

Faller Vehicles – Types of Battery and Expected Life

Rechargeable v Disposable Batteries

The vehicles supplied have a rechargeable battery soldered in, with a socket at the back for recharging. The starter sets come with a charger.

Rechargeable batteries mean you don't have to keep taking the vehicle apart, no cost, and you don't have to remember to stock up on batteries.

Disadvantages are lower capacity for same size and weight, need to recharge once run down which takes overnight and most exhibitions turn off the power at night. Further a single button cell is very small and will fit vehicles that cannot take a rechargeable.

Types of Battery

2/3 AAAA NiMH Rechargeable. Faller initially used a 2/3 AAAA rechargeable with a capacity of 200 mAh. Size is 8.4 mm diameter and 28.5 mm long. It seemed to get damaged recharging (it was getting very hot) and capacity dropped. (I think the charger delivers slightly too much current, the newer vehicles have a 100 ohm resistor in series with the recharge socket to limit current). Weighs 5g. Difficult to find for sale, Battery Giant in the US is the only one I could find 10/2016.

Similar NiMH batteries that might fit are 300 mAh 2/3 AAA (10mm dia, 28.5mm long), 210 mAh 1/2 AAA (10mm dia, 21mm long), AAAA 300 mAh (8.4 mm dia, 42 mm long, 7g). These are all fairly easy to find, some are available with tags for soldering to.

150 mAh NiMH Rechargeable Flat Battery. The current vehicles use a 150 mAh rechargeable Varta code V150H and readily obtainable. It measures 27 mm x13.5 mm x 6mm deep, and weighs 6g.

Recharging NiMH Batteries. The easy and safe way to recharge is a current of Capacity/10 for 15 hours, further charging at this level will not damage it. The charger supplied is a nominal 2.8V 30 mA though seems to deliver more like 3.4V. The 100 ohm resistor fitted to later vehicles should limit current to 15 mA which is appropriate for the 150 mA batteries the new vehicles are fitted with. With no resistor you rely on the 30 mA limit of the charger (it might deliver more) and this is rather too much for the original 2/3 AAAA battery though OK for the full AAAA battery – but I would put a small resistor, say 47 ohms, in series to be safe.

It is possible to recharge much faster but you need more electronics. A fully discharged battery can be charged at C/3 in 5 hours, but you need a charger that discharges the cells first. You can charge at C in 1.5 hours with a sophisticated charger that monitors the voltage to protect against overcharging.

Standard AAAA Alkaline Battery. 8.3 mm dia, 42 mm long, 500+ mAh at 50 mA drain, weight 7g. Will fit in a longer coaches or lorries. Gives a rather higher voltage at 1.5V nominal as against 1.2V for other types so vehicle runs faster, perhaps faster than you want. I found it did a scale 40 mph rather than the usual 25-30 mph so added a 2 ohm resistor in series with the motor.

Button Cell Type LR44 (also known as AG13) – Alkaline (Zinc/Manganese dioxide).

The standard cheap button cell, available in 10 packs for about 10 – 20p per cell on the internet or in pound shops. 11.6 mm diameter and 5.4 mm deep. Weight < 2g. Capacity typically 110 mAh.

Different cells vary in how long they last. Cheap ones bought on the Internet were quite good,

ones that I bought from a £ shop 3 years ago were not so good (the cells lose about 10% charge a year). More expensive ones from well known manufacturers may last longer before the voltage drops too much – sometime I will do a test.

Button Cell Type SR44 – Silver Oxide. Same size as LR44 but have higher capacity of about 160 mAh and maintain voltage better as they run down. They cost at least 10 times as much (if you find them much cheaper they are misleadingly labelled alkaline cells). In fact they are useless – they cannot cope with the high current drain and in practice last for a shorter time than LR44 batteries

Button Cell PR44 - Zinc/Air. Again same size as LR44. They rely on interaction with air, and are initially sealed. Once the seal is removed the battery will dry out over a few weeks, so only good for one exhibition. Capacity is about 600 mAh. Unfortunately they cannot deliver the power needed continuously – the vehicle only manages a couple of feet before slowing to a stop.

Summary

For a rechargeable battery the main choices are the Varta V150H or whatever AAAA or AAA cell you can fit (and find).

For an alkaline (non-rechargeable) you should probably use cheap LR44 button cells, though if it will fit a standard AAAA may be better.

Test Results

The following are the results of tests with a vehicle running continuously round a test oval. In practice at exhibitions they seem to do worse – I think this is because at some point in any session they spend 15 minutes running into a wall or tree, using more power, before someone notices.

The lighter vehicles seem to take around 50 mA when running, but adding a metal body increases power consumption, my heaviest seems to be about 75 mA.

Lorry with 150 mAh rechargeable. More or less standard Faller lorry with cab replaced with one of similar weight. Weight 13g. Ran for about 3 hours.

Lorry with button cell. Wheelbase shortened and LR44 cell used, cab from Base Toys substituted. Weight 11g, could be 2- 3g less if I had put the cell at the rear as it needs an additional lead weight to give enough grip. Ran for 2 hours 15 minutes.

Sunlounger Coach with button cell. Uses the original post-bus chassis (no longer available) with button cell substituted. Weight 23g. Ran for a little over 1 hour. This is rather short, I've since changed this to run off AAAA disposable battery which just fits.

Bedford Bus with Button Cell. Shorter vehicle using lorry chassis with button cell substituted. Weight 18g. Ran for 1 hour 35 minutes.

I have put 2 cells in this bus increasing the weight to 20g. It then ran for over 2 hours 20 but would have managed a bit more. This seems to show there is little benefit in having a second cell possibly because of the increased weight.