

Features and Benefits

Sealed pure-lead cells were invented by a predecessor company of EnerSys® in 1973. The purity of the materials used is key to supporting the GENESIS® battery's performance benefits. A longer service life, meaning fewer replacements and the cost associated with it, combined with higher reliability and fewer system failures, result in a lower long-term cost of ownership to the end user or equipment owner.

What are the advantages of Pure Lead technology?

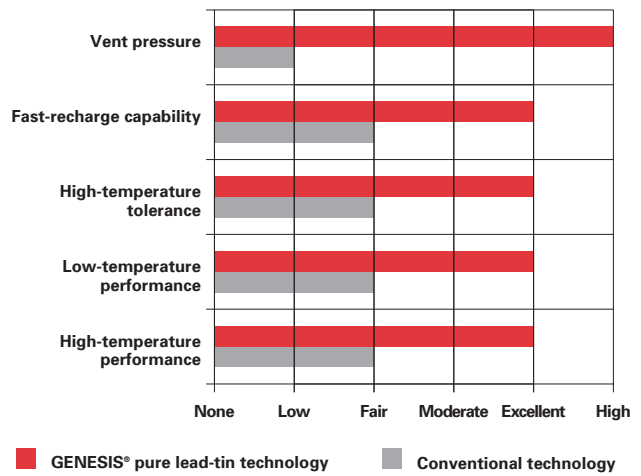
- 1. Power density** - Per unit weight, the power provided by pure lead-tin products offers the greatest high-rate power density for your money. GENESIS' greater volumetric power allows engineers to consider more energy-supporting features or design smaller, lighter packages.

At high-rate and pulse discharges, EnerSys' GENESIS products offer the best performance value when compared with competitive product in applications at less than 100 minutes of discharge.
- 2. Cycle life** - Compared to competitive lead products (offering up to 200 full cycles), pure lead-tin batteries provide 50% to 200% greater full cycle capability. GENESIS product will deliver up to 400 cycles (80% DOD, C₅).
- 3. Float life** - Conventional sealed-lead batteries vary greatly in specified standby life: from three to ten years at 20°C. GENESIS, however, offer 70% to 80% of rated capacity at 20°C, in a fifteen-year design life.
- 4. High stable voltage delivery** - The high stable voltage delivery of a pure lead-tin battery results from its low internal resistance. The flat discharge voltage profile of our batteries, combined with our products' low internal resistance, means our batteries are able to discharge and recharge their power faster, more efficiently and offer greater application flexibility. The pure lead-tin construction also gives more watts-per-unit weight at high discharge rates.
- 5. Widest temperature range** - Due to the product's strong construction and high vent pressures, these batteries will maintain their performance and physical parameters in extreme conditions. At high temperatures, the chemical reaction in a battery that causes aging is accelerated. Pure lead-tin technology resists that chemical reaction more effectively than alloyed lead, thus allowing a battery to have a longer service life. GENESIS has twice the delivered capacity of conventional sealed-lead batteries at temperatures below -20°C, offering unparalleled low-temperature performance.

GENESIS electrodes are thinner, allowing more electrodes per cell, and therefore greater electrode surface area than conventional sealed-lead, thick electrode batteries. As a result, our batteries can reach a high state of charge in fast-charging applications in one-fourth the time of conventional, sealed-lead, thick-plate batteries.

- 6. Rugged construction** - Due to their strong external packaging and internal pure lead-tin composition, EnerSys' products can withstand not only extreme temperatures but also harsh usage.

The pure lead-tin advantage



GENESIS external case for the EP product is constructed from UL 94V-0 rated non-halogenated flame-retardant materials. GENESIS products are shock and vibration resistant, designed to offer higher tolerance levels to meet demanding applications, including those in commercial and outdoor applications. The company's focus on battery-case integrity and high vent pressure, coupled with pure lead-tin's low grid-corrosion rate, means GENESIS provide the longest service life possible.

7. Fastest recharge - EnerSys' pure lead-tin chemistry allows GENESIS® to offer the shortest recharge efficiency of any sealed-lead battery on the market. With pure lead-tin, you can achieve a 95% state of recharge in less than one hour - without loss of capacity or electrolyte using conventional constant-voltage charging techniques.

Flexible charging options are possible with GENESIS, as no current limit is required when using a constant voltage charger.

8. Orientation/placement/transport - Due to the products' mechanical design, GENESIS can be mounted and operated in any position, except inverted, an attractive feature for less accessible areas.

GENESIS offer UL94 V-0 non-halogenated flame-retardant packaging, thus allowing the mounting of systems in sensitive areas and human environments.

GENESIS products are classified as "nonspillable batteries", and are exempted from the Department of Transportation's comprehensive packaging requirements if the following conditions are satisfied: (1) The battery is protected against short circuits and is securely packaged and (2) The battery and outer packaging must be plainly and durably marked "NONSPILLABLE" or "NONSPILLABLE BATTERY".

GENESIS batteries have been tested and determined to be in compliance with the vibration and pressure differential tests contained in 49 CFR § 173.159(d).

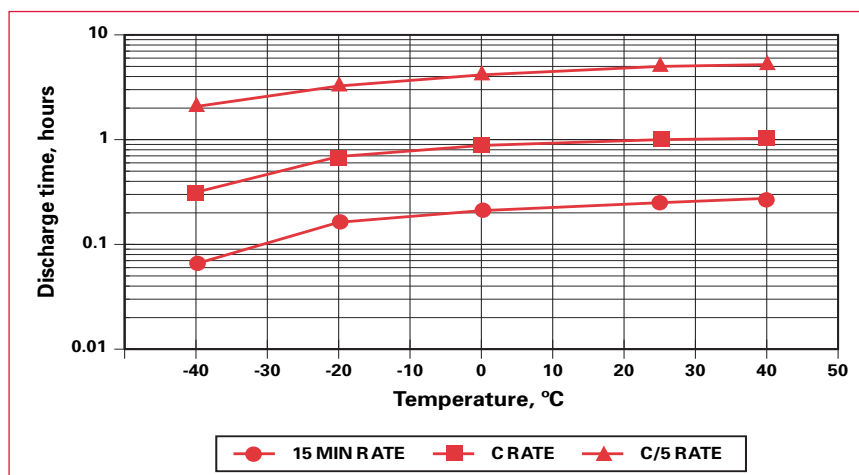
Because GENESIS are classified as "Nonspillable" and meet the conditions from § 173.159(d) they do not have an assigned UN number nor do they require additional DOT hazard labeling.

All batteries that have been tested and determined to be in compliance with the DOT Hazardous Material Regulations, the International Civil Aeronautics Organisation (ICAO), and the International Air Transport Association (IATA) Packaging Instruction 806 and Special Provision A67, are therefore exempt from all other requirements of these regulations and classified as a "nonspillable battery".

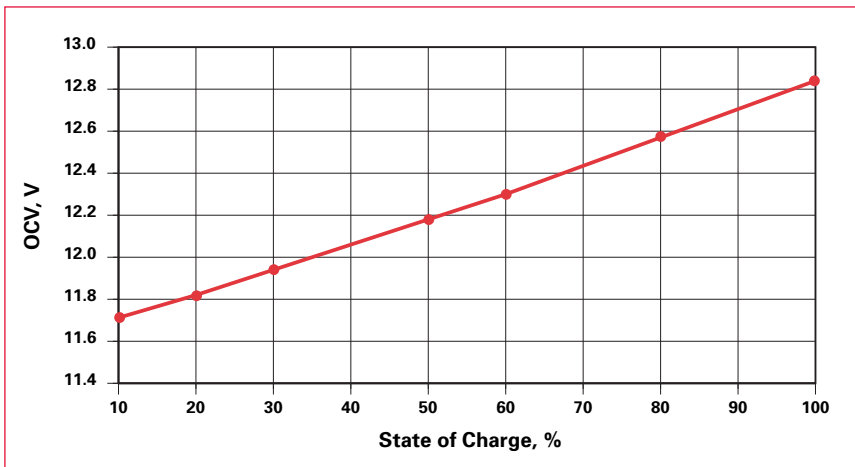
9. Shelf life - Pure lead-tin batteries have an extremely low self-discharge rate, thus providing extended storage capability while maintaining high state-of-charge levels for dependable operation.

GENESIS has a shelf life more than twice that of conventional lead batteries. To assure maximum reliability, EnerSys recommends that all stored batteries be recharged (boost charged) once every 24 months or when the open circuit voltage drops to 12.00 volts per battery, whichever occurs earlier. Inventory should be checked more frequently if storage temperature regularly exceeds 25°C.

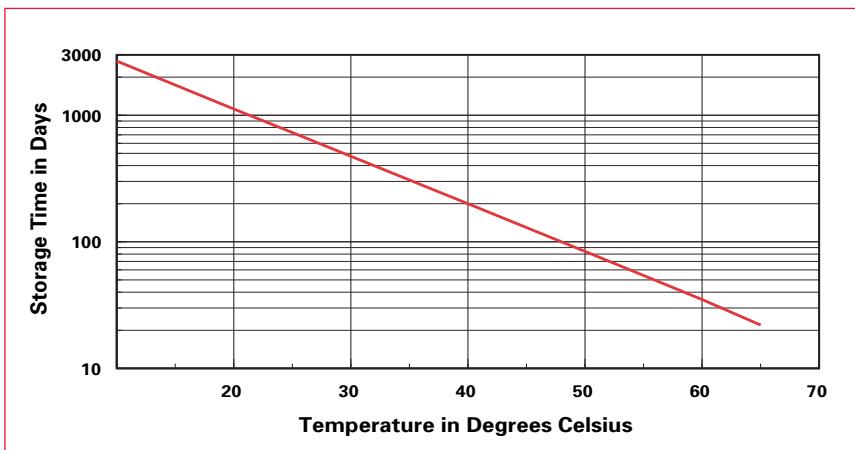
Capacity as a function of temperature for GENESIS® Batteries



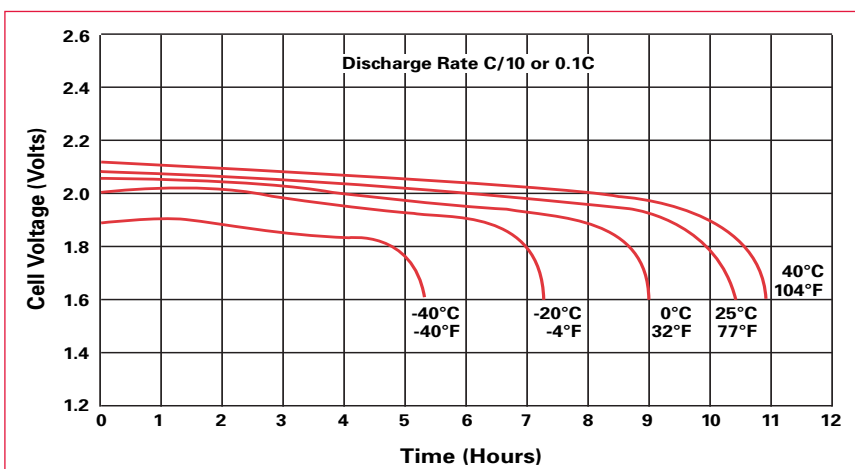
State of charge for GENESIS® batteries



Storage time as a function of temperature for GENESIS® batteries (Fully charged battery)



Voltage regulation for GENESIS® batteries



Charging recommendations:

Broadly speaking, a battery may be recharged using either a constant voltage (CV) charger or a constant current (CC) charger, or a modification of either or both of these.

The exact regime chosen generally depends upon the time and economic constraints imposed by the system. Constant current charging is widely used in cyclic applications where a recharge must be accomplished in a relatively short time period. Constant voltage charging, where a single voltage level is applied across the battery terminals, is the most suitable method to recharge GENESIS® products. Depending on the CV charger's current limit, it is possible to recharge these batteries from a 100% discharged condition to better than 95% state of charge in less than one hour, using only the cyclic charge voltage.

Constant voltage charging

Constant voltage (CV) charging should be within the following ranges:

Fast Chargers:

14.7 to 15.0 volts @ 25°C

NOTE: This type of charger must revert to float once 100% capacity has been retained.

Float Chargers:

13.5 to 13.8 volts @ 25°C

To avoid thermal runaway in warmer temperatures, and to improve charge acceptance in colder temperatures, the charger voltage should be compensated by approximately 18 millivolts per battery per degree centigrade variance from 25°C. This is a negative coefficient, with the voltage being lowered as the temperature increases, and vice versa.

There is no need to limit the inrush current to the battery during the initial phase of constant voltage charging. The low internal resistance of GENESIS[®] batteries allows for large inrush current without damage.

Since not all of the charge returned is accepted to replenish the electro-chemical potential, a good rule of

thumb to use is that the charge returned should be 105% to 110% of the capacity delivered on the previous discharge.

Voltage Ripple: $\pm 1\%$ without battery connected.

GENESIS[®] product family

GENESIS[®] EP:

Products	Capacity C_{10} @ 25°C 1.67 Vpc	Internal res. of fully charged cell $m\Omega$ @ 25°C	Nominal short circuit current for charged battery
G13EP	13Ah	8.5	1,400A
G16EP	16Ah	7.5	1,600A
G26EP	26Ah	5.0	2,400A
G42EP	42Ah	4.5	2,600A
G70EP	70Ah	3.5	3,500A

For extreme duty: X after EP denotes a metal jacket, eg. G42EPX

GENESIS® EP performance specifications

Constant current discharge/amps to 1.67Vpc @ 25°C

Products	DURATION									
	5 min	10 min	15 min	30 min	60 min	90 min	5 hr	8 hr	10 hr	20 hr
G13EP (13Ah)	70.8	43.6	32.2	18.6	10.4	7.3	2.5	1.6	1.3	.7
G16EP (16Ah)	90.0	54.8	40.1	23.0	12.7	8.9	3.0	2.0	1.6	.8
G26EP (26Ah)	143.4	90.7	67.4	39.0	21.7	15.1	5.0	3.2	2.6	1.4
G42EP (42Ah)	212.0	138.4	104.1	60.8	33.8	23.5	7.9	5.1	4.2	2.3
G70EP (70Ah)	342.4	228.5	173.4	102.5	57.4	40.6	13.4	8.7	7.1	3.9

Constant current power/watts per bloc to 1.67Vpc @ 25°C

Products	DURATION									
	5 min	10 min	15 min	30 min	60 min	90 min	5 hr	8 hr	10 hr	20 hr
G13EP (13Ah)	758.4	481.8	361.2	231.6	121.2	85.8	29.4	19.2	15.6	8.4
G16EP (16Ah)	975.6	609.6	453.6	264.6	190.2	105.0	36.0	23.4	19.2	10.2
G26EP (26Ah)	1532	995	751	444	251	175.8	59	38	31	16
G42EP (42Ah)	2291	1540	1173	698	394	276	94	62	51	28
G70EP (70Ah)	3680	2519	1940	1173	670	486	161	105	86	47

Charging/Temperature/Life:

Products	CHARGING VOLTAGE		TEMPERATURE RANGE		LIFE EXPECTANCY	
	Cyclic	Float	Storage & discharge	Charge	C ₅₀ Cycle life 100% DOD	Float life at 20°C
G13EP, G16EP G26EP & G42EP	CV 14.7-15.0	CV 13.5-13.8	-40°C to +45°C	-40°C to +45°C	400	15 years
G70EP	CV 14.7-15.0	CV 13.5-13.8	-40°C to +60°C	-40°C to +60°C	400	10 years

Atmospheric pressure range - Vacuum to 2 atmospheres

Terminal attachment torque for G13EP & G16EP - (5.6 Nm)

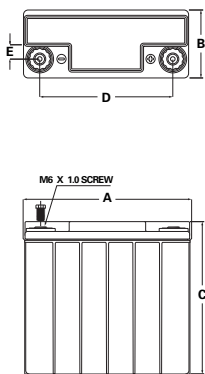
Terminal attachment torque for G26EP & G42EP - (6.8 Nm)

**Users planning to use CC should consult the EnerSys Application Support Department*

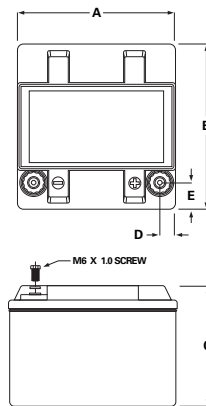
GENESIS® EP mechanical specifications (A, B & C - Maximum)

Products	DIMENSIONS					Weight kg
	A mm	B mm	C mm	D mm	E mm	
G13EP	175.5	83.4	129.9	141.2	20.6	4.9
G13EPX	177.7	85.5	131.2	141.2	20.6	5.4
G16EP	181.6	76.3	167.8	145.8	16.9	6.1
G16EPX	184.6	78.9	169.3	145.8	16.9	6.7
G26EP	166.7	175.7	125.9	16.3	27.0	10.1
G26EPX	168.5	179.0	128.0	17.5	28.2	10.8
G42EP	197.5	165.7	170.6	18.8	22.0	14.9
G42EPX	199.8	169.1	172.8	20.1	23.2	15.9
G70EP	330.71	168.15	176.02	246.13	62.23	24.3
G70EPX	330.71	168.15	176.02	246.13	62.23	25.4

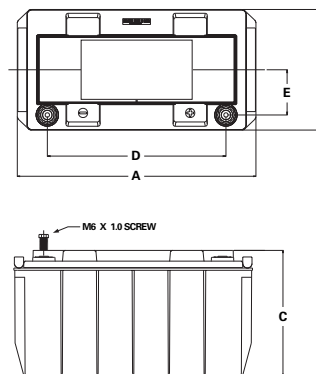
G13EP - G16EPX



G26EP - 42EPX



G70EP & G70EPX

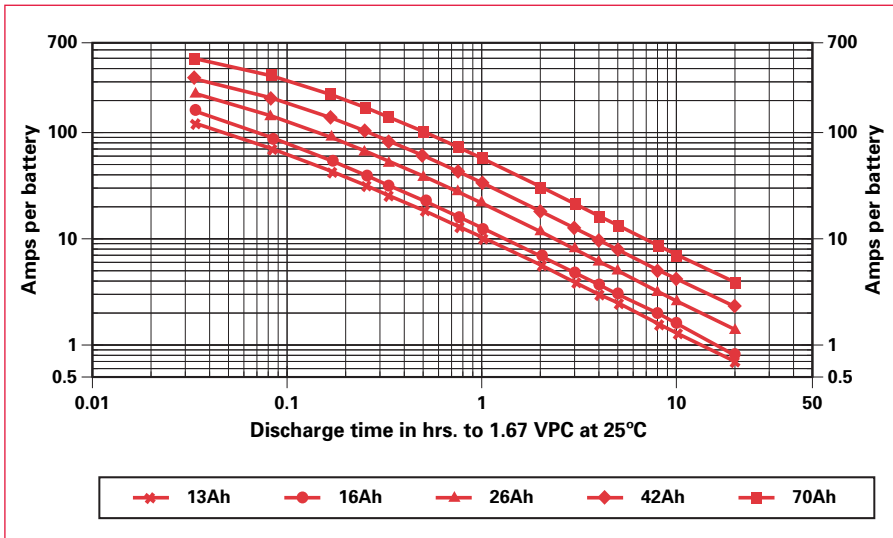


All shown without metal jacket

UL Recognised Component. Meets UL 1989

Caution: Batteries contain toxic materials (Pb and H₂SO₄) • Avoid short circuit • Do not charge in gas-tight container
Sealed-lead rechargeable battery must be recycled or disposed of properly. Contact EnerSys Customer Service for details.

GENESIS® constant current (CC) discharge



GENESIS® constant power (CP) discharge

