

Understanding the Specifications

Yuasa Number

Yuasa battery part numbers are based on the BBMS (British Battery Manufacturers Society) standard which has been used and understood by the UK aftermarket business for many years.

DIN Number

The DIN (German Industrial Standard) Part Number system traditionally used within Europe, but replaced by ETN number system.

e.g. 560.49

- 1st digit - Voltage
 - 1-2 = 6 Volt Battery
 - 5-7 = 12 Volt Battery
- 2nd & 3rd digits - Nominal capacity
 - 560 = 60Ah @ 20 hour rate
 - 660 = 160Ah @ 20 hour rate
- 4th & 5th digits - Unique code number referencing battery performance and features

The DIN numbering system is still used, more within Europe to identify battery types.

ETN Number

The ETN (European Type Number) was introduced to replace the DIN Number in the course of Europeanisation of Battery standards. The ETN is a combination of the DIN numbering system which facilitates the change over and gives further technical details.

The introduction of ETN system has lead to nearly 2000 part numbers being issued during its formal control period up to 2006 and therefore can lead to added confusion if cross referencing of part numbers is required without the formal number index records. The control of number issue by Eurobat was disbanded in 2006 and subsequently issued numbers are now difficult to understand as no formal central records are kept and issued.

The 9 digit ETN offers additional information to the DIN numbering system.

e.g. 536 046 030

- 1st digit Voltage – 1-2 = 6 volt Battery, 5-7 12 volt Battery
- 2nd and 3rd digits – nominal capacity
 - 560 = 60Ah @ 20hour rate
 - 660 = 160Ah @ 20hour rate
- 4th, 5th and 6th digits – Unique code number
 - 5th and 6th digit can refer back sometimes to older battery design and original DIN number (4th and 5th digits)
 - Unique code number giving details of endurance level, cold cranking performance level, vibration level, lid terminal and holddown details
- 7th, 8th and 9th digits – Cold Cranking Performance
 - There are 2 different EN rating EN1 and the EN2
 - This can cause confusion, as is unclear to the end user which standard is used, especially with the use of digital conductance testers which can not currently test to both standards.

- Details to which specification the battery is supplied to is hidden within the unique code number.

Cold Cranking Performance (Amps)

The Cold Cranking Performance (CCA) measures the starting performance of the battery. In simple terms, the higher the CCA, the easier it will be to start the vehicle.

SAE (American Standard – commonly used in UK)

This is the starting test according to the SAE (Society of Automotive Engineers). The test specifies that the battery at a temperature of -18°C will deliver a current equal to the Cold Cranking Amps for 30 seconds with the voltage staying above 7.2 volts (3.6 volts for a 6 volt battery).

Although subject to battery design, an approximation of SAE to DIN CCA relationship is:-

$$\text{SAE} = (\text{DIN} \times 1.5) + 40$$

Battery performance drops off quickly with temperature, so this test is a good check of a battery's starting ability as with 10s voltage of EN rating and its need to support 30 seconds to 7.2V gives a good view of high rate capacity capability of the battery.

DIN (German Industrial Standard at -18°C)

Again as with SAE the test is carried out at -18°C. The fully charged battery is discharged to 6V with the rated test current. The voltage must be at least 9.0V after 30 seconds and the time to achieve 6V must be at least 150 seconds.

Although subject to battery design an approximation of DIN to SAE CCA relationship is:-

$$\text{DIN} = (\text{SAE} - 40) \times 0.66$$

Since the introduction of modern fuel injected vehicles and the need for fast starting, the DIN standard has lost favour amongst automotive vehicle manufacturers. However, it does give a clear relationship with the amount of materials used within the battery, but not startability.

IEC (International Electrotechnical Commission)

Again as the SAE and DIN tests also tested at -18°C. The voltage after discharging for 60 seconds with the specified test current must be at least 8.4V. Typically:-

$$\text{IEC} = \text{DIN} / 0.85$$

This test requirement has fallen out of usage within European market over recent years.

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EN (European Standard EN50342.1 2006, previously EN 60095-1)

The test also is performed at -18°C. The EN requirement is however split into two levels EN1 and EN2.

EN1 - The battery is required to meet a voltage of 7.5V after 10 seconds and after 10 seconds rest, the battery is further discharged @ 0.6 x original current and is required to complete 73s in the second stage giving a total combined discharge period of 90 seconds (assume initial period equates to (10s/0.6) 16.7 seconds).

EN2 As EN1 except that the second discharge period to 6.0V should achieve 133 seconds giving a total time of 150 seconds. The discharge currents relationship to meet both designs is very much subject to battery design and can vary from manufacturer to manufacturers and design to design, however as an overview of our benchmarking work at Yuasa of competitor batteries the relationship between EN1 and EN2 is:- EN2 = 0.85% to 0.92% EN1

Due to this relationship, we usually display SAE as our standard to minimise confusion.

JIS (JIS Industrial standard)

The Japanese Industrial Standard test is carried out at -15°C. The automotive batteries are usually tested at either 150A or 300A with different 10s /30s voltage and durability requirement to 6V. For European applications we believe this does not give as clear a view to the customer of battery startability and is rarely shown and used within the European aftermarket.

Marine Cranking (MCA)

This Marine cranking test is based on SAE CCA requirement but carried out at the higher temperature of 0°C, usually indicated on batteries as CA (cranking Amps) or MCA (Marine cranking Amps) rather than CCA (cold cranking amps). The cranking current (CA/MCA) is typically 25% higher than the corresponding SAE CCA marked battery. It is advised that this should be checked with respect to any Marine related cranking current enquires.

The number of automotive battery standards in the world market's are numerous, Yuasa currently use the SAE CCA standard as a norm to hopefully give a clear balanced representation of battery cranking performance between startability and starting endurance.

Reserve Capacity (Minutes)

The Reserve Capacity is the amount of time in minutes that a battery at 25°C can deliver a current of 25 Amps until the voltage drops to 10.50V (5.25V for a 6 volt battery).

25 Amps represents a typical electrical load on a car under normal running conditions, so the Reserve Capacity gives an indication of the time that a vehicle with a normal electrical load will run with a broken alternator or fan-belt. This is a good, practical test.

Obviously, the more electrical accessories you turn off, the further you can drive the car.

Aside - Reserve Capacity was originally used to give an indication of the capacity of the battery if the then charging system (dynamo) failed and the duration of driving time left after charging warning light first appeared. With the greater dependability of modern vehicle charging systems the direct usefulness of reserve capacity to the automotive user has dropped, but does show the relative drop off in battery performance as the discharge current is increased.

Ampere-Hour Capacity at 20 Hour Rate (Ah)

The Ampere-Hour Capacity measures the total amount of electricity stored in a battery.

An Ampere-Hour represents the amount of electricity when a current of 1 Ampere passes for 1 hour.

The Ampere-Hour Capacity varies with the rate at which the battery is discharged; the slower the discharge, the greater the amount of electricity that the battery will deliver.

The Ampere-Hour Capacity is the amount of electricity that a battery will deliver during 20 hours before the voltage falls to 10.50V. For example, a 60Ah battery will deliver a current of 3A for 20 hours.

Recommended Charge Rate (Amps)

This is the recommended current for charging batteries with a constant-current charger.

For more details, see Section G of 'Information about Batteries' in this Catalogue.

Dimensions – Length (mm)

This is the dimension over the longest part of the battery, including the hold-down if fitted.

Dimensions – Width (mm)

This is the dimension over the widest part of the battery, including the hold-down if fitted.

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Dimensions – Height (mm)

This is the overall height of the battery to the tops of the terminals if these are proud of the lid.

Weight with Acid (kg)

This is the average weight of the battery as supplied.

Cell Layout

See the diagram on page 7 showing cell layouts and polarity.

Terminal

The diagram on page 8 shows the types of terminal fitted to each type of battery.

Container Features

The diagram on page 7 shows information about container hold-downs and other features.

Handles

A * in this column shows that the battery is fitted with carrying handles.

End-Venting

There are now several batteries in the range that have end-venting, rather than the normal venting through the individual vent-plugs.

A * in this column shows that the battery is fitted with end-venting at the negative end.

The battery is fitted with a gassing outlet according to EN60095-2 to allow remote venting of the battery.

State of Charge Indicator

A clever floating ball and prism device fitted to one cell of the battery to give a quick visual guide to battery state of charge and electrolyte level within the battery. If concerns noted, it should be used as advice to seeking further engineering support.

Japanese True-Fit

A * in this column shows that the battery has the same dimensions, features and performance-level as an original Japanese battery.

Lid features

An indication of lid design feature which may be specific to vehicle fitment:-

- Block – T shaped lid feature to give recessed area for terminals, and for European type sufficient area for top clamping according to EN60095-2.
 - Flat – Flat lid feature with no raised plugs which could interfere with manufacturers top clamp frame.
 - Raised plugs – Raised vent plug design sitting above the top face of the lid.
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Semi-Traction Features

A * in this column shows that the battery has semi-traction features. These make the battery suitable for applications in which there is some cycling (eg vehicles with tail-lifts).
