	554	602
NBLE 395	395	40,4	50,1	78,1	122	153	174	218	284	314	325	361	412	445	486	584	634
NBLE 415	415	42,4	52,7	82,1	129	161	183	229	298	329	342	380	433	467	511	613	666
NBLE 435	435	44,4	55,2	86,1	135	168	192	240	313	345	358	398	454	490	535	643	698
NBLE 460	460	47,0	58,4	91,0	143	178	203	253	330	365	379	421	480	518	566	680	738
NBLE 475	475	48,5	60,3	94,0	147	184	210	262	341	377	391	435	496	535	584	702	762
NBLE 500	500	51,1	63,5	99	155	193	221	276	359	397	412	457	522	563	615	739	802
NBLE 510	510	52,1	64,7	101	158	197	225	281	366	405	420	467	533	574	628	754	818
NBLE 550	550	56,2	69,8	109	171	213	243	303	395	437	453	503	574	619	677	813	882
NBLE 600	600	61,3	76,2	119	186	232	265	331	431	476	494	549	626	676	738	887	963
NBLE 650	650	66,4	82,5	129	202	252	287	358	467	516	535	595	679	732	800	961	1043
NBLE 700	700	71,5	88,9	138	217	271	309	386	503	556	577	640	731	788	861	1035	1123
NBLE 750	750	76,6	95,2	148	233	290	331	413	539	595	618	686	783	845	923	1109	1203
NBLE 790	790	80,7	100	156	245	306	349	435	568	627	651	723	825	890	972	1168	1267
NBLE 830	830	84,8	105	164	257	321	366	457	596	659	684	759	867	935	1021	1227	1332
NBLE 890	890	90,9	113	176	276	344	393	490	639	707	733	814	929	1002	1095	1316	1428
NBLE 925	925	94,5	117	183	287	358	408	510	665	734	762	846	966	1042	1138	1367	1484
NBLE 980	980	100	124	194	304	379	433	540	704	778	807	896	1023	1104	1206	1449	1572
NBLE 1000	1000	102	127	198	310	387	442	551	718	794	824	915	1044	1126	1230	1478	1604
NBLE 1020	1020	104	129	202	316	395	450	562	733	810	840	933	1065	1149	1255	1508	1636
NBLE 1070	1070	109	136	212	332	414	472	590	769	850	881	979	1117	1205	1317	1582	1717
NBLE 1100	1100	112	140	218	341	426	486	606	790	873	906	1006	1149	1239	1353	1626	1765
NBLE 1150	1150	118	146	228	357	445	508	634	826	913	947	1052	1201	1295	1415	1700	1845
NBLE 1200	1200	123	152	237	372	464	530	661	862	953	988	1098	1253	1351	1477	1774	1925
NBLE 1250	1250	128	159	247	388	484	552	689	898	992	1030	1143	1305	1408	1538	1848	2005
NBLE 1300	1300	133	165	257	403	503	574	716	934	1032	1071	1189	1357	1464	1600	1922	2086
NBLE 1350	1350	138	171	267	419	522	596	744	970	1072	1112	1235	1410	1520	1661	1996	2166
NBLE 1400	1400	143	178	277	434	542	618	771	1006	1112	1153	1281	1462	1577	1723	2070	2246
NBLE 1450	1450	148	184	287	450	561	640	799	1042	1151	1194	1326	1514	1633	1784	2143	2326
NBLE 1500	1500	153	190	297	465	580	662	827	1078	1191	1236	1372	1566	1689	1846	2217	2407
NBLE 1560	1560	159	198	309	484	604	689	860	1121	1239	1285	1427	1629	1757	1919	2306	2503
NBLE 1600	1600	163	203	317	496	619	706	882	1149	1270	1318	1464	1671	1802	1969	2365	2567
NBLE 1660	1660	170	211	328	515	642	733	915	1193	1318	1367	1519	1733	1869	2043	2454	2663
NBLE 1690	1690	173	215	334	524	654	746	931	1214	1342	1392	1546	1765	1903	2079	2498	2711

** Height including the IP2X terminal cover*

NBLE 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	Capacity (C_5 Ah)	Hours							Minutes						Seconds		
		10	8	5	3	2	1,5	1	30	20	15	10	5	1	30	5	1
NBLE 7,5	7,5	0,75	0,90	1,31	2,10	2,72	3,18	3,59	4,70	5,27	5,66	6,14	7,12	8,33	9,10	10,1	10,4
NBLE 15	15	1,50	1,84	2,82	4,01	5,11	6,09	7,19	9,65	10,7	11,4	12,8	15,1	17,4	20,0	26,2	29,7
NBLE 22	22	2,20	2,70	4,14	5,89	7,49	8,9	10,5	14,2	15,7	16,8	18,7	22,1	25,6	29,4	38,4	43,6
NBLE 30	30	3,00	3,68	5,65	8,03	10,2	12,2	14,4	19,3	21,5	22,9	25,5	30,1	34,9	40,1	52,4	59,5
NBLE 40	40	4,00	4,90	7,53	10,7	13,6	16,2	19,2	25,7	28,6	30,5	34,0	40,2	46,5	53,4	69,8	79,3
NBLE 47	47	4,70	5,76	8,85	12,6	16,0	19,1	22,5	30,2	33,6	35,8	40,0	47,2	54,6	62,7	82,0	93
NBLE 62	62	6,20	7,60	11,7	16,6	21,1	25,2	29,7	39,9	44,4	47,3	52,8	62,3	72,1	82,8	108	123
NBLE 75	75	7,43	9,10	14,0	20,0	25,3	29,7	34,7	44,4	49,0	49,7	54,7	64,6	73,4	82,1	103	115
NBLE 85	85	8,50	10,4	16,0	22,2	27,8	32,1	37,9	47,5	51,4	56,3	62,0	65,1	78,0	85,0	103	113
NBLE 95	95	9,50	11,6	17,9	24,8	31,1	35,9	42,3	53,1	57,4	63,0	69,3	72,8	87,2	95,0	116	127
NBLE 110	110	10,9	13,3	20,5	29,3	37,0	43,5	50,9	65,2	71,8	72,9	80,3	94,7	108	120	151	169
NBLE 125	125	12,5	15,3	23,5	32,6	41,0	47,2	55,7	69,9	75,5	82,8	91,2	95,8	115	125	152	167
NBLE 140	140	14,0	17,2	26,4	36,5	45,9	52,8	62,4	78,3	84,6	92,8	102	107	128	140	170	187
NBLE 165	165	16,5	20,2	31,1	43,0	54,1	62,3	73,5	92,3	100	109	120	126	151	165	201	220
NBLE 185	185	18,5	22,7	34,8	48,3	60,6	69,8	82,4	103	112	123	135	142	170	185	225	247
NBLE 200	200	20,0	24,5	37,7	52,2	65,5	75,5	89,1	112	121	133	146	153	183	200	243	267
NBLE 215	215	21,5	26,4	40,5	56,1	70,4	81,2	95,8	120	130	142	157	165	197	215	262	287
NBLE 230	230	23,0	28,2	43,3	60,0	75,3	86,8	102	129	139	152	168	176	211	230	280	307
NBLE 255	255	25,5	31,3	48,0	66,5	83,5	96,3	114	143	154	169	186	195	234	255	310	340
NBLE 275	275	27,5	33,7	51,8	71,7	90,1	104	122	154	166	182	201	211	252	275	335	367
NBLE 300	300	30,0	36,8	56,5	78,3	98,3	113	134	168	181	199	219	230	275	300	365	400
NBLE 325	325	32,5	39,8	61,2	84,8	106	123	145	182	196	215	237	249	298	325	396	434
NBLE 355	355	35,5	43,5	66,8	92,6	116	134	158	199	214	235	259	272	326	355	432	474
NBLE 365	365	36,5	44,8	68,7	95,2	120	138	163	204	221	242	266	280	335	365	444	487
NBLE 375	375	37,5	46,0	70,6	97,8	123	142	167	210	227	249	274	287	344	375	457	501
NBLE 395	395	39,5	48,4	74,4	103	129	149	176	221	239	262	288	303	362	395	481	527
NBLE 415	415	41,5	50,9	78,1	108	136	157	185	232	251	275	303	318	381	415	505	554
NBLE 435	435	43,5	53,3	81,9	113	143	164	194	243	263	288	317	333	399	435	530	581
NBLE 460	460	46,0	56,4	86,6	120	151	174	205	257	278	305	336	352	422	460	560	614
NBLE 475	475	47,5	58,2	89,4	124	156	179	212	266	287	315	347	364	436	475	578	634
NBLE 500	500	50,0	61,3	94,1	130	164	189	223	280	302	331	365	383	459	500	609	667
NBLE 510	510	51,0	62,5	96,0	133	167	193	227	285	308	338	372	391	468	510	621	681
NBLE 550	550	55,0	67,4	104	143	180	208	245	308	332	364	401	421	505	550	670	734
NBLE 600	600	60,0	73,6	113	157	197	226	267	336	363	398	438	460	550	600	730	801
NBLE 650	650	65,0	79,7	122	170	213	245	289	364	393	431	474	498	596	650	791	868
NBLE 700	700	70,0	85,8	132	183	229	264	312	392	423	464	511	536	642	700	852	934
NBLE 750	750	75,0	92,0	141	196	246	283	334	420	453	497	547	575	688	750	913	1001
NBLE 790	790	79,0	96,9	149	206	259	298	352	442	477	524	576	605	725	790	962	1054
NBLE 830	830	83,0	102	156	217	272	313	370	464	501	550	606	636	761	830	1010	1108
NBLE 890	890	89,0	109	168	232	292	336	396	498	538	590	649	682	816	890	1083	1188
NBLE 925	925	92,5	113	174	241	303	349	412	517	559	613	675	709	849	925	1126	1235
NBLE 980	980	98,0	120	184	256	321	370	436	548	592	649	715	751	899	980	1193	1308
NBLE 1000	1000	100	123	188	261	328	377	445	559	604	663	730	766	917	1000	1217	1335
NBLE 1020	1020	102	125	192	266	334	385	454	571	616	676	744	781	936	1020	1242	1361
NBLE 1070	1070	107	131	201	279	351	404	477	599	646	709	781	820	982	1070	1303	1428
NBLE 1100	1100	110	135	207	287	360	415	490	615	665	729	803	843	1009	1100	1339	1468
NBLE 1150	1150	115	141	217	300	377	434	512	643	695	762	839	881	1055	1150	1400	1535
NBLE 1200	1200	120	147	226	313	393	453	534	671	725	795	876	919	1101	1200	1461	1602
NBLE 1250	1250	125	153	235	326	410	472	557	699	755	828	912	958	1147	1250	1522	1668
NBLE 1300	1300	130	159	245	339	426	491	579	727	785	862	948	996	1193	1300	1583	1735
NBLE 1350	1350	135	166	254	352	442	510	601	755	816	895	985	1034	1238	1350	1643	1802
NBLE 1400	1400	140	172	264	365	459	528	624	783	846	928	1021	1073	1284	1400	1704	1869
NBLE 1450	1450	145	178	273	378	475	547	646	811	876	961	1058	1111	1330	1450	1765	1935
NBLE 1500	1500	150	184	282	391	491	566	668	839	906	994	1094	1149	1376	1500	1826	2002
NBLE 1560	1560	156	191	294	407	511	589	695	873	943	1034	1138	1195	1431	1560	1899	2082
NBLE 1600	1600	160	196	301	417	524	604	713	895	967	1060	1167	1226	1468	1600	1948	2136
NBLE 1660	1660	166	204	313	433	544	627	739	929	1003	1100	1211	1272	1523	1660	2021	2216
NBLE 1690	1690	169	207	318	441	554	638	753	945	1021	1120	1233	1295	1550	1690	2057	2256

** Height including the IP2X terminal cover*

NBLE 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	Capacity (C_5 Ah)	Hours							Minutes						Seconds		
		10	8	5	3	2	1,5	1	30	20	15	10	5	1	30	5	1
NBLE 7,5	7,5	0,74	0,86	1,15	1,91	2,37	2,61	2,96	3,79	4,27	4,50	5,01	6,02	6,76	7,21	8,45	8,71
NBLE 15	15	1,47	1,73	2,48	3,53	4,38	4,92	5,91	7,58	8,53	9,18	9,66	11,0	14,3	16,5	21,6	24,8
NBLE 22	22	2,16	2,54	3,64	5.,17	6,42	7,21	8,67	11,1	12,5	13,5	14,2	16,2	20,9	24,2	31,7	36,4
NBLE 30	30	2,94	3,46	4,97	7,05	8,76	9,83	11,8	15,2	17,1	18,4	19,3	22,1	28,5	33,0	43,3	49,6
NBLE 40	40	3,92	4,61	6,62	9,40	11,7	13,1	15,8	20,2	22,8	24,5	25,8	29,4	38,0	44,0	57,7	66,1
NBLE 47	47	4,61	5,42	7,78	11,0	13,7	15,4	18,5	23,7	26,7	28,8	30,3	34,6	44,7	51,7	67,8	77,7
NBLE 62	62	6,08	7,15	10,3	14,6	18,1	20,3	24,4	31,3	35,3	37,9	39,9	45,6	58,9	68,2	89,4	102
NBLE 75	75	7,20	8,46	12,3	17,2	21,3	23,7	27,2	34,3	39,1	39,3	44,9	48,3	60,0	66,4	85,1	96,0
NBLE 85	85	8,32	9,79	14,1	19,2	23,1	25,5	29,4	37,6	40,3	41,8	47,0	54,7	63,6	69,5	86,5	95,7
NBLE 95	95	9,29	10,9	15,7	21,5	25,8	28,5	32,9	42,1	45,0	46,7	52,6	61,1	71,0	77,7	96,7	107
NBLE 110	110	10,6	12,4	18,0	25,2	31,2	34,8	39,9	50,4	57,4	57,6	65,8	70,9	88,0	97,4	125	141
NBLE 125	125	12,2	14,4	20,7	28,3	33,9	37,6	43,3	55,3	59,3	61,5	69,2	80,4	93,5	102	127	141
NBLE 140	140	13,7	16,1	23,2	31,7	38,0	42,1	48,5	62,0	66,4	68,9	77,5	90,1	105	114	142	158
NBLE 165	165	16,1	19,0	27,3	37,3	44,7	49,6	57,1	73,0	78,2	81,2	91,3	106	123	135	168	186
NBLE 185	185	18,1	21,3	30,6	41,8	50,2	55,6	64,1	81,9	87,7	91,0	102	119	138	151	188	208
NBLE 200	200	19,6	23,0	33,1	45,2	54,2	60,1	69,3	88,5	94,8	98,4	111	129	150	163	203	225
NBLE 215	215	21,0	24,8	35,6	48,6	58,3	64,6	74,5	95,2	102	106	119	138	161	176	219	242
NBLE 230	230	22,5	26,5	38,1	52,0	62,4	69,1	79,6	102	109	113	127	148	172	188	234	259
NBLE 255	255	24,9	29,4	42,2	57,7	69,2	76,6	88,3	113	121	125	141	164	191	208	259	287
NBLE 275	275	26,9	31,7	45,6	62,2	74,6	82,6	95,2	122	130	135	152	177	206	225	280	310
NBLE 300	300	29,3	34,6	49,7	67,8	81,4	90,1	104	133	142	148	166	193	224	245	305	338
NBLE 325	325	31,8	37,4	53,8	73,5	88,1	97,6	113	144	154	160	180	209	243	266	331	366
NBLE 355	355	34,7	40,9	58,8	80,3	96,3	107	123	157	168	175	196	228	265	290	361	400
NBLE 365	365	35,7	42,1	60,5	82,5	99,0	110	126	162	173	180	202	235	273	298	371	411
NBLE 375	375	36,7	43,2	62,1	84,8	102	113	130	166	178	184	208	241	280	307	382	422
NBLE 395	395	38,6	45,5	65,4	89,3	107	119	137	175	187	194	219	254	295	323	402	445
NBLE 415	415	40,6	47,8	68,7	93,8	113	125	144	184	197	204	230	267	310	339	422	467
NBLE 435	435	42,6	50,1	72,1	98,3	118	131	151	193	206	214	241	280	325	356	443	490
NBLE 460	460	45,0	53,0	76,2	104	125	138	159	204	218	226	255	296	344	376	468	518
NBLE 475	475	46,5	54,7	78,7	107	129	143	164	210	225	234	263	306	355	388	483	535
NBLE 500	500	48,9	57,6	82,8	113	136	150	173	221	237	246	277	322	374	409	509	563
NBLE 510	510	49,9	58,8	84,5	115	138	153	177	226	242	251	282	328	381	417	519	574
NBLE 550	550	53,8	63,4	91,1	124	149	165	190	243	261	271	304	354	411	450	560	619
NBLE 600	600	58,7	69,1	99,4	136	163	180	208	266	284	295	332	386	449	490	610	676
NBLE 650	650	63,6	74,9	108	147	176	195	225	288	308	320	360	418	486	531	661	732
NBLE 700	700	68,5	80,7	116	158	190	210	242	310	332	344	387	450	523	572	712	788
NBLE 750	750	73,4	86,4	124	170	203	225	260	332	356	369	415	483	561	613	763	845
NBLE 790	790	77,3	91,0	131	179	214	237	274	350	375	389	437	508	591	646	804	890
NBLE 830	830	81,2	95,6	137	188	225	249	287	367	394	408	459	534	621	678	844	935
NBLE 890	890	87,1	103	147	201	241	267	308	394	422	438	493	573	666	727	905	1002
NBLE 925	925	90,5	107	153	209	251	278	320	410	439	455	512	595	692	756	941	1042
NBLE 980	980	95,9	113	162	222	266	294	339	434	465	482	542	631	733	801	997	1104
NBLE 1000	1000	97,8	115	166	226	271	300	346	443	474	492	553	644	748	817	1017	1126
NBLE 1020	1020	100	118	169	231	277	306	353	452	484	502	564	656	763	834	1038	1149
NBLE 1070	1070	105	123	177	242	290	321	371	474	507	526	592	689	800	875	1089	1205
NBLE 1100	1100	108	127	182	249	298	330	381	487	522	541	609	708	823	899	1119	1239
NBLE 1150	1150	113	133	191	260	312	346	398	509	545	566	636	740	860	940	1170	1295
NBLE 1200	1200	117	138	199	271	325	361	416	531	569	590	664	772	897	981	1221	1351
NBLE 1250	1250	122	144	207	283	339	376	433	553	593	615	692	804	935	1022	1272	1408
NBLE 1300	1300	127	150	215	294	353	391	450	576	616	639	719	837	972	1063	1323	1464
NBLE 1350	1350	132	156	224	305	366	406	467	598	640	664	747	869	1010	1103	1373	1520
NBLE 1400	1400	137	161	232	317	380	421	485	620	664	689	775	901	1047	1144	1424	1577
NBLE 1450	1450	142	167	240	328	393	436	502	642	687	713	802	933	1084	1185	1475	1633
NBLE 1500	1500	147	173	248	339	407	451	519	664	711	738	830	965	1122	1226	1526	1689
NBLE 1560	1560	153	180	258	353	423	469	540	691	740	767	863	1004	1167	1275	1587	1757
NBLE 1600	1600	157	184	265	362	434	481	554	708	759	787	885	1030	1197	1308	1628	1802
NBLE 1660	1660	162	191	275	375	450	499	575	735	787	817	919	1068	1241	1357	1689	1869
NBLE 1690	1690	165	195	280	382	458	508	585	748	801	831	935	1088	1264	1381	1719	1903

** Height including the IP2X terminal cover*

Maintenance of Batteries

Cleanliness / Mechanical
Cells must be kept clean and dry at all times, as dust and damp cause current leakage. Terminal and connectors should be kept clean, and any spillage during maintenance should be wiped off with a clean cloth. The battery can be cleaned, using water. Do not use wire brush or a solvent of any kind. Vent caps can be rinsed in clean water, if necessary.

Check that the flame arresting vents are tightly sealed and that there are no deposits on the vent caps.

Terminals should be checked for tightness, and the terminals and connectors should be corrosion protected by coating with a thin layer of neutral grease or anti-corrosion oil.

Changing electrolyte
In most stationary operations, the electrolyte will retain its effectiveness for the life of the battery. Thus, normally it is not necessary to change the electrolyte.

However, under certain battery operating conditions involving high temperature and cycling, the electrolyte can become excessively carbonated. Under these circumstances, the battery performance can be improved by replacing the electrolyte. Please consult your representative under these conditions.

Topping up
Check the electrolyte level. Never let the level fall below the lower MIN mark. Use only approved distilled or deionized water to top up. Do not overfill the cells.

Excessive consumption of water indicates operation at too high a voltage or too high temperature. Negligible consumption of water, with batteries on continuous low current or float charge, could indicate undercharging. A reasonable consumption of water is the best indication that a battery is being operated under the correct conditions. Any marked change in the rate of water consumption should be investigated immediately.

Capacity check
Electrical battery testing is not part of normal routine maintenance, as the battery is required to have the back-up function and cannot be easily taken out-of-service.

However, if a capacity test of the battery is needed, the following procedure should be followed:

a) Discharge the battery at the rate of $0.1C_5$ to $0.2C_5$ amperes (10 to 20 amperes for a 100 Ah battery) to a final average voltage of 1.0 volts per cell. (i.e. 92 volts for a 92 cells battery)

b) Charge 200% (i.e. 200 Ah for 100 Ah battery at the same rate used as the above paragraph (a)

c) Discharge at the same rate used in (a), measuring and recording current, voltage and time every hour, and more frequently towards the end of the discharged. This should be continued until a final average voltage of 1.0 volts per cell is reached. The overall state of battery can then be seen, and if individually cell measurements are taken, the state of each cell can be observed.

Recommended maintenance procedure

In order to obtain the best from your battery, the following maintenance procedures are recommended.

Yearly
- Check charge voltage settings
- Check cell voltages
  (50 mV deviation from average is acceptable)
- Check floats current of the battery
- Check electrolyte level
- High voltage charge if agreed for application

Every 2 years
- Clean cell lids and battery area
- Check torque values
- Grease terminals and connectors

Every 5 years or as required
- Capacity check

As required
Top-up with water according to defined period (depend on float voltage, cycles and temperature)

It is also recommended that a maintenance record be kept which should include a record of the temperature of the battery room.

Installation and storage

Batteries on arrival
On receiving the battery, open the cases and check for any indication of damage in transit.

Remove the cells and any accessories from the packaging, and check that the contents are in order and inspect for any damage in transit.

Damage must be reported immediately to the carrier, and the company or its agent.

If batteries are not put into service immediately they should be stored in a clean, dry, cool and well ventilated storage space on open shelves. Plastic cells should not be exposed to direct sunlight.

Before storage, ensure that:

a) Cells are kept clean with adequate protective finish, such as neutral grease on post and connectors.

b) Electrolyte in cells are filled to the correct level.

c) Vents are correctly seated and vent plugs firmly in position. Keep the transit sealing tape in position.

Note that if excessive loss of electrolyte in transit is found in cells supplied filled, ensure that the cells are correctly filled before storage.

Cells after storage
All cells after storage must be prepared for service and fully commissioned.

Cell oil
On top of the electrolyte of filled cells which floats a layer of cell oil to reduce self- discharge and water loss due to evaporation. This layer is approximately 5mm thick, when the cells are delivered empty and must be added to the cells after they have been filled with electrolyte.

Filled Cells
Filled cells can be stored for up to a maximum of one year. The cells should be sealed with plastic transport seals, supplied with the cells. Check the transport seals upon receipt.

If for unavoidable reasons, filled cells have been stored for more than one year, they must be given maintenance cycles as follows:

a) Remove transport seals form the cells.

b) Discharged at the charging current in the Cell Data Tables to 1.0 Volts per cell.

c) Charge to 10 hours at the charging current in the Cell Data Tables, or equivalent.

d) Wait for 24 hours for all gassing to stop.

e) Replace plastic transport seals and return to store.

For batteries stored more than 12months, at least one discharged/charged cycle as above should be carried out before the commissioning change begins.

Discharge and empty
Cells discharge and empty can be stored for many years if kept under the correct conditions. They should be stored in a clean, dry, cool (+10˚C to 30˚C) and well ventilated storage space on open shelves. It is important that they are sealed with the transport seals firmly in place. These should be checked at least yearly, and if necessary replaced or refitted. Failure or the seal will result in ingress of carbon dioxide from the atmosphere, which will result in carbonation of plates. This can affect the capacity of the battery.

Storage of the battery at temperatures above +30˚C can result in loss of capacity. This can be as much as 5% per 10˚C above +30˚C per year. Discharged and empty cells should be filled with electrolyte, and then the procedure for filled cells stored more than 1 year must followed.

Emplacement
The battery should be installed in a dry and clean location, away from direct sunlight, strong daylight and heat.

Block batteries can be fitted on to stands, floor-mounted or fitted into cabinets. The battery will give the best performance and maximum service life when the ambient temperature is between +10°C and + 35°C.

Local standards or codes normally define the mounting arrangements of batteries, and these must be followed, if applicable. However, if this is not the case, the following comments should be used as a guide. When mounting the battery, it is desirable to maintain an easy access to all blocks; they should be situated in a readily available position.

Distance between stands, and between stands and walls, should be sufficient to give good access to the battery.

Example

A battery of 98 cells, type NBH 79 on a two step, two tier stand, is placed in a room of dimension 2m x 2m x 3m

The charging system is capable of charging at $0.1C_5$ and so the charging current is 7.9 amperes.

The volume of hydrogen evolved per hour in this, the worst, case is:
$= 98 \times 7.9 \times 0.00045\ m^3$
$= 0.35\ m^3$

The total volume of room is $2 \times 2 \times 3 = 12\ m^3$

Approximate volume of battery and stand does not exceed $1\ m^3$, and so, the volume of free air in the room is $11\ m^3$.

Therefore, the concentration of hydrogen gas after charging for 1 hour at full gassing potential at $0.1\ C_5$ will be: $= 0.35/11 = 3.2\%$

The overall weight of the battery must be considered and the load bearing on the floor taken into account in the selection of the battery accommodation. In case of doubt, please contact your representative for advice.

When mounting the battery, ensure that the cells are correctly interconnected with the appropriate polarity. The battery connection to load should be with nickel-plated cable lugs.

Recommended torque for connecting screws is:

* M6 11 ± 1.0 N.m
* M8 20 ± 2 N.m
* M10 30 ± 3 N.m

To avoid accelerated aging of the plastic due to UV-light, batteries with plastic cell containers should not be exposed to direct sunlight or strong daylight for a prolonged period.

If the battery is enclosed in a cabinet or other such enclosed space, it is important to provide sufficient space to disperse the gasses given off during charging, and also to minimize condensation. It is recommended that at least 200mm be allowed above cell tops, to ensure easy access during inspection and topping up, and that enough space is allowed between cabinet walls and the battery to avoid any risk of short circuits. Flip-top vents may be turned through 180' to achieve the most convenient position for topping-up.

Ventilation

When the battery is housed in a cubicle or enclosed compartment, it is necessary to provide adequate ventilation.

During the last part of high-rate charging, the battery is emitting gases (oxygen-hydrogen mixture).

It is required to establish that the ventilation of the battery room is adequate, and it is necessary to calculate the rate of evolution of hydrogen to ensure that the concentration of hydrogen gas in the room is kept within safe limits.

The normally accepted safe limit for hydrogen is 4%. However, some standards call for more severe levels than this, and levels as low as 1% are sometimes required.

To calculate the ventilation requirements of a battery room, the following method can be used:

1 Ah of overcharge breaks down $0.366\ cm^3$ of water, and $1\ cm^3$ of water produces 1.865 liters of gas in the proportion 2/3 hydrogen and 1/3 oxygen. Thus 1 Ah of overcharge produces 0.45 liters of hydrogen.

Therefore, the volume of hydrogen evolved from a battery per hour

= number of cells x charge current x 0.45 liters or

= number of cells x charge current x $0.00045\ m^3$

The volume of hydrogen found by this calculation can be expressed as a percentage of the total volume of the battery room, and from this, the number of air changes required to keep the concentration of hydrogen below a certain level can be calculated.

Thus, to maintain a maximum concentration of 2%, the air in the room will need changing 3.2 = 1.6 times per hour.

A typical figure for natural room ventilation is about 2.5 air changes per hour, and so, in this case, it would not be necessary to introduce any forced ventilation. In a floating situation, the current flowing is very much lower than when the cell is being charged, and the gas evolution is minimal; it may be calculated in the same way using typical floating currents.