ALLIANCE
TRUCK PARTS

TRUCK BATTERIES

HEAVY DUTY
BATTERIES

ALLIANCE
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GOLD PREMIUM TRUCK BATTERIES

Alliance Truck Parts provides durable and highly reliable replacement batteries for the heavy commercial transport industry in Australia.

The batteries we provide meet or exceed OE specifications for quality, performance and fitment, giving you the durability and life needed to keep your trucks and buses on the road.

Our batteries come in a variety of sizes that are sure to fit your requirements.

WARRANTY

Alliance Truck Parts are backed by a 1-year/unlimited kilometre standard warranty.

Illustrations and photographs used in this catalogue may vary slightly from the actual product. Prototype samples are sometimes used for photography. The production parts may vary slightly.

Availability of products shown in this catalogue is subject to change without notice.

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BATTERIES

GOLD PREMIUM TRUCK BATTERY

1. **Foldable handles**
   - Ease of handling and installation
2. **Terminal posts**
   - Bigger inside post diameter improves power transfer capacity
3. **Fully sealed cover design**
   - Eliminates acid handling and minimises battery contamination from dirt and dust
4. **Intercell centre lug design**
   - Improves vibration resistance and cranking performance
5. **Advanced polypropylene casing**
   - Computer controlled heat injected lightweight plastic resin moulded to provide high impact resistance
6. **Glass mat separators**
   - Provides enhanced cranking power through minimal electrical resistance
   - Envelope on negative plates reduces internal short occurrences
   - Provides longer life through better puncture and tear resistance
   - Provides top class vibration resistance
7. **Hybrid design**
   - Includes antimony positive and calcium negative
   - Allows the battery to run hot longer and accept better charge rate, resulting in industry leading durability

FEATURES AND BENEFITS

- Maintenance and worry-free operation — no need to top up water
- High-density corrosion-resistant grid
- Advanced plate paste formulation (Tetrabasic)
- Polyethylene puncture-resistant separator
- Heavy duty terminal post and internal current efficient carrying components (thicker straps, bigger intercell weld, bigger posts)
- Vibration fins on cell

SPECIFICATIONS

ALLIANCE CODE	VOLTS	CASE SIZE	CCA @ -18C	RC @ 25°C	OVERALL DIMENSION (MM)				ASSEMBLY	POST TYPE	WARRANTY MONTHS
					L	W	H	TH			
4WD, TRUCK, BUS APPLICATIONS											
Q ABP MF80D26R	12	NS70	720	130	259	174	202	223	D	STD	12
Q ABP MF80D26L	12	NS70	720	130	259	174	202	223	C	STD	12
Q ABP MF95D31R	12	N70	810	175	304	173	203	224	D	STD	12
Q ABP MF95D31L	12	N70	810	175	304	173	203	224	C	STD	12
Q ABP MF31-931	12	G31	1000	200	330	172	215	237	H	STD	12
Q ABP MF31-930	12	G31	1000	200	330	172	215	237	H	TS	12
Q ABP MFN94	12	N94	900	275	508	208	177	204	D	STD	12
Q ABP MFN100	12	N100	815	200	405	173	211	232	D	STD	12
Q ABP MFN100L	12	N100	815	200	405	173	211	232	C	STD	12
Q ABP MFN120	12	N120	930	200	505	180	210	233	C	STD	12
Q ABP MFN150	12	N150	1030	300	508	220	210	236	C	STD	12
Q ABP MFN200	12	N200	1150	400	524	278	225	251	F	STD	12
Q ABP MFN200L	12	N200	1150	400	524	278	225	251	E	STD	12

SPECIFICATIONS FOR ADDITIONAL GOLD BATTERIES

ALLIANCE CODE	VOLTS	CASE SIZE	CCA @ -18C	RC @ 25°C	OVERALL DIMENSION (MM)				ASSEMBLY	POST TYPE	WARRANTY MONTHS
					L	W	H	TH			
EUROPEAN TRUCK SIZES											
Q ABP DIN100L	12	N100	950	200	394	175	190	190	C	STD	12
Q ABP EMFN120	12	N120	900	258	513*	186	195	223	F	STD	12
Q ABP EMFN120L	12	N120	900	258	513*	186	195	223	E	STD	12
Q ABP EMFN150	12	N150	1000	326	513*	223	195	223	F	STD	12
Q ABP EMFN150L	12	N150	1000	326	513*	223	195	223	E	STD	12
Q ABP EMFN200	12	N200	1300	450	518*	273	215	242	F	STD	12
Q ABP EMFN200L	12	N200	1300	450	518*	273	215	242	E	STD	12
Q ABP D12	6	D12	600	160	228	173	190	204	A	STD	12

*Maximum top length, bottom length is 475mm

CROSS REFERENCE CHART

SUPERCHARGE	CENTURY	EXIDE	ACDELCO
Q ABP MF80D26R	NS70MF	N50ZZ	S80D26L
Q ABP MF80D26L	NS70LMF	N50ZZL	S80D26R
Q ABP MF95D31R	N70ZZMF	N70EX	S95D31RHD
Q ABP MF95D31L	N70ZZLMF	N70EXL	S95D31LHD
Q ABP MF31-931	86ZMF	86AX	S31901MF
Q ABP MF31-930	86ZTMF	31-950C	S31900MF
Q ABP MFN94	94 SQUAT	94B	4DLT
Q ABP MFN100	N100MF	N100DMF	SN100
Q ABP MFN120	N120	N120MF	SN120
Q ABP MFN150	4D-N150Z	N150MF	SN150
Q ABP MFN200	8D-N200Z	N200MF	SN200

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   - Ease of handling and installation
2. **Terminal posts**
   - Bigger inside post diameter improves power transfer capacity
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   - Provides top class vibration resistance
7. **Hybrid design**
   - Includes antimony positive and calcium negative
   - Allows the battery to run hot longer and accept better charge rate, resulting in industry leading durability

FEATURES AND BENEFITS

- Maintenance and worry-free operation — no need to top up water
- Superior vibration resistance
- Extra heavy duty
- Advanced plate paste formulation (Tetrabasic)
- Polyethylene puncture-resistant separator
- Heavy duty terminal post and internal current efficient carrying components (thicker straps, bigger intercell weld, bigger posts)
- Vibration fins on cell

SPECIFICATIONS

ALLIANCE CODE	VOLTS	CASE SIZE	CCA @ -18C	RC @ 25C	OVERALL DIMENSION (MM)				ASSEMBLY	POST TYPE	WARRANTY
					L	W	H	TH			
4WD, TRUCK, BUS APPLICATIONS											
Q ABP TMNS70	12	NS70	590	119	259	174	201	222	D	STD	24
Q ABP TMNS70L	12	NS70	590	119	259	174	201	222	C	STD	24
Q ABP TMN70ZZ	12	N70	680	170	304	173	203	224	D	STD	24
Q ABP TMN70ZZL	12	N70	680	170	304	173	203	224	C	STD	24
Q ABP TMN25	6	N25	915	300	304	172	201	224	A	STD	12
Q ABP TMN87LZ	12	N87	810	185	326	173	202	223	C	TM	12
Q ABP TMN94P	12	N94	870	230	508	208	177	204	E	STD	12
Q ABP TMN120P	12	N120	900	210	505	180	210	233	F	STD	12
Q ABP TMN150P	12	N150	1000	265	508	220	210	236	F	STD	12
Q ABP TMN200P	12	N200	1100	350	524	278	225	251	F	STD	12

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TRUCK APPLICATION GUIDE

MODEL	QTY	GOLD
FREIGHTLINER		
Argosy Evolution	4	Q ABP MF31-931
C112, C120	4	Q ABP MF31-931
Columbia	4	Q ABP MF31-931
FCL112	2	Q ABP MFN120
FL112	3	Q ABP MF95D31R
FL50, FL60, FL70, FL80	3	Q ABP MF31-931
FLA Series, FLB Series, FLD Series	3	Q ABP MF31-931
FRCL 112	2	Q ABP MFN120
MERCEDES-BENZ		
0500R — BUS	2	Q ABP EMFN200L
05010 — BUS	2	Q ABP EMFN200L
217, 149, 1625, 1626, 2219, 2222, 2226	2	Q ABP MFN150
1413, 1418, 1918, 1924, 2224	2	Q ABP MF88H
1932, 2226, 2244, 2632	2	Q ABP MFN120
2228, 2232, 2233, 2236	2	Q ABP MFN150
2620, 2624	2	Q ABP MF88H
2632	2	Q ABP MFN150
2235K32	2	Q ABP MFN120
2244 30H	2	Q ABP MFN120
2244 30HH	2	Q ABP MFN200
230GE	1	Q ABP MF66
300GD	1	Q ABP MF88H
3850A	2	Q ABP MFN120
420, 450, 500, 560	1	Q ABP MF88
508LD	2	Q ABP MF31-931
Actros (most models)	2	Q ABP EMFN150L
Atego	2	Q ABP EMFN120L
Fleetstar	2	Q ABP MFN150
L911B - 48, 42, 1417C/48	2	Q ABP MF51
LA911B - 1217	2	Q ABP MF51
LK - 2624/36	4	Q ABP MF51
Sprinter & Vito Series	1	Q ABP MF88
Sprinter Petrol	1	Q ABP MF66
V Series - 1425, 2223, 2236	4	Q ABP MF51
V Series - 2238, 2638	4	Q ABP MF51

MODEL	QTY	GOLD
STERLING		
Sterling HX7500	2	Q ABP MF31-931
Sterling LT9500	4	Q ABP MF31-931
WESTERN STAR		
Constellation Series 1996-1999	3	Q ABP MF31-930 (Stud)
Constellation Series 1999-2000	4	Q ABP MF31-930 (Stud)
Early models	4	Q ABP N25
Heritage Series	1 or 3	Q ABP MF31-930 (Stud)
IVECO		
10-14	2	Q ABP MF31-931
110	2	Q ABP MF31-931
12-11, 12-12, 12-14	2	Q ABP MF31-931
120TA	2	Q ABP MF31-931
13-14	2	Q ABP MF31-931
15-14	2	Q ABP MF31-931
18-14, 18-16	2	Q ABP MF31-931
220T, 230T, 335T, 340T, 435T, 450T	2	Q ABP MF31-931
23-16	2	Q ABP MF31-931
Daily	1	Q ABP MF31-931
Eurocargo – 100, 150	4	Q ABP MF95D31R
Eurocargo – 160, 180, 230	2	Q ABP MF31-931
Eurotech – 4300, 4500, 4700	4	Q ABP MF95D31R
ML150E23	2	Q ABP MF31-931
ML170E27	2	Q ABP MFN120
Powerstar	4	Q ABP MF95D31R
Stralis (Australian-made)	4	Q ABP MF95D31R
Stralis (Imported)	2	Q ABP EMFN200L
Z100, Z110, Z120TA, Z220-T	2	Q ABP MF31-931
Z230T, Z340T, Z450T	2	Q ABP MF31-931
SCANIA		
Most 6 cylinder models	2	Q ABP MFN120
Most 8 cylinder models	2	Q ABP MFN150
VOLVO		
B10 BLE	2	Q ABP MFN150
B10M	2	Q ABP MFN200
B6FO Bus	2	Q ABP MF31-931

MODEL	QTY	GOLD
E724	4	Q ABP MF50
F10	4	Q ABP MF50
F10	2	Q ABP MFN150
F101	4	Q ABP D12
F1017	4	Q ABP MF50
F1023 Turbo 6	4	Q ABP MF50
F12	2	Q ABP MFN150
F12	4	Q ABP MF50
F12	2	Q ABP MF95D31R
F12F	2	Q ABP MF31-931
F12FK	2	Q ABP MF31-931
F12GT	2	Q ABP MF31-931
F16F	2	Q ABP MF50
F71	4	Q ABP MF50
F717	4	Q ABP MF50
F7T	4	Q ABP MF50
F86/28	2	Q ABP MF31-931
FH12 420	2	Q ABP MFN200
FH12 460	2	Q ABP MFN200
FL10	4	Q ABP MF50
FL7 260	2	Q ABP MFN150
FL7 290	2	Q ABP MFN150
FL7F	4	Q ABP MF50
FL7FD	2	Q ABP MF95D31R
FLC 140	2	Q ABP MF31-931
G88	2	Q ABP MFN150
G89	2	Q ABP MFN150
N10	2	Q ABP MFN150
N10 – T, F	2	Q ABP MF31-931
N12	4	Q ABP MF50
N12	2	Q ABP MFN150
N12 – T, F	2	Q ABP MF31-931
N7	2	Q ABP MF31-931
N715	2	Q ABP MF31-931
NH 565	2	Q ABP MFN150
TAMD40	2	Q ABP MFN150
HINO		
AC, BXN, FS270, GS221, RK, RR	2	Q ABP MFN120
BX340E	4	Q ABP D12

MODEL	QTY	GOLD
Dutro	2	Q ABP MF75D23L
FC, FD, FE, FF, FG, FM	2	Q ABP MF80D26R
FS	2	Q ABP MFN150
Fuso FP-FV 103	1	Q ABP MFN150
Fuso FP-FV 113	2	Q ABP MFN150
GD, FC, FG, FD, KL, KL300, KL300E, GH	2	Q ABP MF80D26R
GD, GH	2	Q ABP MF80D26R
GS221	2	Q ABP MFN120
FB, FC, FD, FF, FG, FM	2	Q ABP MF75D23R
FS	2	Q ABP MFN150
GD, GH	2	Q ABP MF75D23R
KL	2	Q ABP MF80D26R
KL300, KL300E, KR360, KR360E, LB500, LB560	2	Q ABP MF95D31R
Ranger – 4, 5, 6	2	Q ABP MF80D26R
Ranger – 7, 8, 9, 10, 14, 15	2	Q ABP MF95D31R
RK, RR	2	Q ABP MFN120
FUSO/MITSUBISHI		
Canter Diesel	2	Q ABP MF80D26R
Canter Fuso Diesel	2	Q ABP MFN100
Canter Petrol	1	Q ABP MF80D26R
D50	1	Q ABP MF43
FB, FC, FE, FP, FX, FK, FK102, FM	2	Q ABP MF80D26R
FM104	2	Q ABP MF31-931
FN358	2	Q ABP MFN120
FP Series	2	Q ABP MFN150
FS Series	2	Q ABP MFN150
FU Series	2	Q ABP MFN150
Fuso FP-FV 103	1	Q ABP MFN150
Fuso FP-FV 113	2	Q ABP MFN150
FV Series	2	Q ABP MF80D26R
KENWORTH		
C500	4	Q ABP MF95D31R
K100E, K120, K140	4	Q ABP MF95D31R
L170	2	Q ABP MF31-931
L700A, W900	3	Q ABP MF31-931
Peterbilt	3	Q ABP MF31-931
T400, T440, T450, T400A, L700A	3	Q ABP MF31-931
T600, T601, T650, C500T, K100E, T600A	4	Q ABP MF95D31R
Other models	4	Q ABP MF95D31R

MODEL	QTY	GOLD
MACK		
A to L Series Diesel	4	Q ABP D12
A to L Series Petrol	2	Q ABP D12
Air Start (24 volt)	2	Q ABP MF31-931
B61 Battery Start	2	Q ABP D12
Buses — PR100-2, PR180-2	4	Q ABP D12
CHR Air Start	1	Q ABP MF31-931
CHR Elec Start	4	Q ABP MF95D31R
CLR	1	Q ABP MF31-931
Fleet-Liner	3	Q ABP MF95D31R
G260 Magnum, G260 Maxter/Manager, Granite	2	Q ABP MF95D31R
Magnum	2	Q ABP MF80D26R
Metro-Liner	3	Q ABP MF80D26R
MGR – 613R, 6142R	2	Q ABP D12
Midlum	2	Q ABP MF95D31R
ML Battery Start	2	Q ABP MF31-931
Qantum	6	Q ABP MF95D31R
R Series – R688RST R722VL	2	Q ABP D12
Titan, Super Aliner	4	Q ABP MF31-931
Trident	2 or 4	Q ABP MF31-931
Value-Liner	4	Q ABP MF31-931
M.A.N.		
Buses – Most models	2	Q ABP MFN150
10, 14, 15, 18 Series	2	Q ABP MFN120
20, 22, 26 Series	2	Q ABP MFN150
F2000 Series	2	Q ABP MFN94
L/M 2000 Series	2	Q ABP MFN94
Other truck models	2	Q ABP MFN120 or Q ABP MFN150
INTERNATIONAL		
ACCO – 1630, 1650, 1810D	2	Q ABP MF51
ACCO – 1850G/210 LPV	2	Q ABP MF80D26R
ACCO – 2250, 2350	3	Q ABP MF95D31R
ACCO – A Cummins Engine	4	Q ABP MF95D31R
ACCO – A Cummins Engine, 3072 Eagle	4	Q ABP MF95D31R
ACCO – All models 1850-2650, 2670	2 to 4	Q ABP MF95D31R
N1630, N1650	2	Q ABP MF95D31R

MODEL	QTY	GOLD
S Line 2670, T Line, TF Line	3 or 4	Q ABP MF95D31R
S3600	2 or 4	Q ABP MF95D31R
Scout – Terra, Traveller, Traveltop	1	Q ABP MF50
TF Line	4	Q ABP MF95D31R
TK Line	3	Q ABP MF95D31R
D.A.F.		
2300	2	Q ABP MFN150
2526	2	Q ABP MFN150
2800	2	Q ABP MFN150
3300	2	Q ABP MFN150
3600	2	Q ABP MFN150
FT2426	2	Q ABP MFN150
FTT3300	2	Q ABP MFN150
XF480	2	Q ABP MFN94
XF530, XF540	2	Q ABP MFN200
Most models	2	Q ABP MFN120

ALLIANCE
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SAFETY

PRECAUTIONS

Think safety when working around and with batteries

- Remove all jewellery
- Wear gloves and safety glasses. The hydrogen gas that batteries make when charging is very explosive
- Sulphuric acid eats up clothing and you may want to select Polyester clothing to wear as it is naturally resistant to some acids
- When doing electrical work on vehicles, disconnect the earthed cable first
- Never operate the battery near an open flame or spark – the battery gas build up is highly explosive

CARE OF ELECTRONICS

- Never disconnect or reconnect the battery with the ignition on
- Never reverse battery polarity
- Never use an electric welder even with the battery cable disconnected

BATTERY RECHARGING PROCEDURE

Safety Precautions

- Wear protective glasses while handling batteries
- Do not charge a damaged battery
- Switch the charger to:
    - ON: only when the battery terminals are already connected to the charger
    - OFF: only when the battery terminals are already disconnected from the charger
- Charge in well-ventilated area away from open flames and sparks
- Position the batteries at least 20mm apart
- Batteries to be connected in series should have the positive terminal of one battery to be connected to negative terminal of the neighbouring battery

RECHARGING

OPEN-CIRCUIT VOLTAGE	FLOODED LEAD-ACID BATTERIES			AGM/VRLA BATTERIES	
	CONSTANT CURRENT, AMP x HR	CONSTANT VOLTAGE, VOLTS x HR		CONSTANT VOLTAGE, VOLTS x HR	
12.50-12.59	1% of rated CCA x 3.5	14.4 volts at 25 amps current limited	5 to 7	14.1 volts at 25 amps current limited	2 to 4
12.40-12.49	1% of rated CCA x 5.5		7 to 9		4 to 8
12.30-12.39	1% of rated CCA x 7.5		9 to 11		8 to 12
12.20-12.29	1% of rated CCA x 11		11 to 13		16 to 20
12.10-12.19	1% of rated CCA x 13		13 to 15		20 to 24
	** CCA - *cold cranking amps*				
Float voltage (constant voltage)	13.5 - 13.8 volts at 25 degC			13.6 - 13.8 volts at 25 degC (current limited to 4 x 20hr rate)	

Important

a. The above charge rates are an approximation as charge rates varies depending on actual capacity of battery, battery age and condition

b. Battery temperature should not exceed 45 degC during recharging process on flooded lead-acid batteries and 35 degC on AGM/VRLA batteries

   Recharging process should be stopped when it exceeds the recommended temperature and resume as the battery cools down

c. Batteries to be grouped (connected) should be with the same open voltage and same capacity to be able to charge them with the necessary rates

d. 20hr rate refers to current discharge rate for 20hr capacity (example: 5amps for 100AH battery)

e. Voltage setting should be adjusted depending on operating temperature

f. After completion of recharging process, a standby time of approximately 25 minutes is recommended before removing connectors from the batteries as chargers may still be in charge state, which can still generate sparks, and to remove the surface charge

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CARE & MAINTENANCE

CARE AND MAINTENANCE

- Keep the battery clean and away from dirt
- Post and cable connection must be clean and free from corrosion
- Never keep battery discharged for extended period. Avoid continuously operating batteries in a partially charged condition. This will shorten battery life and reduce capacity
- Non-use can be extremely harmful to all lead-acid batteries. If seasonal use is the norm, the following is recommended:
  1. Make sure that battery is fully charged before storing
  2. Remove all electrical connection from the battery
  3. Store the battery in a cool dry place. The cooler the better, but do not store in a location that will be normally be at 0 degC or lower. Batteries will discharge even when not in use, the lower the temperature the lower the self-discharge
  4. When not in use for long period boost charge battery every two months
- In applications where multiple batteries are connected in series, parallel or series-parallel, replacement batteries should be of the same size, age and usage. Do not put a new battery in a pack with more than 80 cycles. Either replace all batteries in the set-up or use good batteries of same age
- Remember that the battery is just one part of the vehicle electrical system. In most cases, the battery masks the weakness/failure of the other parts before it fails

BATTERY TESTING

5 POINT IN-VEHICLE BATTERY QUICK TEST

1. VISUAL CHECK

a. Check battery is firmly held on the carrier, terminal cables are tight and clean

b. Check for cracks or acid leaks

c. Check battery is generally clean

d. Check other components of the electrical system (alternator, voltage regulator, connectors, ground cable) are working properly

2. HEADLIGHT TEST

a. Park near a wall or outside a garage door after dusk

b. Engine off, hand brake on, gear shift on park

c. Turn on headlights – if bright, battery is okay

d. If headlights are dim, start the engine

e. If lights brighten up with the engine on, the battery is suspect and needs checking

3. READ BUILT-IN CHARGE INDICATOR

a. On op of the battery, you'll see the 'Hydrometer Eye'

b. hen the eye is GREEN, the battery is okay

c. hen the eye is CLEAR, capacity is below 65%

d. When the eye is RED, the battery is flat and needs immediate recharging. Note: the eye is just an indicator of the capacity in one cell and does not indicate whether the battery is "good" or "bad". Only a battery test can determine that

4. VOLTMETER TEST

a. Voltmeter can also be used to check the battery voltage. Note: Multiply values below to the number of batteries in the pack if working on 24 or 48 volt system

b. A normal fully charged battery should read around 12.6~13.0 volts

c. If the battery voltage is below 12.5 volts, recharge the battery

d. If the ttery is okay but is not holding charge, check the alternator drive belt

e. If the drive belt is tight, test the voltage regulator using volt-ohmmeter according to the manufacturer's instructions or the vehicle's manual

5. VOLTMETER — VEHICLE CHARGING TEST

a. With engine off read battery voltage using voltmeter (open headlights for 10 seconds to remove surface charge of the battery). Open circuit voltage should read between 12.5~13 volts

b. Start engine (make sure that vehicle is on park or neutral) – voltage drop on meter should not go lower than 10.5 volts and should stabilise to around 13.8~14.7 volts (without any accessories on)

   i. If the voltage drops below 10.5 and the engine won't start, the battery needs to be changed

   ii. If the voltage stabilises below 13.8 after five minutes the system is undercharging the battery. This is the most common alternator problem. The condition is often accompanied by symptoms such as a low state of charge on the battery, poor or erratic performance from electrical components and dim headlights and other lighting systems. The first symptom of an undercharging alternator is a slow cranking engine

   Note: when jump started, a severely discharged battery can cause the alternator to overload and internally fail

   iii. If the voltage stabilises above 14.8 volts after five minutes there's a high possibility of the battery getting overcharged. Symptoms of overcharging include a swollen or "seeping" (acid flowing out of the vents) battery, both headlight bulbs failing at the same time, and other electrical system problems. Replace the alternator with an original (OE) unit. While an inferior rebuilt alternator is often much cheaper, it can fail prematurely causing another costly replacement or damage to other components

There are several electronic battery conductance testers on the market that can give quick test and evaluation of the battery. Some advanced models also incorporate an engine analyser on the battery tester. They are not foolproof but can give a reasonable indication of state of battery charge and general health. Combined with the simple tests above, this reduces margin for error

CAUSES OF BATTERY FAILURE

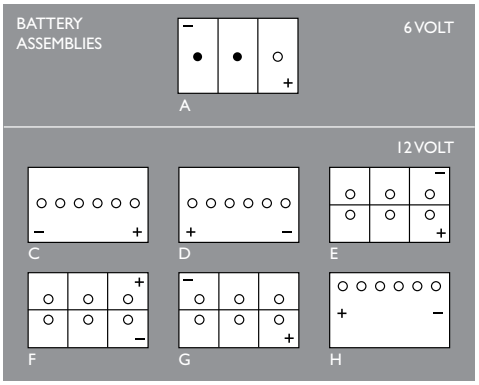
All batteries have a limited life, but some conditions can shorten that life

1. **Electrolyte Level**: A low electrolyte level exposes active material, and any sulphate hardens and resists chemical action. Loss of electrolyte may be caused by a cracked case, poor maintenance (not adding water when needed) or severe overcharging, which causes high internal heat and excessive gassing. Too much electrolyte is just as bad. Overfilling dilutes the electrolyte and spillage may corrode battery terminals
2. **Corrosion**: Spilled electrolyte and condensation from gassing may cause corrosion on terminals, connectors, and metal hold-downs/carriers. Such corrosion increases electrical resistance, which reduces available voltage and charging effectiveness. It may also create a current leakage path to allow self-discharge
3. **Cycling**: Repeated cycling, from fully charged to fully discharged and back, may cause loss of active material from the positive plates. This reduces battery capacity and useful life
4. **Overcharging**: Overcharging by the vehicle's charging system or separate battery charger causes excessive gassing and high internal heat. Too much gassing can wash active materials off the plates, as well as cause excessive water usage. Too much heat can oxidise the positive plate material and warp the plates
5. **Undercharging**: A faulty charging system will not maintain the battery at full charge. Severe undercharging allows sulphate on the plates to become hard and impossible to remove by normal charging. The weak electrolyte freezes easier. The undercharged battery may fail to crank the engine
6. **Vibration**: A battery must be mounted securely. Vibration can loosen connections, crack the case, damage internal components and cause explosion

ABBREVIATIONS & BATTERY ASSEMBLIES

CT	Centered Terminals
CV	Central Venting
DFA	Dual Fit Aligned Terminals
DFP	Dual Fit Parallel Terminals
DST	Dual System Terminals
EL	End Ledge
FDH	Fold Down Handles
FL	Front Ledge
HE	Hydrometer Eye

OLT	Offset Lug Terminal
PT	Pencil Terminal
RPH	Rope Handles
RT	Recessed Terminal
RTH	Retractable Handles
ST	Side Terminal
STD	Standard Terminal
TM	Twin Marine Terminal - Type M
TS	Top Stud Terminal



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