



# ALLSAI-GEL BATTERIES

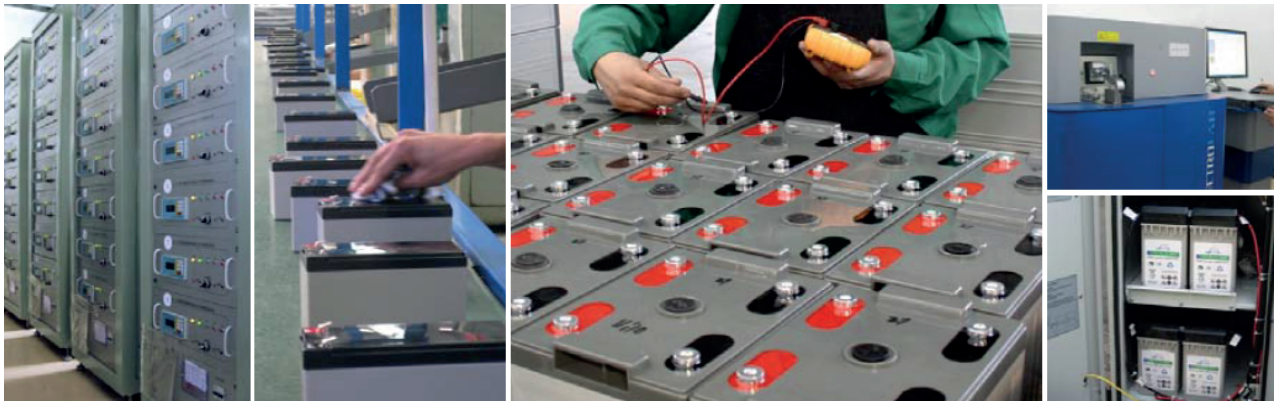


- LPG SERIES GENERAL PURPOSE GEL
- LPFG SERIES FRONT TERMINAL GEL
- LPCG SERIES DEEP CYCLE GEL

[www.allsai.com](http://www.allsai.com)



## BATTERY CARE AND MAINTENANCE



### Influence of Temperature

These Gel batteries are designed to operate within a temperature range between -30 OC and +50 OC. Below -15 OC, there is a risk of freezing the equipment. On the other hand it is possible to use the batteries at lower temperatures, under specific conditions (contact your representative). The use of VRLA batteries at high temperatures affects their service life. The service life is divided by factor 2 for an increasing of temperature of 10 OC. The optimum operating temperature is 20 OC. The battery temperature affects the available capacity (please refer to the chart on this subject in each series). Above 35 OC, the increasing of capacity is negligible.

### Top-charge and precautions

Any GEL battery will be damaged by continually undercharging or overcharging (Capacity is reduced and life is shortened), although ALLSAI batteries accept a charge very well due to their low internal resistance. Overcharging is extremely harmful to any VRLA battery because of the sealed design.

Overcharging dries out the electrolyte by driving the oxygen and hydrogen out of the battery through the pressure relief valves which will lead to less capacity and shorter lifetime. If a battery is continually undercharged, a barrier layer of sulfate will build up on the negative plate which will impact recharging acceptability. Premature

plate shedding can also happen. Performance is reduced and life is shortened.

It is critical that a charger be used that limits voltage. The charger must be temperature-compensated to prevent under or overcharging due to ambient temperature changes (Please refer to the table titled as Charge Voltage and Temperature Ranges on Page 3). The warranty is void if improperly charged. Use a good constant potential, temperature-compensated, voltage-regulated charger. Constant current chargers should never be used on VRLA-GEL batteries.

### Maintenance for Battery Storage

The location in which the batteries are being stored must be clean and well maintained. Appropriate inventory turnover, will ensure the highest operating quality of the products. Prior to installation the battery casings must be cleaned, never use solvents or abrasives. For longer storage periods, storage periods, checking the open circuit voltage (OCV) at the following intervals is recommended:

Storage at 20 OC: after a storage period of 12 months, then charge batteries every 3 months afterwards. Storage at 30 OC: after a storage period of 6 months, then charge batteries every 2 months afterwards.

# ALLSAI GEL BATTERY FEATURES

## INTRODUCTION

ALLSAI Gel batteries are based on true gel technology which has more than a half century experience. This type of battery contains gel electrolyte primarily produced by the homogeneous distributed SiO in a diluted sulfuric acid named gel 2

SOL with thixotropic properties. The special designed vent valves are also used to control the gassing and water losing rate. Since no maintenance is required and valve regulated, they are classified as one type of VRLA batteries (The other type is VRLA-AGM batteries).

After 5 years of development, ALLSAI now has built up two series and 40 gel battery models, from 2V to 12V in the voltage range, and from 24Ah to 3500 Ah in the capacity range, which can be used for general purpose application (named as LPG Series) and Telecom/UPS application with front terminal (named as LPFG Series). ALLSAI can produce batteries from scratch and is capable of engineering tools and molds upon customer's special requests.

## APPLICATIONS

ALLSAI VRLA-GEL Batteries are designed and categorized into two series for different applications as below:

Applications of LPG Series-General Purpose Gel Batteries

### 1) Cycle applications

- Golf trolleys
- Garden equipment
- Portable equipment
- Wheelchairs
- Solar and wind mill units
- Medical equipment
- Flash units also for mining (head flash)
- Portable video/radio
- Military
- Railway crossing
- Traffic lights
- Street signs
- Boats or buoys

- Cottage camping
- SOS pillars
- Toys and hobby applications
- Portable equipment for communication, testing, distance measuring etc.
- Pump system.

### 2) Standby applications

- Telecommunication backup
- Power plants
- Burglar alarms
- Medical equipment (stationary and portable i.e. X-ray)
- Computer back-up (high power)
- Communication systems
- Fire alarm systems
- Transmitter systems
- Cash register systems
- Emergency light signal systems
- Telephone systems
- Clocks systems
- Uninterrupted
- Power supplies
- Elevator emergency power supply (skyscrapers)
- Solar applications
- Mobile stations
- Airport / runway emergency illumination
- Emergency power supply for hospitals
- Radar and satellite stations

### Applications of LPFG Series-Front Terminal Gel Batteries

- Telecom application ( 19 inches and 23 inches power cabinets)
- UPS, Standby power supply
- Systems Solar Power
- Network connection equipment of communication system
- Power station systems
- Railway and marine
- Cable TV.

## FUNDAMENTAL BASICS OF GEL BATTERIES:

### What is gel?

Gel is usually produced by homogeneous dispersion of pyrogenic silica in diluted sulfuric acid. Pyrogenic silica is a kind of powder of very well dispersed SiO<sub>2</sub>, which

## ALLSAI GEL BATTERY FEATURES

absorbs more than 10 times its weight in liquid, producing gel. Because of the thixotropic properties of gel (liquid by stirring and solid by resting), after a certain gelling time, the agglomerates are connecting themselves together to form a network which keeps the liquid inside and gives the gel structure. This form can be broken by stirring to single agglomerates giving again a liquid form.

### Main difference from AGM batteries

- Using gel SOL as electrolyte
- Using the extra microporous separator which can reduce the depolarization of the negative electrode and avoid the PCL 3 effect (premature capacity loss due to negative plate sulphation); significantly decreasing thermal runaway; during deep discharge or pole reversal, helps to prevent short circuits by dendrite growth between the plates
- Plate thickness tolerance is not critical since the high compression of plate group assembly is not required
- More electrolytes for better contact with plates and active materials and container walls, good for releasing internal heat and cooling battery temperature
- Better vent valve design to lower gassing rate and water losing rate to extend battery lifetime

### ADVANTAGE OF GEL BATTERIES

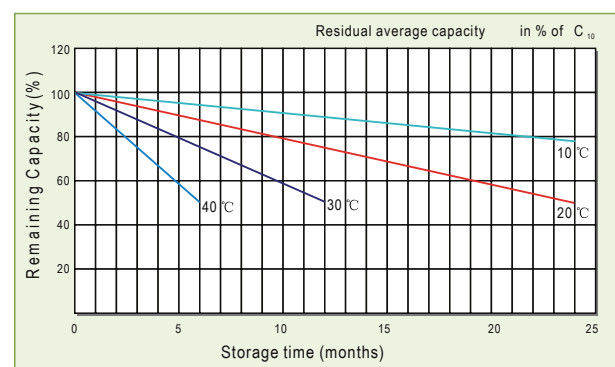
- No electrolyte adjustment needed
- Do not need quick recharging after discharging
- Insensitive to occasional deep discharge. Deep discharging resistance is high and much higher than in case of AGM since AGM has less electrolyte (only about 66% in comparison to gel)
- Extremely low gas extrication during charging
- Low self-discharge: 50% of the nominal capacity after a 12 months' storage in room temperature
- High charge acceptance

- High energy at low temperature
- Higher operating reliability and longer lifetime, as mistakes due to wrong maintenance will not occur
- The tendency to thermo-runaway-effect is strongly reduced for gel batteries since the higher electrolyte content than AGM (b/c the contact between plates and container walls for heat dispersion through the surrounding gel).
- Can be stored and used in upright or on side position (side position may give less capacity)
- No pollution problems if container is damaged
- Approved for air transport (IATA)
- Almost no acid stratification which can occur in AGM and conventional wet cells, especially on the tall batteries
- Self-resealing valves with adapter to reduce severe water losing and extend battery life
- Low cost rate ( cost vs. life time and cost vs. Cycles)

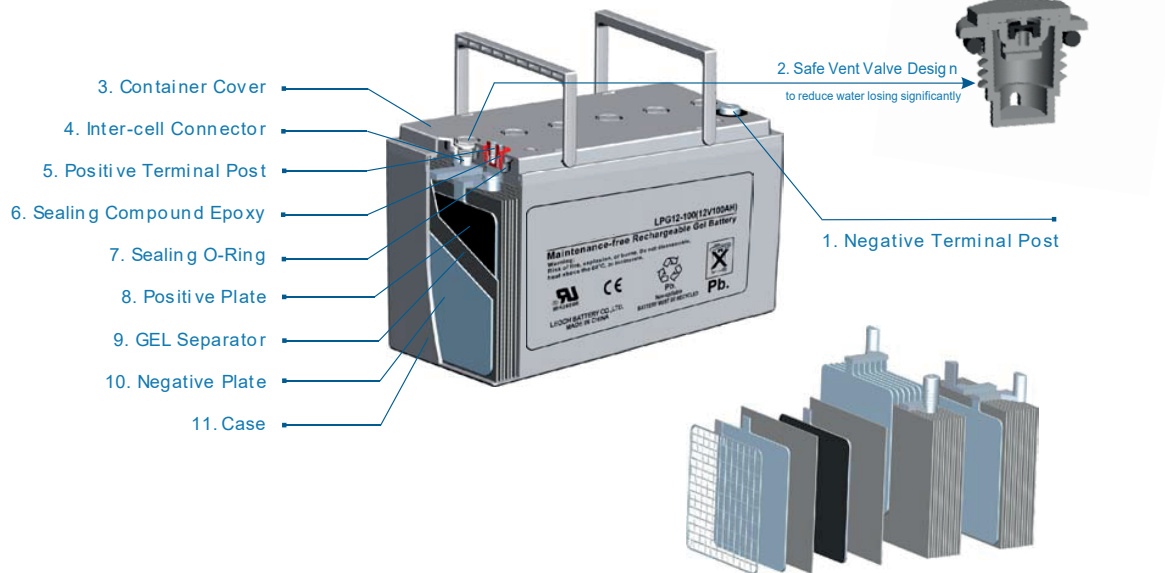
### Charge Voltages and Temperature Ranges

Temp (°F)	Boost Charge (V/cell)		Float Charge (V/cell)		Temp (°C)
	Optimum	Maximum	Optimum	Maximum	
≥120	2.23	2.28	2.15	2.18	≥49
110-120	2.27	2.32	2.17	2.22	43-49
100-111	2.28	2.33	2.18	2.23	38-43
90-100	2.30	2.35	2.20	2.25	32-38
80-90	2.32	2.37	2.22	2.27	27-32
70-80	2.35	2.40	2.25	2.30	21-27
60-70	2.38	2.43	2.28	2.33	16-21
50-60	2.40	2.45	2.30	2.35	10-16
40-50	2.43	2.48	2.33	2.38	4-10
30-40	2.46	2.51	2.34	2.39	(-1)-4
20-30	2.49	2.54	2.36	2.41	(-6)-(-1)
10-20	2.53	2.58	2.38	2.43	(-12)-(-6)
≤10	2.58	2.63	2.39	2.44	≤-12

### General relation of Capacity vs. Storage time



## GEL BATTERY CONSTRUCTION



## ALLSAI GEL BATTERY TERMINAL OPTIONS

Unit:mm[inch]

■ **T5 Terminal** Lead Torque: 3.9 ~ 5.4 N\*m (34.39 ~ 47.75 in\*lbs)

Technical drawing showing dimensions: 16 [0.63] (width), 16 [0.63] (height),  $\phi 6.5$  [4.0.256] (hole diameter),  $R1 [R.0.039]$  (fillet), 7.5 (total height), 6.5 (plate height), 0.62 (plate thickness), and  $\phi 6.5$  (bottom hole diameter).

■ **T6 Terminal** Brass Coated With Tin; Threaded Insert 6mm STU D Torque: 3.9 ~ 5.4 N\*m (34.39 ~ 47.75 in\*lbs)

Technical drawing showing dimensions:  $\phi 16$  [0.63] (width), 6 [0.236] (height), and M6 [0.236] (thread).

■ **T7 Terminal** Brass Coated With Tin; Threaded Insert 6mm STU D Torque: 3.9 ~ 5.4 N\*m (34.39 ~ 47.75 in\*lbs)

Technical drawing showing dimensions:  $\phi 16$  [0.709] (width), 6 [0.236] (height), and M6 [0.236] (thread).

■ **T9 Terminal** Lead Torque: 11 ~ 14.7 N\*m (97.28 ~ 130.0 in\*lbs)

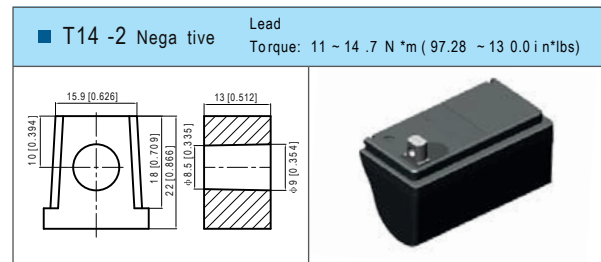
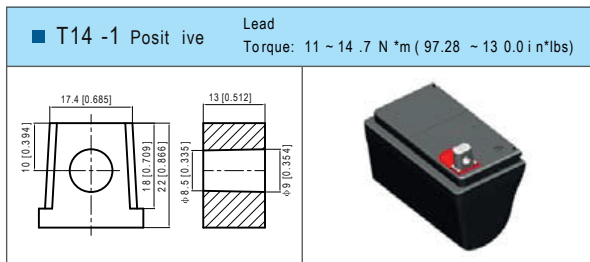
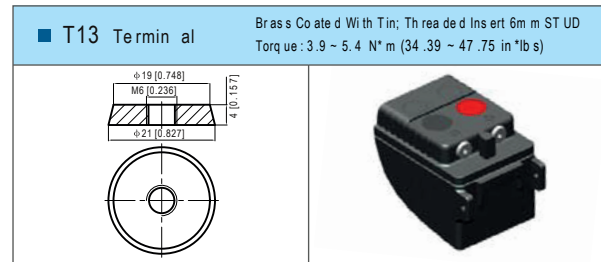
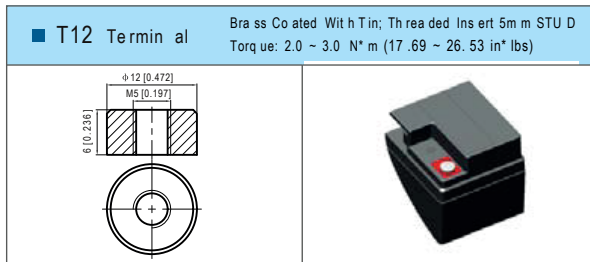
Technical drawing showing dimensions: 16 [0.709] (width), 20 [0.787] (height),  $\phi 8$  [0.315] (hole diameter), and 13 [0.512] (bottom hole diameter).

■ **T10 Terminal** Lead Torque: 3.9 ~ 5.4 N\*m (34.39 ~ 47.75 in\*lbs)

Technical drawing showing dimensions: 17 [0.669] (width), 16 [0.63] (height), 8.5 [0.335] (hole diameter), 8 [0.315] (plate height), and  $\phi 6$  [0.236] (bottom hole diameter).

■ **T11 Terminal** Brass Coated With Tin; Threaded Insert 8mm STU D Torque: 11~14.7 N\*m (97.28 ~ 130.0 in\*lbs)

Technical drawing showing dimensions:  $\phi 20$  [0.787] (width), 7 [0.276] (height), and M8 [0.315] (thread).



Note: the figures below just show the appearance and dimension. For the positioning on each battery model, please check the specification on [www.leoch.com](http://www.leoch.com).

## VALVE REGULATED LEAD-ACID GEL BATTERY, RECHARGABLE

### LPG SERIES GENERAL PURPOSE GEL



#### General Features

- Long discharge time
- Suitable for standby power and energy storage power use
- Special plate design, long cycle lifetime
- Using special lead-calcium alloy to boost up the grid anti-corrosive performance and extend the battery using lifetime
- Special separator to boost up the battery internal performance
- High thermal capacity, reduce the risk of thermal runaway and drying up, can be used in poor environment
- High gas recombination efficiency
- Little water losing, no electrolyte stratification phenomenon
- Long storage time
- Good deep discharge resilience performance
- Using nano-fumed silica, with small particle size, and big specific surface area.

#### Typical Applications

- 1) Cycle applications
  - Golf trolleys • Garden equipments • Portable equipments • Wheel chairs • Solar and wind mill units
  - Medical equipments • Flash units also for mining (head flash) • Portable video/radio • Military • Railway crossing
  - Traffic lights • Street signs • Boats or buoys • Cottage camping • SOS pillars • Toys and hobby applications
  - Portable equipments for communication, testing, distance measuring etc. • Pump system
- 2) Standby applications
  - Telecommunication backup • Power plants • Burglar alarms • Medical equipments (stationary and portable i.e. Xray)
  - Computer back-up (high power) • Communication systems • Fire alarm systems • Transmitter systems
  - Cash register systems • Emergency lights signal systems • Telephone systems • Clocks systems • Uninterrupted power supplies • Elevators emergency power supply (skyscrapers) • Solar applications • Mobile stations
  - Airport / runway emergency illumination • Emergency power supply for hospitals • Radar and satellite stations

## LPG Models and Parameters (Small, Middle Size)

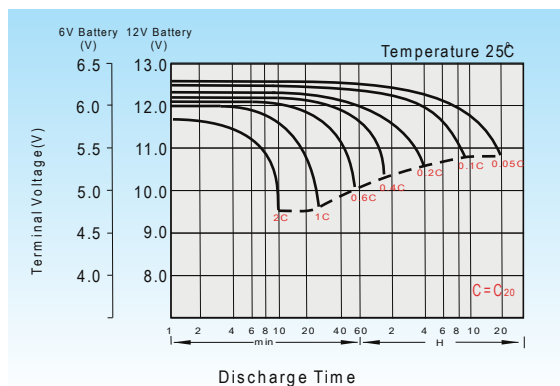
Model	Nominal Voltage (V)	Rated Capacity (AH)				Approx Dimension								Approx Weight		Terminal type
		20HR		1HR		Length		Width		Height		Total Height				
		1.80V /cell	1.75V /cell	1.75V /cell	1.67V /cell	mm	in.	mm	in.	mm	in.	mm	in.	kg	lbs	
LPG 12-17	12	17	15.5	13.6	9.35	181.5	7.15	77	3.03	167.5	6.59	167.5	6.59	5.80	12.79	T12
LPG 12-26	12	26	24.2	20.8	14.3	166.0	6.54	175	6.89	125	4.92	125	4.92	8.70	19.18	T12
LPG 12-31	12	30	27.9	24.0	17.1	195	7.68	130	5.12	164	6.46	178	7.01	10.7	23.59	T5/T6
LPG 12-38	12	38	35.3	30.4	20.9	197	7.76	165	6.50	170	6.69	170	6.69	13.5	29.77	T6
LPG 12-45	12	45	40.0	36.0	24.8	257	10.1	132	5.20	200	7.87	200	7.87	16.2	35.72	T6
LPG 12-50	12	50	46.5	40.0	27.5	229	9.02	138	5.43	205	8.07	211	8.31	16.6	36.60	T6
LPG 12-60	12	60	55.8	48.0	33.0	325	12.8	167	6.57	174	6.85	174	6.85	21.5	47.41	T6

Model	Nominal Voltage (V)	Rated Capacity (AH)				Approx Dimension								Approx Weight		Terminal type
		20HR		1HR		Length		Width		Height		Total Height				
		1.80V /cell	1.75V /cell	1.75V /cell	1.67V /cell	mm	in.	mm	in.	mm	in.	mm	in.	kg	lbs	
LPG12-65	12	65.0	60.5	52.0	35.8	325	12.79	167	6.57	174	6.85	174	6.85	24.0	52.92	T6
LPG12-70H	12	70.0	65.1	56.0	38.5	260	10.24	168	6.61	208	8.19	214	8.43	22.8	50.30	T6
LPG12-85	12	85.0	78.0	68.0	46.8	306	12.05	168	6.61	208	8.20	214	8.43	26.5	58.40	T6
LPG12-100	12	96.0	90.0	80.0	55.0	330	12.99	173	6.81	212	8.35	218	8.58	30.8	67.90	T11
LPG12-110	12	110	102.3	88.0	60.5	408	16.06	177	6.97	225	8.86	225	8.86	35.7	78.70	T11
LPG12-125	12	130	121.0	104	71.5	345	13.58	172	6.77	274	10.79	280	11.02	47.3	104.30	T11
LPG12-140	12	135	125.6	108	74.3	483	19.02	170	6.69	238.5	9.39	238.5	9.39	43.9	96.80	T11
LPG12-200	12	200	186.0	160	110	522	20.55	240	9.45	218	8.58	224	8.82	62.5	137.80	T11
LPG12-240	12	240	219.0	192	132	522	20.60	268	10.6	220	8.70	226	8.90	77.5	170.9	T11
LPG6-200	6	200	185.0	160	110	322	12.68	178	7.01	226	8.89	232	9.13	31.1	68.60	T11

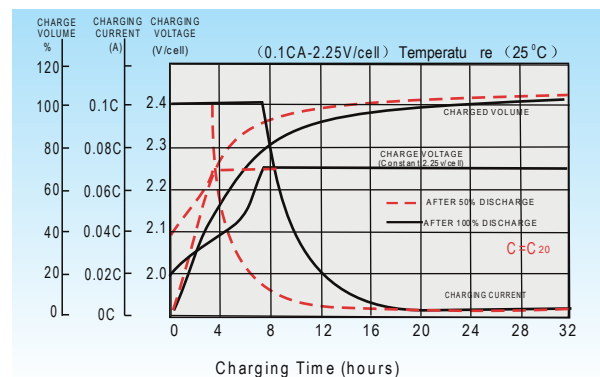
Note: model number followed with H-tall version and L-long version

## LPG Performance Characteristics (Small, Middle size)

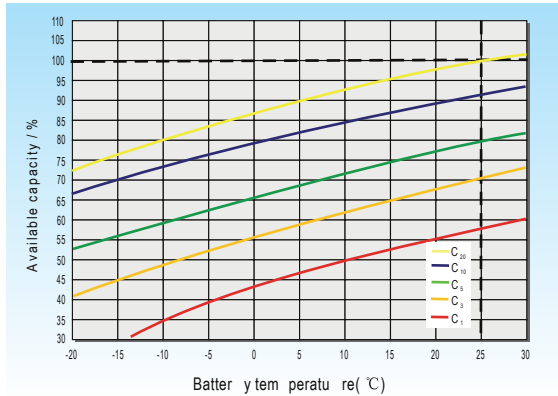
### DISCHARGE CHARACTERISTICS



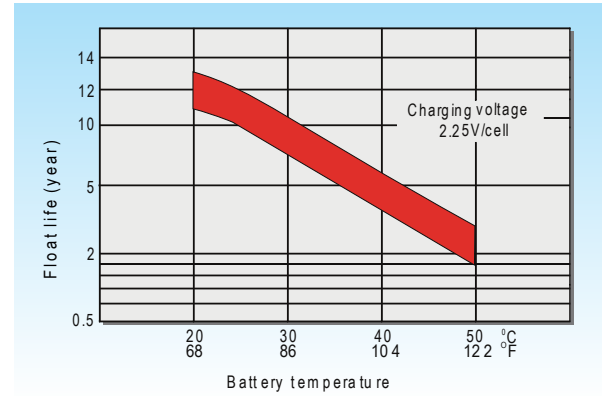
### CHARGING CHARACTERISTICS



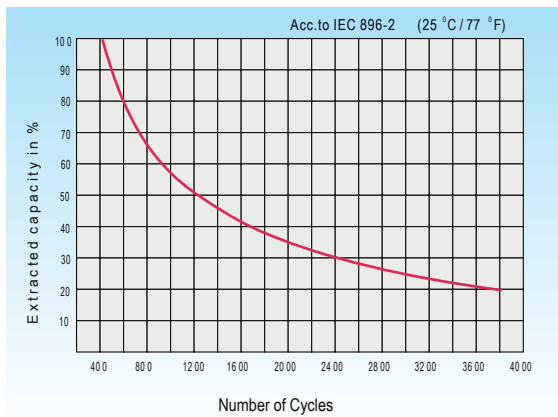
### TEMPERATURE EFFECTS IN RELATION TO BATTERY CAPACITY



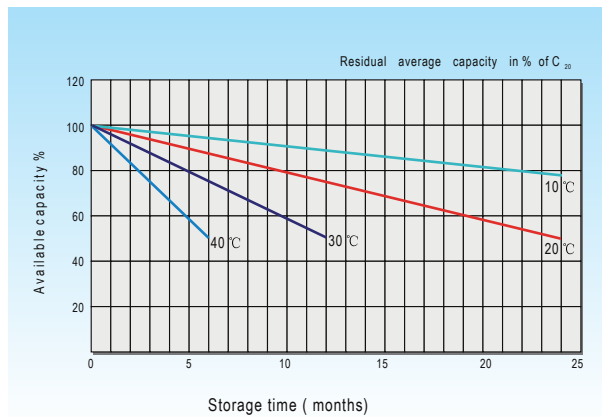
### EFFECT OF TEMPERATURE ON LONG TERM FLOAT LIFE



### CYCLE LIFE IN RELATION TO DEPTH OF DISCHARGE



### GENERAL RELATION OF CAPACITY VS. STORAGE TIME



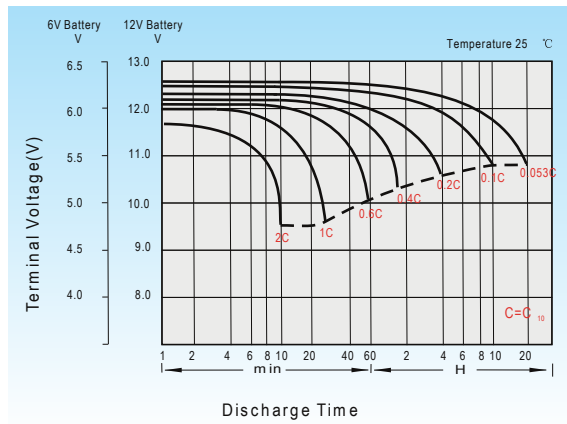
### LPG Models and Parameters (2V Series)

Model	Nominal Voltage (V)	Rated Capacity (AH)				Approx Dimension								Approx Weight		Terminal type
		20HR	10HR	5HR	1HR	Length		Width		Height		Total Height				
		1.80V /cell	1.75V /cell	1.75V /cell	1.67V /cell	mm	in.	mm	in.	mm	in.	mm	in.	kg	lbs	
LPG2-65	2	65.0	60.0	51.6	35.2	170	6.69	72	2.83	205	8.07	212	8.35	5.2	11.4	T6
LPG2-100	2	96	90	77.4	52.8	170	6.69	72	2.83	205	8.07	212	8.35	6.2	13.7	T6
LPG2-150	2	144	135	116	79.2	170	6.69	98	3.86	205	8.07	212	8.35	8.8	19.4	T7
LPG2-200	2	213.3	200	172	117.3	170	6.69	110	4.33	328	12.91	337	13.27	13.5	29.8	T11
LPG2-300	2	320	300	258	176	170	6.69	150	5.91	330	12.99	339	13.35	19.1	42.1	T11
LPG2-400	2	426.7	400	344	234.7	210	8.27	175	6.89	330	12.99	339	13.35	27.0	59.5	T11
LPG2-500	2	533.4	500	430	293.3	240	9.45	175	6.89	327.5	12.89	338	13.39	32.8	72.3	T11
LPG2-600	2	640	600	516	352	300	11.81	175	6.89	330	12.99	340	13.39	39.0	86.0	T11
LPG2-800	2	853.4	800	688	469.3	410	16.14	175	6.89	330	12.99	340	13.39	50.6	111.6	T11
LPG2-1000	2	1067	1000	860	586.7	475	18.7	175	6.89	328	12.91	338	13.31	59.9	132.1	T11
LPG2-1500	2	1600	1500	1290	880	403	15.87	354	13.94	339	13.35	349	13.74	94.8	209.0	T11
LPG2-2000	2	2133	2000	1720	1173	490	19.29	350	13.78	339	13.35	349	13.74	132.5	292.2	T11

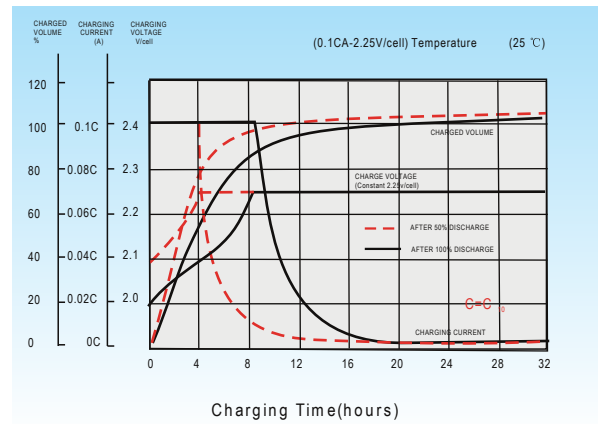


## LPG Performance Characteristics (2V Series)

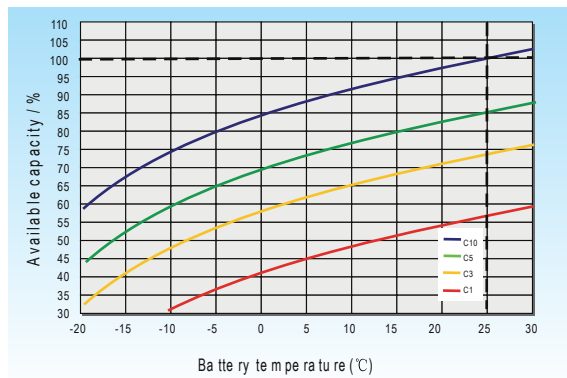
### DISCHARGE CHARACTERISTICS



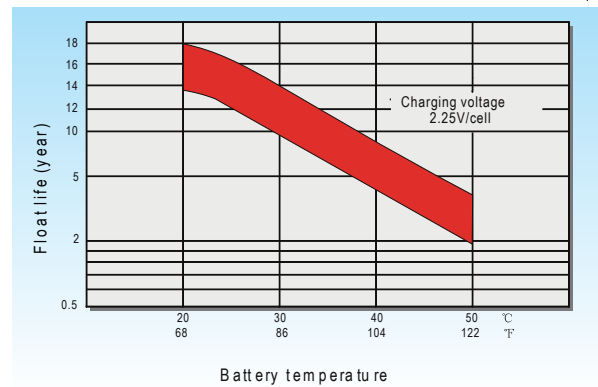
### CHARGING CHARACTERISTICS



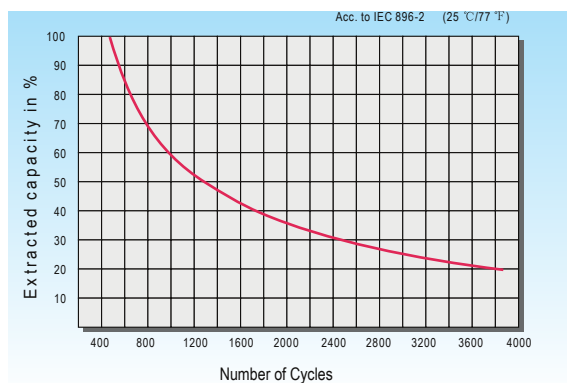
### TEMPERATURE EFFECTS IN RELATION TO BATTERY CAPACITY



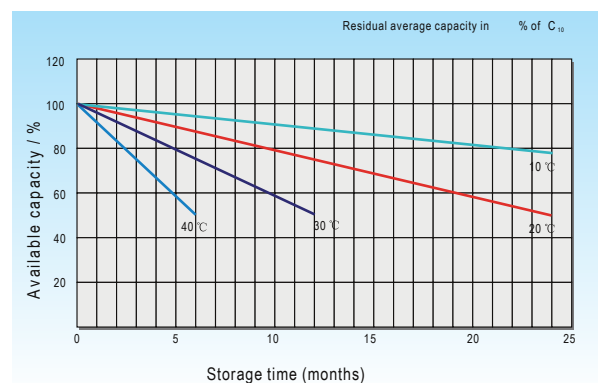
### EFFECT OF TEMPERATURE ON LONG TERM FLOAT LIFE



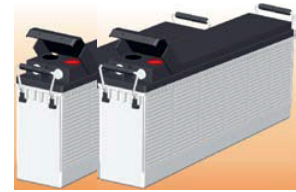
### CYCLE LIFE IN RELATION TO DEPTH OF DISCHARGE



### GENERAL RELATION OF CAPACITY VS. STORAGE TIME



## LPGF SERIES GENERAL PURPOSE GEL



### General Features

- Specifically ideal for 19 inches or 23 inches power cabinets
- Front terminals make the installation, maintenance and supervision easy
- Shield designs protect terminals from short circuit and show good appearance
- Unique vent valve design: reduce water losing and prevent air/spark going inside
- Thick plates, special formula of paste and plate manufacturing process for a long service life
- ABS material: increase the strength of battery container (Flame-retardant ABS is optional)
- Long discharge time
- Suitable for standby power and energy storage power use
- Special plate design, long cycle life
- Using special lead-calcium alloy to boost up the grid anti-corrosive performance and extend the battery using life
- Special separators boost up the battery internal performance
- High thermal capacity, reduce the risk of thermal runaway and drying up, can be used in poor environment
- High gas recombination efficiency
- Little water losing, no electrolyte stratification phenomenon
- Long storage time
- Good deep discharge resilience performance
- Use nano-fumed silica, with small particle size, and big specific surface area.

### LPGF Models and Parameters

#### Typical Applications

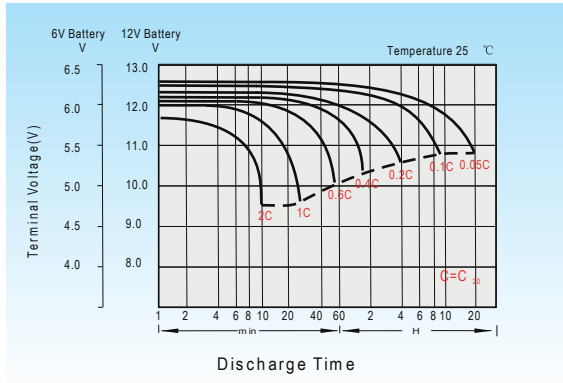
- For standard 19 inches or 23 inches power cabinets • Network connection equipment of communication system
- Power system of special network or local area network • UPS, standby power supply
- Power station systems • Railway and marine systems

Model	Nominal Voltage (V)	Rated Capacity (AH)				Approx Dimension								Approx Weight		Terminal type
		20HR	10HR	5HR	1HR	Length		Width		Height		Total Height				
		1.80V /cell	1.80V /cell	1.75V /cell	1.60V /cell	mm	in.	mm	in.	mm	in.	mm	in.	kg	lbs	
LPGF12-70	12	70.0	65.8	57.8	40.3	564	22.20	114	4.49	187.0	7.36	187	7.36	26.7	58.9	T6
LPGF12-100	12	90.0	85.0	74.5	49.1	508	20.00	110	4.33	238.5	9.39	238.5	9.39	32.3	71.2	T13
LPGF12-100L	12	100	95.0	82.7	54.5	560	22.05	110	4.33	233.0	9.17	233	9.17	34.8	76.7	T13
LPGF12-100H	12	96.0	90.0	79.2	52.2	394	15.51	110	4.33	285.0	11.22	285	11.22	35.0	77.2	T6
LPGF12-150	12	144	135	118.8	78.3	551	21.69	110	4.33	288.0	11.34	288	11.34	47.4	104.5	T6
LPGF12-180	12	158	150	132.0	87.0	550	21.65	126	4.96	280.0	11.02	280	11.02	51.7	114.0	T13

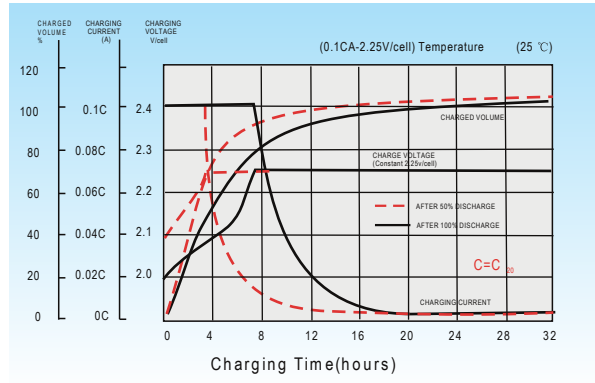
Note: model number followed with H-tall version and L-long version

## LPFG Performance Characteristics

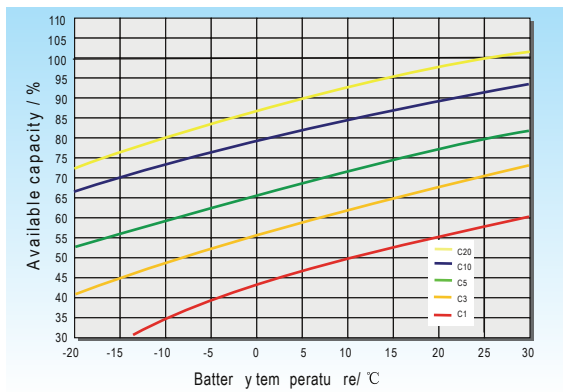
### DISCHARGE CHARACTERISTICS



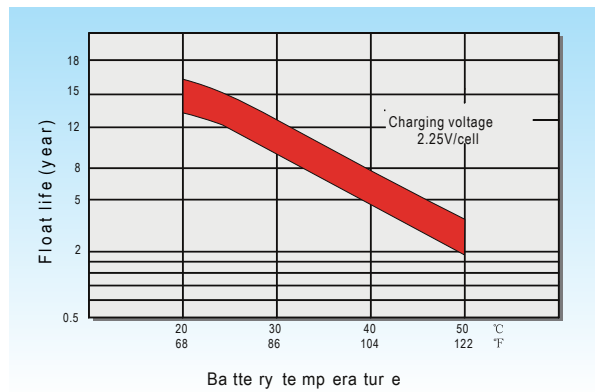
### CHARGING CHARACTERISTICS



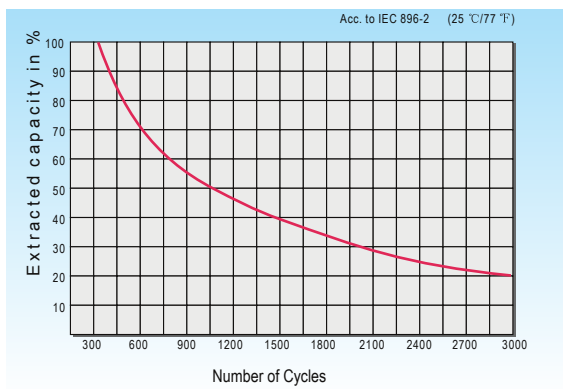
### TEMPERATURE EFFECTS IN RELATION TO BATTERY CAPACITY



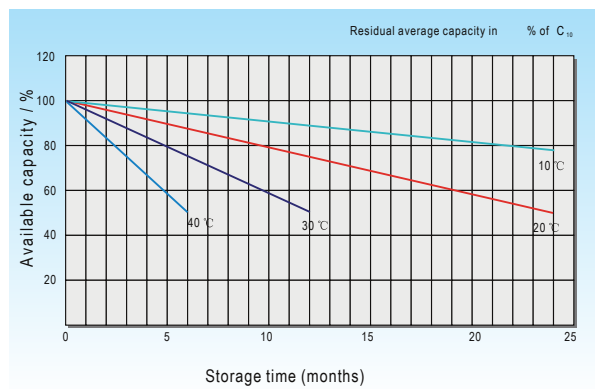
### EFFECT OF TEMPERATURE ON LONG TERM FLOAT LIFE



### CYCLE LIFE IN RELATION TO DEPTH OF DISCHARGE



### GENERAL RELATION OF CAPACITY VS. STORAGE TIME



## LPCG SERIES DEEP CYCLE GEL



### General Features

- For longer cycle life: special paste formula, over dimensioned negative plate, optimised manufacturing process, additives for deep discharge
- Special anti-vibration design (optional)
- Thick plates, special formula of paste and plate manufacturing process for a long service life
- ABS material: increase the strength of battery container (Flame-retardant ABS is optional)
- Long discharge time
- Suitable for standby power and energy storage power use
- Special plate design, long cycle life
- Using special lead-calcium alloy to boost up the grid anti-corrosive performance and extend the battery using life
- Special separators boost up the battery internal performance
- High thermal capacity, reduce the risk of thermal runaway and drying up, can be used in poor environment
- High gas recombination efficiency
- Little water losing, no electrolyte stratification phenomenon
- Long storage time
- Good deep discharge resilience performance

### Typical Applications

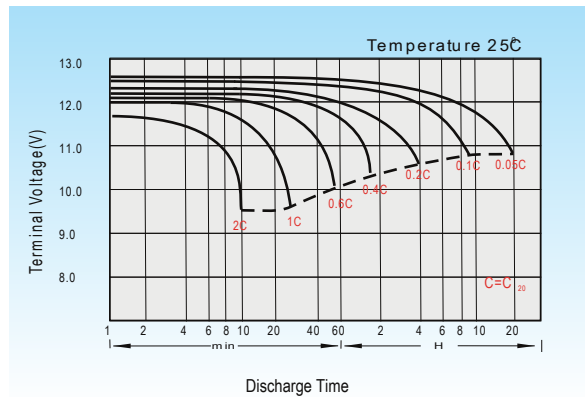
- Vehicle in place of walking • Golf trolleys and golf cart
- Power system of special network or local area network • UPS, standby power supply
- Power station systems • Railway and marine systems

Model	Nominal Voltage (V)	Rated Capacity (AH)				Approx Dimension								Approx Weight		Terminal type
		20HR		10HR		Length		Width		Height		Total Height				
		1.80V /cell	1.80V /cell	1.75V /cell	1.60V /cell	mm	in.	mm	in.	mm	in.	mm	in.	kg	lbs	
LPCG12-24	12	24.0	22.6	19.8	14.5	166	6.54	175	6.89	125	4.92	125	4.92	8.70	19.4	T12
LPCG12-24P	12	24.0	22.6	19.8	14.5	166	6.54	175	6.89	125	4.92	125	4.92	8.70	19.4	T12
LPCG12-30	12	30.0	27.6	24.3	17.8	195	7.68	130	5.12	164	6.46	178	7.01	10.7	23.6	T5/T6
LPCG12-40	12	38.0	35.0	30.7	22.5	197	7.76	165	6.50	170	6.69	170	6.69	13.5	29.8	T6
LPCG12-45	12	45.0	41.5	36.4	26.7	257	10.1	132	5.20	200	7.87	200	7.87	16.2	35.7	T6
LPCG12-60	12	60.0	55.4	48.6	35.6	259	10.2	168	6.61	190	7.48	190	7.48	19.7	43.4	T6
LPCG12-70	12	70.0	64.6	56.5	41.5	260	10.24	168	6.61	208	8.19	230	9.05	24.5	54.0	T14

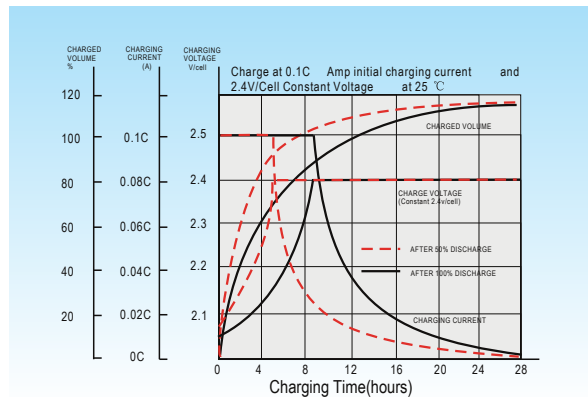
Note: LPCG12-24P could collocate with a charging board

## LPCG Performance Characteristics

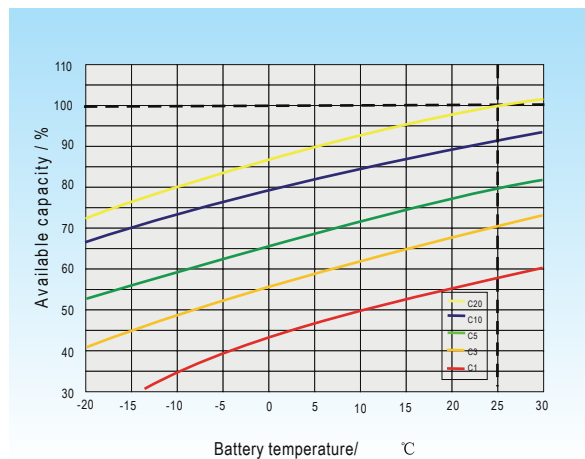
### DISCHARGE CHARACTERISTICS



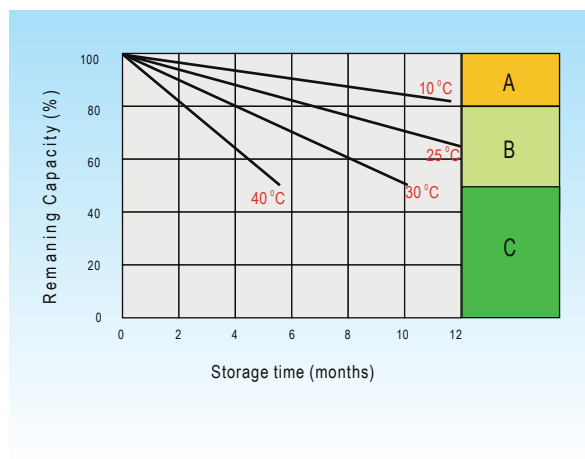
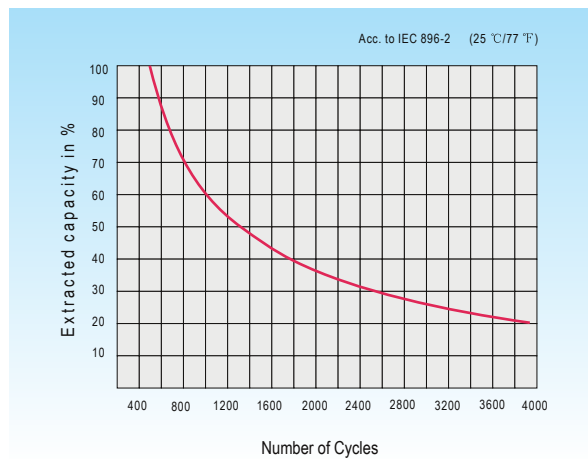
### CHARGING CHARACTERISTICS (CYCLE USE)



### TEMPERATURE EFFECTS IN RELATION TO BATTERY CAPACITY



### EFFECT OF TEMPERATURE ON LONG TERM FLOAT LIFE



### SELF DISCHARGE CHARACTERISTICS

- A** No supplementary charge required  
(Carry out supplementary charge before use if 100% capacity is required.)
- B** Supplementary charge required before use. Optional charging way as below:
  1. Charged for above 3 days at limited current 0.25CA and constant voltage 2.25V/cell.
  2. Charged for above 20hours at limited current 0.25CA and constant voltage 2.4V/cell.
  3. Charged for 8-10hours at limited current 0.05CA .
- C** Supplementary charge may often fail to recover the capacity.  
The battery should never be left standing till this is reached.