

60 000 km käyttötestissä Citroën C5 2,0i Tourer

TAM

21/09

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- ▶ **PLAYSTATION** 3 Slim
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OASIS *of the* SEAS

ESITTELYSSÄ

MAAILMAN SUURIN SUOMALAINEN



VERTAILUISSA

- ▶ **KÄYNNISTYSAKUT** 75 Ah
- ▶ **AUTOJEN KÄYTTÖOHJEKIRJAT**
- ▶ **LEIPÄKONEET**
- ▶ **HENKILÖVAA'AT**



Käynnisty

74-77 Ah
starting batteries

- ▶ Banner
- ▶ Biltema
- ▶ Bosch
- ▶ Energie
- ▶ Exide
- ▶ Faam
- ▶ Hankook
- ▶ Powerline
- ▶ Trane
- ▶ Varta
- ▶ Zap



Start until the spring

The first frosts of winter is experienced. For someone, it has meant a shift on the use of public transport when the car is not started in the morning. In many cases, it is just about the battery has slowly reached no power condition. If the battery does not work, it's time to buy a new one.

HEIKKI PARVIAINEN
TEST WORLD OY.
comparison of design and implementation
HANNU HÄYHÄ, photos

This autumn our comparisons shift to quite large-size batteries with capacity of 74-77 Ah. We would be happy if all manufacturers could give the same capacity batteries, but they were not available. We took into account the grading of batteries with different capacity i.e. scale of the starting time and reserve capacity measurement results of the batteries with indicated capacity.

The battery category in this comparison test is one of the best-selling. The smallest cars which used this battery size are too large, but even the middle-size cars usually use 74 Ah batteries. All batteries in this comparisons are same sized and dimensions, although there is small difference in capacity.

Each individual battery may also have some minor differences, so we took two batteries of each brand for measurements.

Activities in the cold are important

In Finnish conditions there are so many battery problems, especially in winter, the cold characteristics of battery were compared with high interest. We tested the voltage, starting time and charge receiving capacity of batteries at -20°C.



// The batteries were kept at -20°C for 12 hours for the cold start testing requirements...



▲ **IN MOST** batteries, handles design was given to the extent that they are comfortable and easy to use. Yet there are some batteries, which handles are still narrow and sharp angle. Moreover, the battery models with two handles must be carried by using both hands, although it is not necessary in terms of the weight.

◀ **RESERVE STATUS** indicator is equipped, which will tell the future of all batteries. It is convenient to check the battery charge because the specific gravity of existing electrolyte in the maintenance-free battery can not be measured. Very few people have the voltmeter to check voltage at battery poles, but a visual status indicator is reserved for each check.

were measured continuously. This explained how well the tested batteries could survive frosty start. Starting voltage tells how much is enough battery voltage for the morning's first start-up attempt. Start-up time again tells you how many start is left if the car cannot be started at the first attempt.

The best of the cold start voltage measurements were Energie and Trane. Their voltages were more than 10.6 V and 10.5 V high above the Varta, Bosch and Banner. Among these three, the highest voltage was Varta, received a grade of 9 together with Energie and Trane. 6 grades were given to Biltema, Zap and Faam, the voltage dropped to 10.3 V.

In the same event, therefore, starting time has been measured, which Exide has proved to be the

Before the actual testing, batteries were charged and discharged a few times so that they would be ready in the first measurements without any storage problems. The batteries were kept at -20°C for 12 hours for the cold start testing requirements.

The first test is a good match, for example, the situation in the cold Monday morning when the car has been parked along the weekend. The car is really numb with cold, and a cold battery's power should be enough to start up.

The cold-start test was made in such a way that the batteries were charged with 200 A current for 15 seconds, followed by a rest period of the same length. After three times of charging/rest period, the batteries were discharged continuously until the battery terminal voltage fell to 7.5 volts.

During the test, the battery terminal voltage and the current

best candidate. It continuously provided starting current to 278 seconds until the voltage fell to 7.5 V. Varta and Faam were below the top line by 4 and 8 seconds. All these got grades of 9, including Hankook and Zap. The measuring time of Faam, Hankook and Zap was slightly compensated like others with smaller capacity.

The measurement result was therefore the actual measuring time in proportion to the capacity indicated on the battery. The adjustment was small, and did not affect batteries in order. The grades were the same, although the capacity differences should not be taken into account of the measurement results.

Bottom of the starting time measurements were Powerline and Bosch. The result was strange, because Bosch's battery should be in the same line with Varta, and from the top down, they look quite similar. But the difference in their starting times was huge. Bosch

Power consumption from another car

■ If the car cannot be started in one morning due to not enough battery power, it's time to ask for help from another car, or power can also be taken by jump starting from a good battery. You should use the good quality connecting cables with big enough diameter and having good contact with the connecting clamps.

Initially connect the red clamp to the positive terminal of the battery (the positive pole's diameter is usually bigger than the negative pole's and clearly marked). The other end of red cable to connect to the positive terminal of the good battery.

Then connect the negative cable (frequently black or blue) to the negative terminal of the good battery. The other end would not be connected to the negative terminal of the poor battery, but it needs to find a good grounding point from the engine or a basket.

Ground points must be clean and free from paint or rust. If the clamp is not securely connected to the terminal, the jump starting may cause sparks where there might be some gas generated from a weak battery.

In getting start assistance from another car, you should start the assisting car first so it would take a little battery charger voltage. When your car can be started, no need to fear anymore, disconnect the cables in the reverse order of connection.

Maintenance Tips

- ▶ Check that the battery is securely installed in the car.
- ▶ Keep your battery clean and dry. Dirt can cause the battery to be gradually empty.
- ▶ Clean the battery terminals and cable lugs and lubricate them lightly with vaseline. Check the same time that the cable clips are not loose.
- ▶ This autumn should check the status by measuring the voltage of battery. If the voltage is below 12.2 V, the battery should be replaced.
- ▶ Do not park the car for several months with cables connected to the battery, because the car has a small load of equipment, such as a clock. They will slowly empty the battery.
- ▶ When you buy a battery, make sure that its capacity (ampere hour = Ah) is suitable with your car recommended by the battery's manufacturer. Too small capacity will reduce the starting battery power. Too much capacity will be no problem, if only the dimensions can fit into place.
- ▶ Determine the radio code, and its re-setting before battery replacement.



reached just a little bit more than half of Varta's time. And this was not only an individual tested battery, as both brands were measured by using two batteries.

With winter frosts, battery problems are not easily expected. Business trips are usually short as a few ten minutes, and not all batteries have enough time to receive the same amount of energy which they have released by a cold start.

The end result is then, in one morning, the battery has no longer enough energy to start-up. So one of the important benchmarks we tested is the ability of batteries to receive weekly charges in freezing temperatures.

The measured batteries were discharged to remove 30-31.2 Ah depending on capacity difference of each brand, and then cooled at -20°C. The cool batteries were charged with 14.4 V for 10 minutes. Finally, measure how many ampere/hour of energy had been charged to the batteries.

The best in this test turned out to be Banner, the received energy was 1.83 ampere/hour. This is the only one that got the grade of 10 in the charging test. Nine was given to Bosch, Faam, Energie, and Trane. In this measurement, Hankook and Zap got wooden spoon because, during 10 minutes, they were unable to receive even 1 Ah. Also with self-discharge in batteries, they had a significant higher risk than the best charge received Banner.

Capacities indicated overestimated

In addition to the cold measurements, we tested the capacity of batteries in two different measurements, then we gave the ratings. Initially we measured the normal capacity of batteries and compared to the capacity indicated by the manufacturers. Thereafter, we measured the reserve capacity of batteries.

These two measurements are the end voltage with the same exception, but in the reserve capacity measurement, batteries were discharged with 25 amperes current, the capacities measured were about 4 amperes less than the capacities indicated by the manufacturers.

To discharge batteries, we used the power setting from the indicated capacity divided by 20. The batteries should be able to give this power out of the 20-hour period, as stated by the manufacturers.



▲ **BATTERIES** appearance has not changed over the years, but the manufacturers change the labels very fast. Zap's and Banner's logos reflect the energy that it should be found in the start-up battery.



Battery life and the possible influence

■ Battery's life is affected not only by the battery design and manufacturing, but above all its use. Battery manufacturer can reduce the volume of lead. Lead prices have increased greatly over the years, and the temptation to save the amount of lead is high.

In 2003 the comparison of batteries has resulted to about five per cent different level in average when we tested the same-size batteries. It could not be said clearly that the batteries were degraded because advanced manufacturing techniques also allowed for lighter batteries, while their other characteristics had remained unchanged. Yet, they were just the comparison with the measurements of starting time and capacity of batteries in 2003 which their weights were retained or slightly heavier.

If the actual capacity is much lower than indicated, the reserve capacity of battery will be constantly lower. This creates a

chemical change in the battery plates i.e. sulphation (lead sulphate formation). It may change the plate structure permanently and shorten the battery life.

The climax of too low voltage is a deep-discharge i.e. lower voltage level that a battery can be discharged. Deep-discharge damages the plates when removing mass sulphates from the plates. Strong deep-discharge may even destroy the battery. Particular danger is that the battery cannot be recharged once again.

The use of battery also greatly affects its lifetime. Keeping the battery clean and fully charged as possible will be more years of use. The biggest problem to its life is still-standing battery. An unused battery without recharging can be destroyed in a couple of months, especially if the storage temperature is high. When it freezes cold again, the discharged battery is destroyed.

The battery is not good to be kept unused, but also it should not be charged too much. If the battery is being charged with too high voltage, the life may be lower. Car alternator must therefore be in order. If the battery is charged with an external charger, you may want to choose the intelligent design which can charge with the maintaining voltage inside the battery at 13.5 volts.

The incorrectly-installed battery cables and various accessories, such as intrusion alarm, may drain battery within a week, not to mention the fact that some of the accessories are not installed properly which eat the flow much more than normal.

Batteries can also be a manufacturing defect, such as short circuits, but they often occur within the warranty period, mostly during the first months. Short battery life mostly comes from incorrect use. If you think your current battery life is very short, maybe that new battery is likely to be short-lived, but if this occurs to the old battery, the cause is different.

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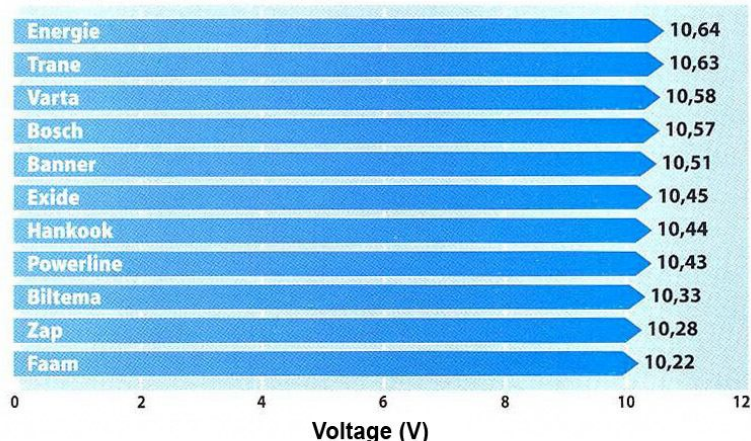


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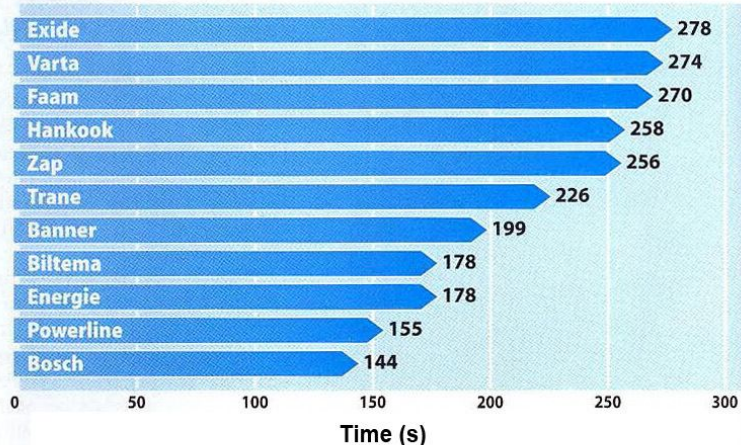


COLD START VOLTAGE



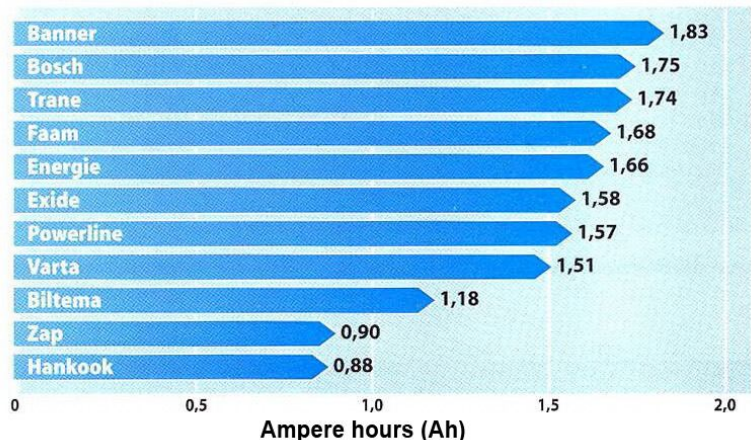
► **COLD START VOLTAGE** strongly influences how the battery can run the engine under frosty condition. The higher the voltage, the better the engine starts.

STARTING TIME



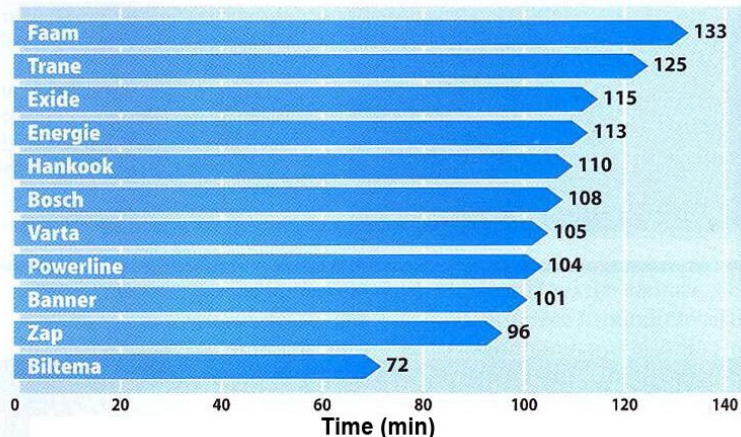
► **LONG** starting time is necessary when the engine will not start up in the first few times, but it should attract plenty of eyes of people.

CHARGING WHILE COLD



► **BATTERY** may reach draining hard frosts if the charge receiving features are not good enough. In particular, the short-distance drives are pleased with batteries whose power are also well against the cold and are ready for charging a full day.

RESERVE CAPACITY



► **IF** a strap charger is disconnected for any reason, a good reserve capacity is required. It tells how long the power will get out of a battery until the end of charge.

Capacity measurements told us that not all the batteries had the energy equal to indicated Ah figures. Trane practically reached the manufacturer's figure, and other 5 brands had more than 90% of the stated Ah. Other 4 brands had more than 80% of the indication, but Biltema only had slightly more than 60% of the declared value.

Measuring on a small current, it took a long time, and therefore the results had a small uncertainty, but the poor performance of Biltema was not explained by this measurement. It had a very poor capacity, and this is reflected in the reserve capacity measurement. Even Biltema was clear tail peak, it still differed by 10% from above.

Reserve capacity is a measurement to determine how long the battery has enough power for the electrical appliances in the car, for example, if the alternator stops charging due to the cut-off of the belt. Batteries will then be discharged of 25 A current until the voltage fell to 9.5 volts. This discharging time will tell the battery reserve capacity.

Faam was the furthest reach because its reserve capacity was 133 minutes. Trane could also run over 120 minutes and Exide to 115 minutes. The result of Biltema was very bad. The value of its reserve capacity was limited to 71 minutes, so after the belt cut-off, it's time to call the tow truck to the site and you hope that the battery still has sufficient power to make a call.

Includes really bad stuff

Review of all four comparison items results to the victory of **Trane**. It is uniformly good in all qualifications, while almost

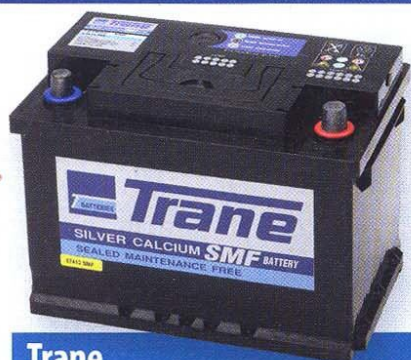
all other batteries have their own Achilles' heel. For Faam, it is starting voltage, which remains low. With much better starting voltage, Faam might be number one, since its starting time, the charging and reserve capacity are world class.

Faam shared the silver ranks with Varta which was not bad in anything, but due to the lack of high-performance its medal was brightless. Good batteries are also Banner, Energie, and Exide, all of which received four stars. The remaining batteries in this comparison are desirable. Biltema needs the most improvement in the battery because it did not succeed in any area. It just felt as if 55 Ah battery inside 75 Ah battery container – Biltema's all measurement results were much below than others.

Biltema usually competes with lower prices, but the comparison did not give appreciation to the less-expensive battery. Biltema did not receive a single star and we really cannot recommend buying it if you want to start-up the car in frosty weather.

GRADES	Overall value%	Banner	Biltema	Bosch	Energie	Exide	Faam	Hankook	Powerline	Trane	Varta	Zap
Start-up voltage	25	8	6	8	9	7	6	7	7	9	9	6
Starting time	25	7	6	5	6	9	9	9	5	8	9	9
Receiving charge	25	10	6	9	9	8	9	5	8	9	8	5
Capacity	25	8	5	8	9	9	10	8	8	9	8	7
General grade	100	8,3	5,8	7,5	8,3	8,3	8,5	7,3	7,0	8,8	8,5	6,8

FINAL REVIEW



Trane

Model: 57412 SMF
Cold start current: 680 A (EN)
Plates per cell: 17 pcs
Maintenance free: yes
Carrying handles: yes
Display for state of charge: yes
Dimensions (LxWxH): 278 x 175 x 190 mm
Price: 110 Euro
Importer: PJP-Batteries Oy,
Tel. (019) 325 072, www.pjp-batteries.com
Country of origin: Thailand
Warranty: 2 years

PROS

- Start-up voltage
- Capacity

CONS

- Starting time reserve

Overall Grade 8.8

★★★★★



Faam

Model: Top Silver 74L32
Cold start current: 680 A (EN)
Plates per cell: unknown
Maintenance free: no
Carrying handles: yes
Display for state of charge: no
Dimensions (LxWxH): 275 x 175 x 190 mm
Price: 79 Euro
Importer: Rautakesko Oy.,
Tel. 010 53 032, www.rautakesko.com
Country of origin: Italy
Warranty: 2 years

PROS

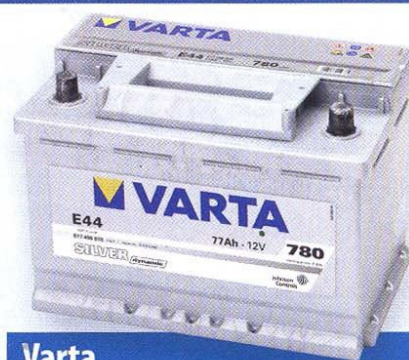
- Capacity
- Starting time
- Receiving charge

CONS

- Start-up voltage

Overall Grade 8.5

★★★★



Varta

Model: Silver Dynamic E44
Cold start current: 780 A (EN)
Plates per cell: 18 pcs
Maintenance free: yes
Carrying handles: yes
Display for state of charge: no
Dimensions (LxWxH): 276 x 175 x 190 mm
Price: 170 Euro
Importer: Suomen Laatuakut Oy,
Tel. 010 346 5800, www.suomenlaatuakut.fi
Country of origin: Spain
Warranty: 3 years

PROS

- Start-up voltage
- Starting time

CONS

- No display for charging status

Overall Grade 8.5

★★★★



Banner

Model: P7405DT
Cold start current: 680 A (EN)
Plates per cell: 15 pcs
Maintenance free: yes
Carrying handles: yes
Display for state of charge: no
Dimensions (LxWxH): 278 x 175 x 175 mm
Price: 114 Euro
Importer: Motoral Oy,
Tel. (09) 37 541, www.motoral.fi
Country of origin: Austria
Warranty: 2 years

PROS

- Receiving charge

CONS

- Starting time reserve

Overall Grade 8.3

★★★★



Energie

Model: 57412
Cold start current: 600 A (EN)
Plates per cell: 15 pcs
Maintenance free: yes
Carrying handles: yes
Display for state of charge: yes
Dimensions (LxWxH): 279 x 175 x 190 mm
Price: 79 Euro
Importer: Akkutalo Finn Sukon Oy,
Tel. 0207 890 790, www.akkutalo.fi
Country of origin: Italy
Warranty: 1 year

PROS

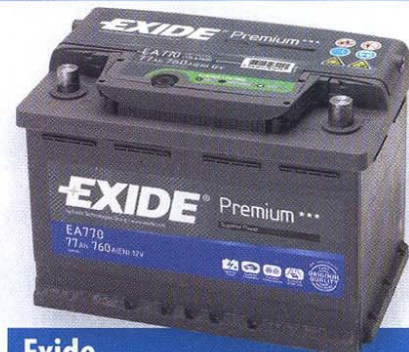
- Start-up voltage
- Receiving charge
- Capacity

CONS

- Starting time

Overall Grade 8.3

★★★★



Exide

Model: Premium EA770
Cold start current: 760 A (EN)
Plates per cell: unknown
Maintenance free: yes
Carrying handles: yes
Display for state of charge: yes
Dimensions (LxWxH): 278 x 175 x 190 mm
Price: 110 Euro
Importer: Exide Technologies Oy,
Tel. (09) 4154 5500, www.exide.fi
Country of origin: Spain
Warranty: 2 years

PROS

- Capacity
- Starting time

CONS

- Starting time reserve

Overall Grade 8.3

★★★★



Bosch

Model: Star Line S5 008
Cold start current: 780 A (EN)
Plates per cell: 18 pcs
Maintenance free: yes
Carrying handles: yes
Display for state of charge: no
Dimensions (LxWxH): 278 x 175 x 190 mm
Price: 124 Euro
Importer: Robert Bosch Oy,
 Tel. (09) 435 991, www.bosch.fi
Country of origin: Germany, Czech and Spain
Warranty: 2 years

PROS

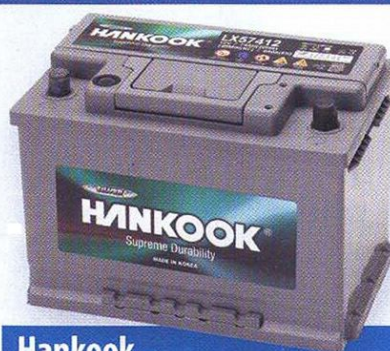
- Start-up voltage
- Receiving charge

CONS

- Starting time

Overall Grade 7.5

★★



Hankook

Model: Silver 936-LX57412
Cold start current: 680 A (EN)
Plates per cell: 16 pcs
Maintenance free: yes
Carrying handles: yes
Display for state of charge: yes
Dimensions (LxWxH): 277 x 174 x 190 mm
Price: 120 Euro
Importer: Koivunen Oy,
 Tel. (09) 35 011, www.koivunen.fi
Country of origin: Korea
Warranty: 2 years

PROS

- Starting time

CONS

- Start-up voltage
- Receiving charge

Overall Grade 7.3

★★



PowerLine

Model: Ultimate PLE11, 57512
Cold start current: 680 A (EN)
Plates per cell: 14 pcs
Maintenance free: yes
Carrying handles: yes
Display for state of charge: no
Dimensions (LxWxH): 276 x 175 x 190 mm
Price: 103 Euro
Importer: Suomen Laatuakut Oy,
 Tel. 010 346 5800, www.suomenlaatuakut.fi
Country of origin: Ukraine
Warranty: 2 years

PROS

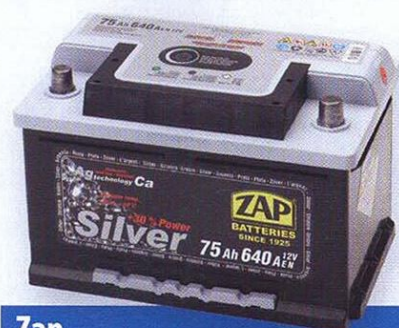
- Receiving charge

CONS

- Starting time

Overall Grade 7.0

★



Zap

Model: Silver 75Ah
Cold start current: 640 A (EN)
Plates per cell: 17 pcs
Maintenance free: yes
Carrying handles: yes
Display for state of charge: yes
Dimensions (LxWxH): 275 x 175 x 175 mm
Price: 103 Euro
Importer: Parkanon Autovaraosa Oy,
 Tel. (03) 44311, www.parkanonautovaraosa.fi
Country of origin: Poland
Warranty: 2 years

PROS

- Starting time

CONS

- Receiving charge
- Capacity
- Start-up voltage

Overall Grade 6.8

★



Biltema

Model: 80-2752 75Ah
Cold start current: 720 A (EN)
Plates per cell: 19 pcs
Maintenance free: yes
Carrying handles: yes
Display for state of charge: yes
Dimensions (LxWxH): 277 x 174 x 175 mm
Price: 109 Euro
Importer: Biltema Suomi Oy,
 Tel. (09) 5123 3330, www.biltema.com
Country of origin: Korea
Warranty: 4 years

PROS

- Long warranty

CONS

- Start-up voltage
- Starting time
- Capacity

Overall Grade 6.8

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