



# **duramp**



## **VALVE REGULATED LEAD ACID BATTERY (AGM)**

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## Introduction to Batteries

A battery is an electrical storage device. Batteries do not make electricity, they store it, just as a water tank stores water for future use. As chemicals in the battery change, electrical energy is stored or released. In rechargeable batteries this process can be repeated many times. Batteries are not 100% efficient - some energy is lost as heat and chemical reactions when charging and discharging. If you use 1000 watts from a battery, it might take 1050 or 1250 watts or more to fully recharge it.

Part - or most - of the loss in charging and discharging batteries is due to internal resistance. This is converted to heat, which is why batteries get warm when being charged up. The lower the internal resistance, the better.

Slower charging and discharging rates are more efficient. A battery rated at 180 amp-hours over 6 hours might be rated at 220 AH at the 20-hour rate, and 260 AH at the 48-hour rate. Much of this loss of efficiency is due to higher internal resistance at higher amperage rates - internal resistance is not a constant - kind of like "the more you push, the more it pushes back".

True Deep Cycle AGM's (such as **duramp**) can approach 98% efficiency, which is almost essential for use with off-grid Wind Turbines and Photovoltaic solar applications. As against this, typical efficiency in a lead-acid battery is 85-95%, while in alkaline and NiCad battery it is about 65%.

Practically all batteries used in wind turbines, PV and all but the smallest backup systems are Deep Cycle Valve Regulated Lead-Acid (VRLA) type AGM (Absorbed Glass Mat) batteries. Even after over a century of use of lead acid batteries, the Deep Cycle VRLA batteries still offer the best price to power ratio due to their long life (typically 5-8 years or longer), no liquid spill, very slow self discharge and up to 60% capacity. Standard Lead Acid Batteries are not suitable for Wind Energy and PV applications due to short life fast discharge for heavier initial current loads and a capacity of around 20% only. A few systems use NiCad, but we do not recommend them except in cases where extremely cold temperatures (-50° F or less) are common. They are expensive to buy, and very expensive to dispose of due the hazardous nature of Cadmium.

One major disadvantage of NiFe (alkaline) batteries is that there is a large voltage difference between the fully charged and discharged state. Another problem is that they are very inefficient - you lose from 30-40% in heat just in charging and discharging them. Many inverters and charge controls have a hard time with them. NiCads, Nickel-Iron, and other types are found in a few systems, but are not common due to their expense, environmental hazards, and/or poor efficiency.



## Applications

**duramp** Deep Cycle VRLA sealed batteries are ideally used with Wind Turbines and Photovoltaic applications. These are designed to take the high initial motorized loads without leading to shorter life capacity, while at

the same time these have a long life (5-8 years or more). These batteries also provide greater safety and do not require maintenance. They are ideal for use in homes and other indoor applications.



## Product Offering - VRLA Batteries

A newer type of sealed battery uses "Absorbed Glass Mats", or AGM between the plates. These type of batteries have all the advantages of gelled, but can stand much more shock and vibrations since the plates are tightly packed and rigidly mounted. As the mat is about 95% saturated, the battery will not leak acid even if broken. In addition, since there is no liquid to freeze and expand, they are practically immune from freezing damage.

Nearly all AGM batteries are "recombinant" - what that means is that the Oxygen and Hydrogen recombine INSIDE the battery, thus preventing the loss of water through electrolysis. Also, since the internal resistance is extremely low, there is almost no heating of the battery even under heavy charge and discharge currents. Even under severe overcharge conditions hydrogen emission are far below those of standard batteries. AGM's have a very low self-discharge - from 1% to 3% per month is usual. This means that they can sit in storage for much longer periods without charging than standard batteries.

AGM batteries main advantages are no maintenance, completely sealed against fumes, Hydrogen, or leakage, non-spilling even if they are broken, and can survive most freezes.

### 1. NPC Series – Deep Cycle Battery

Among our AGM type VRLA batteries, the NPC series is a Deep Cycle battery. These batteries are ideal for Wind Turbines and Solar PV applications since they have a design life of >750 cycles at 50% D.O.D. for most of the models. In addition, where batteries are set in an area where fumes or leakage is a worry, a standard or industrial Deep Cycle battery is a better economic choice.

## Product Features

### Maintenance-Free

There is no need to replenish with water, thanks to the unique gas recombination system which totally transforms the generated gas into water.

### Gas pressure Venting System

Designed to release excessive gas and reseal automatically in the event gas pressure rises to a level above the normal rate, thus, there is no excessive gas build-up in the battery.

### No Free Acid

The special electrolyte retentive separators firmly hold the acid and thus there is no free acid inside the

### 2. GEL Series - Gelled Electrolyte Battery

Gelled batteries, or "Gel Cells" contain acid that has been "gelled" by the addition of Silica Gel. The advantage of these batteries is that it is impossible to spill acid even if they are broken. However, due to this property, the Gel cells, to prevent damage, must be charged at a slower rate than the classical lead-acid batteries. The voltage must also be kept low, as voids can develop in the gel which will never heal, causing a loss in battery capacity.

### 3. NP Series - Standard Battery

This series is most commonly used for powering uninterrupted electrical source (UPS), Emergency Lights, Electric power system, Alarm system, Solar application system and Medical Equipment. This series can discharge to 50% at most, hence it is used for equipment that requires low capacity power output.

### 4. FA series - Front Access Battery

The terminals on this battery are in front, and the battery is long and narrow in dimension, making it convenient for customers to load. These batteries are typically used for Telecommunication power system, Switch electrical source, Control equipments and UPS, Emergency electrical sources, etc.

### 5. STXL Series - Classic Battery

This battery is used with equipment that has a high ampere-hour requirement. It is typically used for systems that have long operation periods, such as Telecommunication Equipment.

battery, and therefore the battery can be mounted in any position.

### Explosion-Proof, Safety

A safety valve prevents the chance of battery explosion and ensures complete safety in normal use.

### Inspection

Batteries will be 100% inspected before shipment (Inspecting sealed intensity, inner-resistance, open-circuit voltage and closed-circuit voltage).

### Certificate

All series of the products have been awarded CE, UL and ISO9001:2000 certificate.

## Chemical Reaction and Sealing Mechanism

Interior Chemical Reaction of the Battery:



At discharge, lead oxide in positive plates and spongy lead in negative plates react with sulfuric acid in the electrolyte and gradually transform into lead sulfate, during which the sulfuric acid concentration decreases.

Conversely, when the battery is charged, the positive and negative active materials which has been turned into lead sulfate gradually revert to lead oxide and spongy lead respectively releasing the sulfuric acid absorbed in the active materials, during which the sulfuric acid concentration increases, as shown in Fig.1.

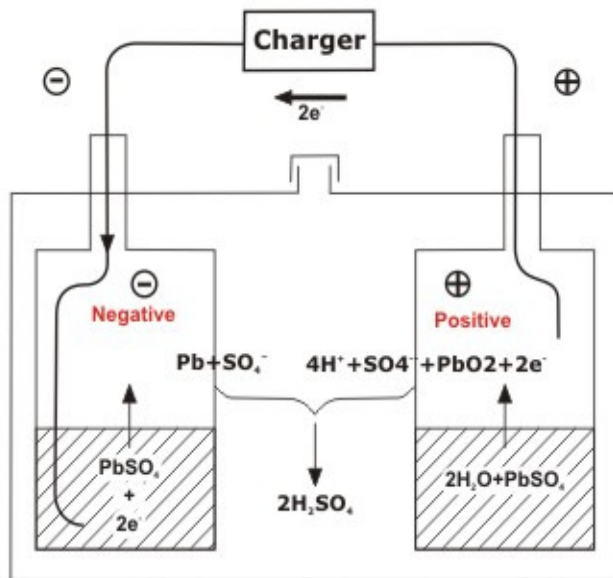
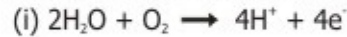


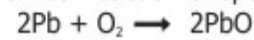
Fig 1: Reaction from beginning of charge to before the final stage

### (1) O<sub>2</sub> Reaction at positive plate (oxygen generation)



### (2) Reaction at Negative Plate

(ii) (Chemical reaction of spongy lead with oxygen)

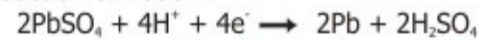


(iii) (Chemical reaction of PbO with electrolyte)



to reaction (i) ←

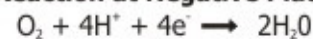
(iv) Reduction of PbSO<sub>4</sub>



to reaction (ii) ←

to reaction (iii) ←

### Total Reaction at Negative Plate



## Discharge Characteristics

The battery capacity is the parameter to scale the output of the battery discharge. The following factors affect the battery capacity: discharge current, discharge temperature, and final discharge voltage.

### Discharge Current and Discharge Capacity

For the same model, the bigger the current to discharge, the actual capacity will be smaller.

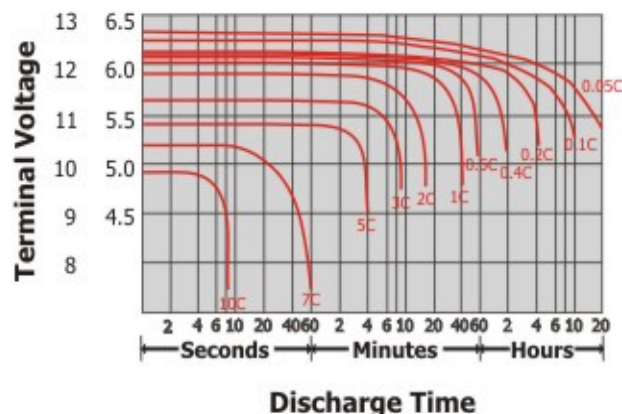


Fig 2: The relation between discharge rate and discharge time at 25°C.

### Ambient Temperature and Discharge Capacity

For the same model in certain ranges, the higher the temperature, the discharge capacity will be larger.

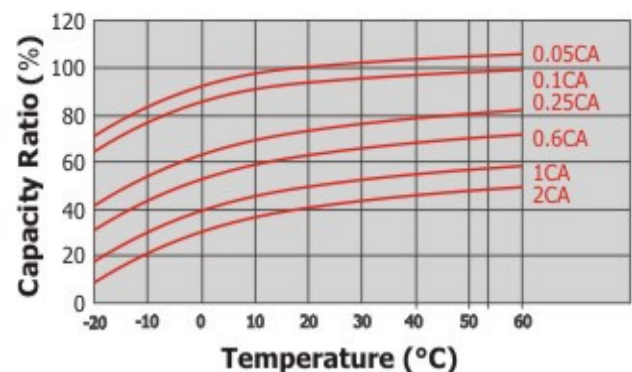


Fig 3: The relationship between ambient temperature and discharge capacity under different discharge conditions.



## Relationship of Discharge Capacity and Final Discharge Voltage

For higher final discharge voltage, the discharge capacity will be smaller. Likewise, for lower final discharge voltage, the discharge capacity will be higher. To avoid over-discharge, it is recommended that the lowest final discharge voltage be as follows:

Discharge Current (A)	0.05C	0.09C	0.17C	0.6C	1.0C	2.0C
Final Discharge Voltage (V/cell)	1.7	1.75	1.7	1.7	1.6	1.6

## Charge and discharge cyclic life

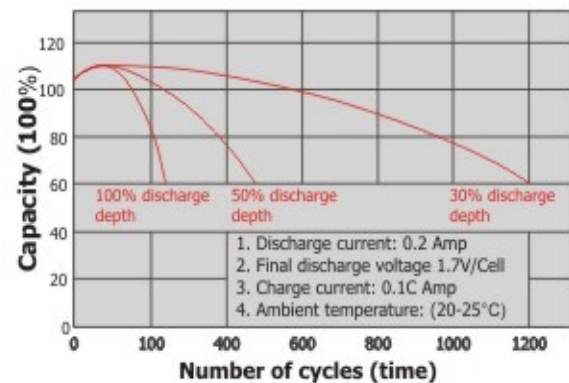


Fig 5: The table shows the relation between cycle numbers and charge depth under some operation condition.

## Relationship between Self-Discharge and Temperature

Storage temperature influences self-discharge rate of battery directly. The self-discharge rate will be higher for higher temperatures.

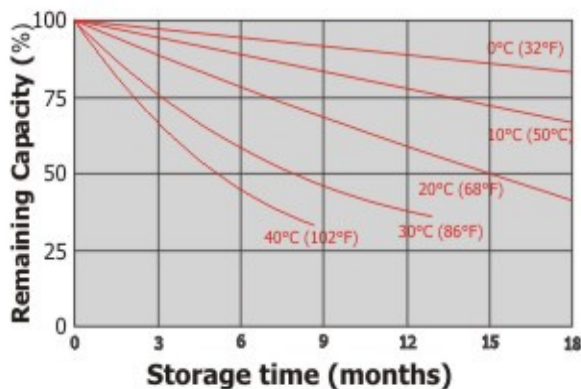


Fig 4: The relation between remaining capacity and storage time under different temperature.

## Open voltage and remaining capacity

The direct result of self-discharge is the loss of capacity, and it appears as the reducing of open-circuit voltage. So sometimes the reducing of open-circuit voltage is used to measure the depth of battery self-discharge.

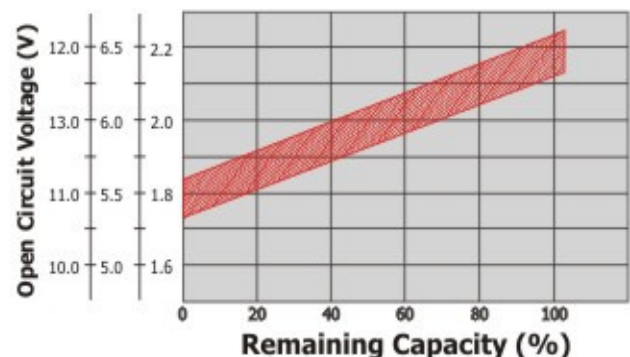


Fig 6: The relation between open-circuit voltage and the remaining capacity.

## FA Series (Front Access Range)

Model	Nominal Voltage	Nominal Capacity	Dimensions						Ht.Over Terminal		Weight Approx(kg)		Terminals
	(V)	(Ah)	L		W		H						
			in	mm	in	mm	in	mm	in	mm	kg	lb	
FA55-12	12	55	10.91	277	4.17	106	8.74	222	8.74	222	18	39.67	B04
FA75-12	12	75	22.12	562	4.48	114	7.4	188	7.4	188	29	63.92	B04
FA100-12	12	100	15.51	394	4.29	109	11.22	285	11.22	285	35	77.14	B04
FA105-12	12	105	19.96	507	4.29	109	9.37	238	9.37	238	36	79.34	B04
FA120-12	12	120	21.69	551	4.29	109	9.41	239	9.41	239	37.5	82.65	B04
FA150-12	12	150	21.69	551	4.29	109	11.3	287	11.3	287	47.5	104.69	B04
FA180-12	12	180	22.05	560	4.92	125	12.44	316	12.44	316	57	125.63	B04

Nominal capacity 10hr, Final Voltage 1.80V/Cell. Temperature 25°C.

Note: Other ratings are also available. Please e-mail us your requirements.

## NP Series (Standard Range)

Model	Nominal Voltage	Nominal Capacity	Dimensions						Ht.Over Terminal		Weight Approx(kg)		Terminal
	(V)	(Ah)	L		W		H						
			in	mm	in	mm	in	mm	in	mm	kg	lb	
NP4-2	2	4	1.89	48	0.98	25	3.98	101	4.21	107	0.27	0.6	T01(02)
NP4.5-2	2	4.5	1.89	48	0.98	25	3.98	101	4.21	107	0.3	0.66	T01(02)
NP10-2	2	10	2.05	52	2.05	52	3.66	93	3.86	98	0.55	1.21	T01(02)
NP12-2	2	12	2.05	52	2.05	52	3.66	93	3.86	98	0.7	1.54	T01(02)
NP3.5-4	4	3.5	3.54	90	1.34	34	2.4	61	2.6	66	0.44	0.97	T01
NP4-4	4	4	1.85	47	1.85	47	3.98	101	4.17	106	0.54	1.19	T01(02)
NP4.5-4	4	4.5	1.85	47	1.85	47	3.98	101	4.17	106	0.6	1.32	T01(02)
NP10-4	4	10	3.98	101	1.97	50	3.7	94	3.9	99	1.15	2.53	T01(02)
NP12-4	4	12	3.98	101	1.97	50	3.7	94	3.9	99	1.3	2.87	T01(02)
NP1-6	6	1	2.01	51	1.65	42	2.01	51	2.2	56	0.25	0.55	T01
NP2.3-6	6	2	1.65	42	1.46	37	2.99	76	2.99	76	0.33	0.73	P02
NP2.8-6	6	2.9	2.6	66	1.34	34	3.9	99	4.09	104	0.59	1.3	T01
NP3.0-6	6	3	4.92	125	1.3	33	2.36	60	2.56	65	0.6	1.32	T01(02)
NP3.2-6	6	3.3	2.6	66	1.34	34	4.53	115	4.72	120	0.63	1.39	T01
NP4-6	6	4	2.76	70	1.85	47	3.94	100	4.13	105	0.7	1.54	T01(02)
NP5-6Y	6	5	2.64	67	2.64	67	3.82	97	4.53	115	0.9	1.98	P05
NP6-6	6	6	2.76	70	1.85	47	3.94	100	4.13	105	0.42	0.93	T01(02)
NP7-6	6	7	5.91	150	1.34	34	3.74	95	3.94	100	1.12	2.47	T01(02)
NP7.5-6	6	7.5	5.91	150	1.34	34	3.74	95	3.94	100	1.15	2.53	T01(02)
NP8.5-6	6	8.5	3.86	98	2.21	56	4.65	118	4.65	118	1.55	3.41	T01(02)
NP10-6	6	10	5.95	151	1.97	50	3.7	94	3.9	99	1.53	3.37	T01(02)
NP12-6	6	12	5.95	151	1.97	50	3.7	94	3.9	99	1.7	3.75	T01(02)
NP16-6T	6	16	4.25	108	2.8	71	5.47	139	5.47	139	2.54	5.6	X01
NP100-6	6	100	7.68	195	6.69	170	8.11	206	8.31	211	15.2	33.5	B01
NP150-6	6	150	10.24	260	7.09	180	9.72	247	9.92	252	23.8	52.46	B01
NP180-6	6	180	12.05	306	6.61	168	8.66	222	8.74	227	27.1	59.73	B01
NP200-6	6	200	12.72	323	7.01	178	8.82	224	9.02	229	30.2	66.58	B01
NP225-6	6	225	10.24	260	7.09	180	9.72	247	9.92	252	30.5	67.24	B01
NP300-6	6	300	19.02	483	6.69	170	9.49	241	9.49	241	42	92.59	B01
NP3-8	8	3	5.28	134	1.42	36	2.52	64	2.72	69	0.84	1.85	T01
NP3.2-8	8	3.2	2.68	68	1.89	48	3.54	90	3.54	90	0.79	1.04	P06
NP7.2-8	8	7.2	6.46	164	1.1	28	3.9	99	4.09	104	1.32	2.91	T01(02)
NP0.8-12	12	0.8	3.78	96	0.98	25	2.44	62	2.44	62	0.36	0.79	X02(X03)
NP1.2-12	12	1.2	3.82	97	1.73	44	2.09	53	2.28	58	0.59	1.3	T01
NP2-12	12	2	2.76	70	1.85	47	3.9	99	4.09	104	0.73	1.61	T01
NP2.9-12	12	2.9	3.11	79	2.21	56	3.9	99	4.09	104	1.05	2.31	T01
NP3-12	12	2.8	4.09	104	1.89	48	2.76	70	2.76	70	0.99	2.18	P08
NP3.2-12	12	3.2	5.31	135	2.64	67	2.4	61	2.6	66	1.4	3.09	T01
NP4-12	12	4	3.54	90	2.76	70	3.98	101	4.17	106	1.35	2.98	T01(02)
NP4.5-12	12	4.5	3.54	90	2.76	70	3.98	101	4.17	106	1.55	3.42	T01(02)
NP5-12	12	5	3.54	90	2.76	70	3.98	101	4.17	106	1.55	3.42	T01(02)
NP7-12	12	7	5.94	151	2.56	65	3.74	95	3.94	100	2.25	4.96	T01(02)
NP10-12	12	10	5.94	151	3.86	98	3.74	95	3.94	100	3.25	6.72	T01(02)
NP12-12	12	12	5.94	151	3.86	98	3.74	95	3.94	100	3.5	7.71	T01(02)
NP18-12	12	18	7.13	181	2.99	76	6.61	168	6.61	168	5.7	12.56	Q02(B02)
NP20-12	12	20	7.13	181	2.99	76	6.61	168	6.61	168	6.1	13.44	Q02(B02)
NP22-12	12	22	7.13	181	2.99	76	6.61	168	6.81	173	6.55	14.44	Q03
NP24-12	12	24	6.89	175	6.5	165	4.96	126	4.96	126	8.1	17.85	Q04(B03)
NP26-12	12	26	6.89	175	6.5	165	4.96	126	4.96	126	8.5	18.73	Q04(B03)
NP33-12	12	35	7.64	194	5.2	132	6.73	171	6.73	171	10.8	23.8	Q06
NP35-12	12	35	7.72	196	5.16	131	6.42	163	7.05	179	11.2	24.68	Q02
NP38-12	12	38	7.8	198	6.54	166	6.77	172	6.77	172	13	28.65	Q07(B04)
NP40-12	12	40	7.8	198	6.54	166	6.77	172	6.77	172	14.2	31.3	Q07(B04)
NP55-12	12	55	9.02	229	5.43	138	8.19	208	8.94	213/227	17.2	37.91	Q08(B04)
NP60-12	12	60	10.12	257	5.24	133	7.87	200	7.87	200	18.1	39.89	Q09
NP65-12	12	65	13.78	350	6.16	168	7.01	178	7.01	178	21	46.28	Q10(B04)
NP70-12	12	70	10.2	259	6.65	169	8.19	208	8.94	213/227	22.5	49.59	Q11(B04)
NP80-12	12	80	13.78	350	6.54	166	6.85	174	6.85	174	23.1	50.91	Q12
NP90-12	12	90	12.09	307	6.65	169	8.19	208	8.94	227	26.6	58.63	Q13
NP100-12	12	100	12.91	328	6.77	172	8.43	214	9.57	219/243	29.8	65.68	Q14(B04)
NP120-12	12	120	16.02	407	6.85	174	8.23	209	9.37	238	36.9	81.33	Q15(B04)
NP134-12	12	134	13.43	341	6.81	173	11.14	283	11.34	288	40	88.16	B01
NP150-12	12	150	19.02	483	6.69	170	9.49	241	9.49	241	45	99.18	Q16(B05)
NP200-12	12	200	20.55	522	9.45	240	8.62	219	9.65	224/245	62.5	137.75	Q17(B06)
NP200-12A	12	200	20.51	521	10.59	269	7.99	203	8.19/9.13	208/232	62	136.65	Q17(B06)
NP3.5-24	24	3.5	8.11	206	3.03	77	2.91	74	2.91	74	2.84	6.26	X02

Nominal capacity ( $\leq 24\text{Ah}$ ). 20hr, Final Voltage 1.75V/Cell. Temperature 25°C. Nominal capacity ( $>24\text{Ah}$ ). 10hr.

Final Voltage 1.80V/Cell. Temperature 25°C.

Note: Other ratings are also available. Please e-mail us your requirements.



## GEL Series

Model	Nominal Voltage	Nominal Capacity	Dimensions						Ht.Over Terminal		Weight Approx(kg)		Terminals
	(V)	(Ah)	L		W		H						
GEL100-2	2	100	6.73	171	2.83	72	8.07	205	8.27	210	6	13.22	B05
GEL200-2	2	200	6.81	173	4.37	111	12.95	329	14.37	365	16.4	36.15	B05
GEL300-2	2	300	6.73	171	5.94	151	12.99	330	14.41	366	24.6	54.22	B05
GEL400-2	2	400	8.31	211	6.93	176	12.95	329	14.45	367	31.8	70.09	B05
GEL500-2	2	500	9.49	241	6.77	172	13.03	331	14.41	366	39	85.96	B05
GEL600-2	2	600	11.85	301	6.89	175	13.03	331	14.41	366	49.2	108.44	B05
GEL800-2	2	800	16.14	410	6.89	175	12.99	330	14.37	365	65.6	144.58	B05
GEL1000-2	2	1000	18.7	475	6.89	175	12.91	328	14.37	365	80	176.32	B05
GEL1500-2	2	1500	15.79	401	13.82	351	13.46	342	14.88	378	118	260.07	B05
GEL2000-2	2	2000	19.33	491	13.82	351	13.54	344	15.08	383	159	350.44	B05
GEL100-6	6	100	7.68	195	6.69	170	8.11	206	8.38	213	15.5kg	34.16	M8
GEL125-6	6	125	10.24	260	7.09	180	9.72	247	9.92	252	18.8	41.44	B01
GEL150-6	6	150	10.24	260	7.09	180	9.72	247	9.92	252	24.2	53.34	B01
GEL180-6	6	180	12.05	306	6.61	168	8.66	222	8.74	227	27.5	60.61	B01
GEL200-6	6	200	12.72	323	7.01	178	8.82	224	9.02	229	30.6	67.44	B01
GEL225-6	6	225	10.24	260	7.09	180	9.72	247	9.92	252	31.2	68.76	B01
GEL1.3-12	12	1.3	3.82	97	1.73	44	2.09	53	2.28	58	0.59	1.3	T01
GEL7-12	12	7	5.94	151	2.56	65	3.98	101	3.98	101	2.25	4.98	T01
GEL10-12	12	10	5.94	151	3.86	98	3.74	95	3.94	100	3.19	7.03	T01(02)
GEL12-12	12	12	5.94	151	3.86	98	3.74	95	3.94	100	3.44	7.59	T01(02)
GEL20-12	12	17	7.13	181	2.99	76	6.61	168	6.61	168	6	13.23	Q02(B02)
GEL24-12	12	24	6.89	175	6.49	165	4.96	126	4.96	126	8.3	18.29	Q04(B03)
GEL26-12	12	26	6.89	175	6.49	165	4.96	126	4.96	126	8.5	18.73	Q04(B03)
GEL26-12SX	12	26	6.5	165	4.96	126	6.89	175	7.17	182	9.3	20.5	Q05
GEL33-12	12	33	7.64	194	5.2	132	6.73	171	6.73	171	11	24.24	Q06
GEL38-12	12	38	7.8	198	6.54	166	6.77	172	6.77	172	13.3	29.31	Q07(B04)
GEL40-12	12	40	7.8	198	6.54	166	6.77	172	6.77	172	13.8	30.42	Q07(B04)
GEL42-12	12	42	7.8	198	6.54	166	6.77	172	6.77	172	14.2	32.84	M6
GEL55-12	12	55	9.02	229	5.43	138	8.19	208	8.39/8.94	213/227	17	37.47	Q08(B04)
GEL60-12	12	60	10.12	257	5.24	133	7.87	200	7.87	200	18.4	40.55	Q09
GEL65-12	12	65	13.78	350	6.16	168	7.01	178	7.01	178	21.5	47.39	Q10(B04)
GEL70-12	12	70	10.2	259	6.65	169	8.19	208	8.39/8.94	213/227	23	50.69	Q11(B04)
GEL80-12	12	80	13.78	350	6.54	166	6.85	174	6.85	174	23.6	52.01	Q12
GEL90-12	12	90	12.09	307	6.65	169	8.19	208	8.94	213/227	27.2	59.95	Q13
GEL100-12	12	100	12.91	328	6.77	172	8.43	214	8.62/9.57	219/243	30.5	67.22	Q14(B04)
GEL120-12	12	120	16.02	407	6.85	174	8.23	209	9.37	238	37.9	83.53	Q15(B04)
GEL134-12	12	134	13.43	341	6.81	173	11.14	283	11.34	288	40.2	88.6	B01
GEL150-12	12	150	19.02	483	6.69	170	9.49	241	9.49	241	46	101.38	Q16(B05)
GEL200-12	12	200	20.55	522	9.45	240	8.62	219	8.82/9.65	224/245	64	141.06	Q17(B06)

Nominal capacity 10hr, Final Voltage 1.80V/Cell. Temperature 25°C.

Note: Other ratings are also available. Please e-mail us your requirements.

## STXL Series (Classic Range)

Model	Nominal Voltage	Nominal Capacity	Dimensions						Ht.Over Terminal		Weight Approx(kg)		Terminals
	(V)	(Ah)	L		W		H						
			in	mm	in	mm	in	mm	in	mm	kg	lb	
STXL100-2	2	100	6.73	171	2.83	72	8.07	205	8.27	210	5.8	12.79	B05
STXL150-2	2	150	6.77	172	4	102	8.1	205	8.94	227	10.2	22.5	B05
STXL200-2	2	200	6.81	173	4.37	111	12.95	329	14.37	365	16	35.27	B05
STXL300-2	2	300	6.73	171	5.94	151	12.99	330	14.41	366	24	52.91	B05
STXL400-2	2	400	8.31	211	6.93	176	12.95	329	14.45	367	31	68.34	B05
STXL500-2	2	500	9.49	241	6.77	172	13.03	331	14.41	366	38	83.77	B05
STXL600-2	2	600	11.85	301	6.89	175	13.03	331	14.41	366	48	105.82	B05
STXL800-2	2	800	16.14	410	6.89	175	12.99	330	14.37	365	64	141.09	B05
STXL1000-2	2	1000	18.7	475	6.89	175	12.91	328	14.37	365	78	171.96	B05
STXL1500-2	2	1500	15.79	401	13.82	351	13.46	342	14.88	378	115	253.53	B05
STXL2000-2	2	2000	19.33	491	13.82	351	13.54	344	15.08	383	155	341.71	B05

Nominal capacity 10hr, Final Voltage 1.80V/Cell. Temperature 25°C.

Note: Other ratings are also available. Please e-mail us your requirements.

## NPC Series (Deep Cycle Battery)

Model	Nominal Voltage	Nominal Capacity	Dimensions						Ht.Over Terminal		Weight Approx(kg)		Terminals
	(V)	(Ah)	L		W		H						
			in	mm	in	mm	in	mm	in	mm	kg	lb	
NPC7-12	12	7	5.94	151	2.56	65	3.74	95	3.94	100	2.35	5.18	T01(T02)
NPC7.2-12	12	7.2	5.94	151	2.56	65	3.74	95	3.94	100	2.35	5.18	T02
NPC12-12	12	12	5.94	151	3.86	98	3.74	95	3.94	100	4.05	8.93	T01(T02)
NPC17-12	12	17	7.13	181	2.99	76	6.61	168	6.61	168	5.1	11.24	Q02(B02)
NPC20-12	12	20	7.13	181	2.99	76	6.61	168	6.61	168	6.2	13.65	B03
NPC24-12	12	24	6.97	177	6.57	167	4.96	126	4.96	126	8.1	17.85	Q04(B03)
NPC26-12	12	26	6.5	165	4.96	126	6.89	175	7.17	182	9.1	20.6	Q05
NPC33-12	12	33	7.72	196	5.16	131	6.42	163	7.05	179	11	24.24	Q19(B04)
NPC40-12	12	40	7.8	198	6.54	166	6.77	172	6.77	172	14.4	31.74	Q07(B04)
NPC55-12	12	55	9.02	229	5.43	138	8.19	208	8.94	227	18	39.6	B04
NPC65-12	12	65	13.78	350	6.16	168	7.01	178	7.01	178	21	46.28	Q10(B04)
NPC80-12	12	80	13.78	350	6.54	166	6.85	174	6.85	174	23.1	50.91	Q12
NPC100-12	12	100	12.91	328	6.77	172	8.43	214	9.57	243	31	68.32	Q14(B04)
NPC120-12	12	120	16.02	407	6.85	174	8.23	209	9.37	238	36.9	81.33	Q15(B04)
NPC150-12	12	150	19.02	483	6.69	170	9.49	241	9.49	241	45.9	100.98	Q16(B05)
NPC200-12	12	200	20.55	522	9.45	240	8.62	219	9.65	245	62.5	137.75	Q17(B06)
NPC250-12	12	250	20.5	520	10.55	268	8.66	220	9.8	249	75	165.2	B06

Nominal capacity ( $\leq 24\text{Ah}$ ). 20hr, Final Voltage 1.75V/Cell. Temperature 25°C. Nominal capacity ( $>24\text{Ah}$ ). 10hr.

Final Voltage 1.80V/Cell. Temperature 25°C.

Note: Other ratings are also available. Please e-mail us your requirements.

## Terminal Types

