

Made by GS Yuasa
For Japanese cars
EFB-battery (EPIY)
Explanatory materials



What is a GS Yuasa EFB Battery (EPIY)?

◆ It meets the required specifications of Japanese automakers.

“No.1 Share of Japanese automakers Original Equipment battery market”

◆ It is manufactured with technologies that eliminate defects.

◆ Responds to state-of-the-art advances in STOP & START systems, sophisticated vehicle equipment, and technology.

EPIY series is the ideal EFB-cell for STOP & START Japanese vehicles.

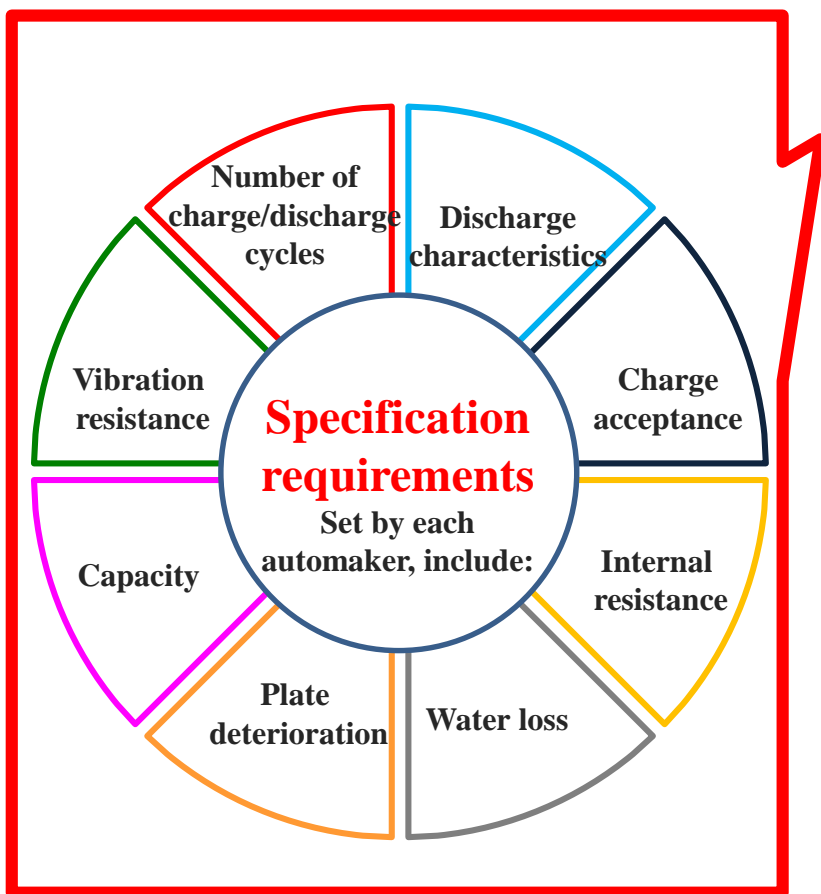
Points for Selecting EFB Batteries

- ◆ **Meet the requirements of Japanese automakers.**
- ◆ **Respond to increasingly sophisticated vehicle equipment and changes in automotive technology.**
- ◆ **GS Yuasa batteries are the OE manufacturer of choice for Japanese automakers.**

GS Yuasa began research on EFB batteries around the year 2000 and continues to evolve to meet the demands of automakers.

What are the specs for new cars?

The batteries installed in new cars by their manufacturers satisfy the vehicle's requirements and specifications.



◆ Response of GS Yuasa

① Understood battery requirements and specifications.

② Developed compatible batteries that meet new vehicle requirements.

③ Analyzed the deterioration status of batteries in actual use.

④ Developed technology to improve the effects of degradation.

If the battery doesn't meet the required specs

- ◆ **Insufficient durability and shorter life.**
- ◆ **STOP & START functionality does not work properly and fuel efficiency deteriorates.**
- ◆ **The possibility of battery trouble increases**
 - **The vehicle cannot be restarted**
 - **The battery goes flat due to self-discharge**
 - **The battery goes flat due to insufficient charge**

An EFB battery's quality cannot be determined by performance rank, CCA or capacity. Choose a reliable manufacturer's battery.

No.1 Share of Battery Equipped in new cars

“Reasons why GS Yuasa has No.1 share of Japanese automakers Original Equipment battery market”



Perfect fit for
Start & Stop

What is GS Yuasa's EFB battery?

GS Yuasa 's EFB batteries meet the strict requirements of Japanese automobile manufacturers and they are installed in a variety of new models. Especially higher specification models with lots of equipment and high power demands.

**No. 1 share in new STOP & START car
= High performance and reliability**

Japanese vehicles fitted with GS Yuasa batteries by the manufacturer

··· New stop & start vehicles equipped with GS Yuasa batteries as Original Equipment (OE)

Toyota	Pixis Epoch	Pixis Mega	IQ	Allion	Premio	Alphard	Vell Fire	Vitz	Auris	Corolla Axio	Corolla Fielder	Crown
	Sienta	Tank	Roomy	Noah	Voxy	Esquire	Passo	Porte	Spade	Lactis		
NISSAN	Dayz	Dayz roox	Moco	X-Trail	Cube	Juke	Serena	Note	March	Latio	Lafesta	
Honda	N-BOX	N-BOX+	N-ONE	N-WGN	S660	Veziel	Odyssey	Grace	Jade	Civic	Shuttle	Step Wagon
	Fit	Freed										
Mazda	Carol Eco	Flair	Flair wagon	Flair Cross Over	CX-3	CX-5	Axela	Atenza	Demio	Biante	Premacy	Roadster
Mitsubishi	EK space	EK Wagon	RVR	Outlander	Galant	Delica D:2	Delica D:5	Mirage				
Subaru	Stella	Preo	Lucra	XV	Impreza	Exiga Cross Over 7	Chiffon	Justy	Trezia	Forester	Levorg	Legacy
Suzuki	MR wagon	Alto Eco	Spacia	Hustler	Lapin	Wagon R	Ignis	Escudo	Swift	Solio	Randy	
Daihatsu	Wake	Cast	Copen	Conte	Tanto	Tanto exe	Mira e:s	Miraco Cocoa	Move	Tall	Boon	

Impact of vehicle control and upgrading of equipment

	STOP & START frequency		Duration of STOP & START	Charging time of the battery	
Evolution of vehicles	Increasing frequency		More time (Engine stops at deceleration)	Shortening	
Battery	Increased burden Easy to discharge		Insufficient charge Easy to discharge	Insufficient charge quick charge	

	Convenient equipment		Indoor expansion	Safe driving equipment	Battery mounting position
Equipment sophistication	Electric sliding door	Smart key	Electric power for air conditioners	Sensor camera	Engine compartment, backward
Battery	Operation when key off	Dark current increase	Electric load increase	Electric load increase	Less maintenance

Evolution of vehicles and upgrading of equipment increase the burden on batteries. There is a need for a battery that can accommodate this.

Changes in car life

	Development of transportation	Automobiles Owned Increase	Increased congestion
Economic development	Decrease in vehicle utilization	Reduction in mileage per vehicle	Increased frequency of STOP & START
Battery	Easy to discharge	Insufficient charge	Increased burden
	Stay-at-home order	Restrictions on outing	Decline in new car sales
Covid-19 pandemic	Decrease in vehicle utilization	Reduction in mileage	Aging of vehicles
Battery	Easy to discharge	Insufficient charge	Increased battery problems

Due to the economic development and the impacts of the Covid-19 pandemic, the battery burden is increasing and battery trouble is increasing.

GS Yuasa EFB Battery Development

	Increased power demands		GS Yuasa's development response
STOP & START system	Increased numbers and duration of STOP & START cycles to improve fuel efficiency	▶	Meet the requirements of the newest STOP & START vehicles and improve durability
Change in battery load	Widespread use of safe driving equipment and an increase in the number of electrical components in operation during stoppages	▶	Improve durability
Changes in car life	Reduction in long-distance travel. Increase in traffic jams	▶	Improve quick charge performance. Reduce self-discharge

GS Yuasa has set development points for EFB batteries to respond to changes in vehicle and car life. We are adopting new technologies in our EPIY series.

Three features of EPIY Series

◆ 1 - Evolved Next-Generation Battery

- Compatible with the latest vehicles
- Adopts the latest technology

◆ 2- Wide range of compatibility

- Able to be mounted both on STOP & START and regular vehicles
- Excellent quick charge performance

◆ 3 - Made by GS Yuasa, a reliable Japanese brand

- No. 1 of battery share in Japan

1. Evolved Next-Generation Battery

Correspond with the latest automaker's specification requirements

Adopted into new cars by all Japanese automakers ※

Responds to evolving state-of-the-art STOP & START vehicles.



Allows start – stop and other emission reduction systems to operate to their full potential.

※ Including 1 OEM and co-developed vehicles

With the latest technology

Excellent STOP & START life and quick charge performance. Suitable for use in various environments.



2. Suitable for many vehicles

Wide range of compatibility

Able to be mounted both on STOP & START and regular vehicles

Sales Benefits

- ★ Reduction of inventory burden, reduction of missed sales opportunities
- ★ Preventing troubles by installing normal products on STOP & START vehicles

Adapt to the evolution of STOP & START generations

- ★ Supports vehicle control by the latest Japanese automakers

Excellent quick charge performance

Even in short-distance operation the battery is quickly charge extending service life

3. Trusted Brand GS Yuasa

No. 1 of battery share in Japan



No.1 Domestic aftermarket share ※1

No.1 Share of new cars in Japan ※2

No.1 Share of new battery for START & STOP vehicles ※3

Battery: Made in Japan by GS Yuasa

It has a 100-year history.

It also produces batteries for the International Space Station, submarines and emergency power supplies.



※1 In the 2018 Domestic Automobile Repair Battery Share Survey by Domestic Research Companies

※2 In a 2018 investigation of battery share for new vehicles by domestic research companies

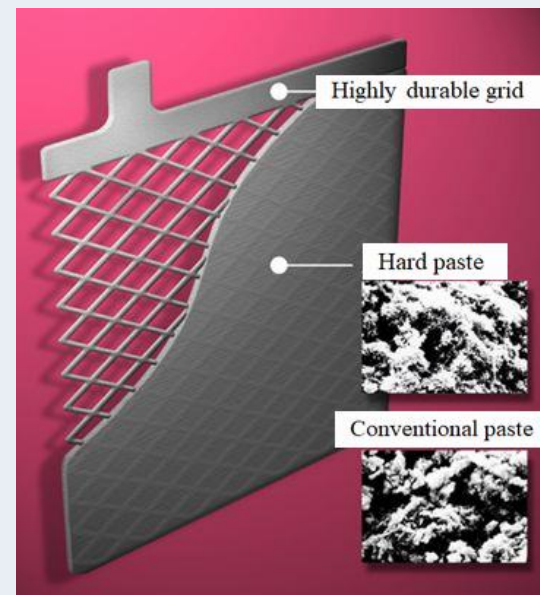
※3 In 2018, a survey by domestic research companies on battery shares for new vehicles for STOP & START vehicles in Japan

Details of EPIY Series Technologies

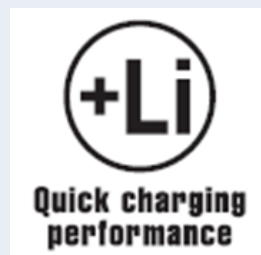
ULL structure

ULL (Ultra Long Life) structure is adopted for internal elements.

Allows start – stop and other emission reduction systems to operate to their full potential.

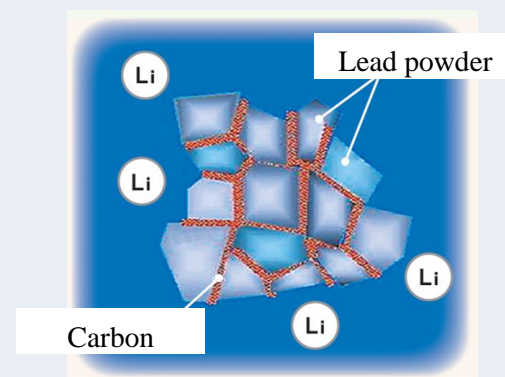


Electrolyte lithium formulation



Optimization of carbon quantity and lithium formulation within electrolyte liquid greatly improve charge acceptance.

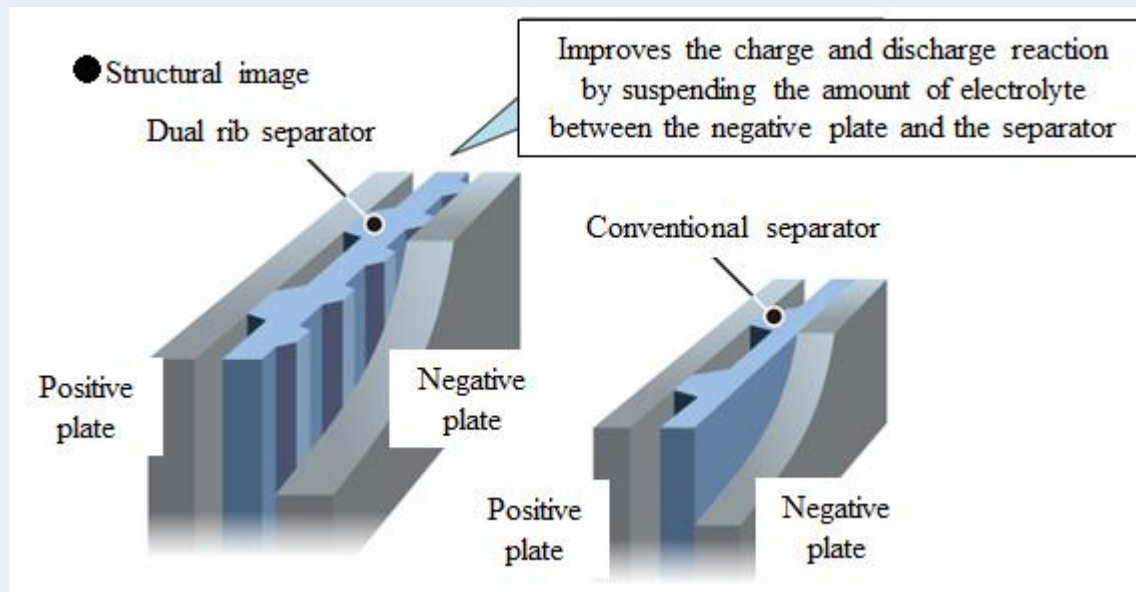
Optimization of carbon volume



Details of EPIY Series Technologies

New separator

By forming a new rib on the negative pole side of the separator as well, the reaction of the pole plate as a whole is improved. This reduces electrolyte to stratification prolong battery life.

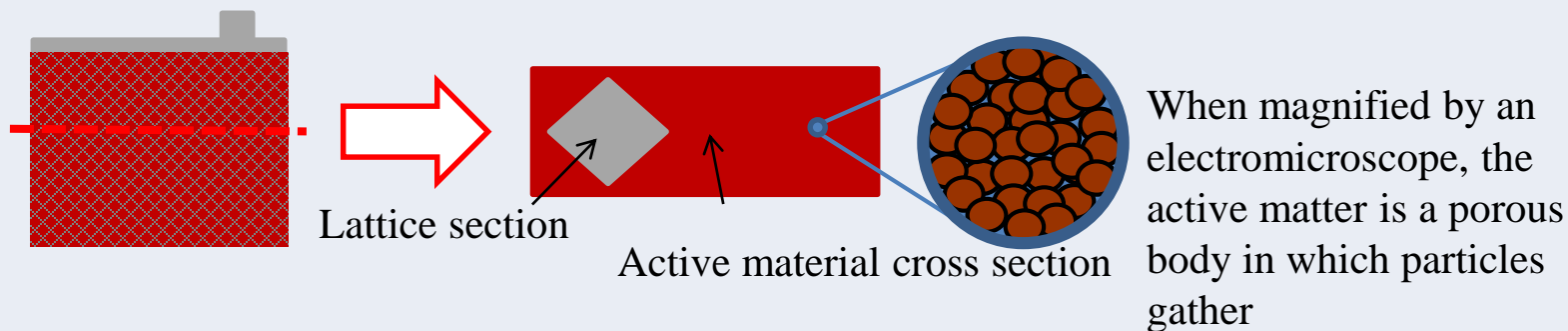


Trademark application pending for "dual rib separator"

Details of EPIY Series Technologies

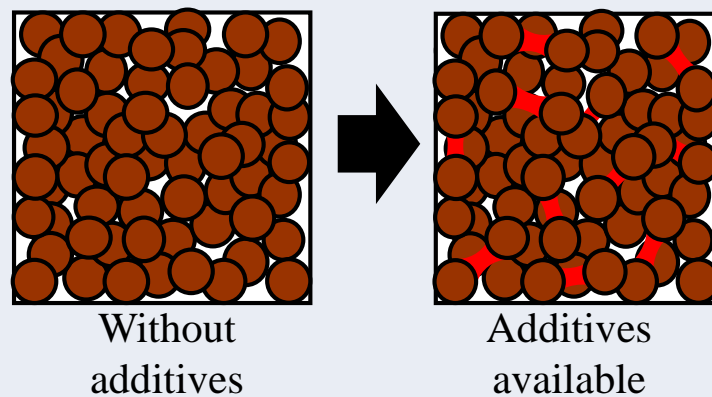
Positive active additive

Adopted additives to strengthen the network of active material particles reduces the softening of the positive electrode plate and improves durability.



Function of additives

Additives improve the durability of the positive plate

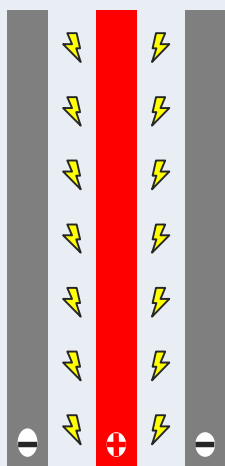


Details of EPIY Series Technologies

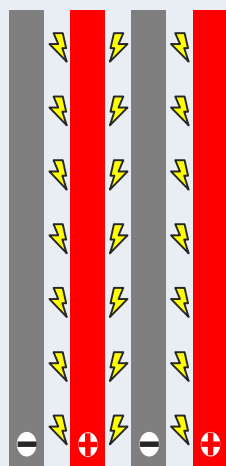
Increase in the number of plates

The number of plates has been increased without changing the thickness of the grid.
Increasing the plate count results in the four effects shown on the right.

Conventional product



Multiple sheets of thin ultra-thin plates



**Improvement of
STOP & START
life**

**Improved quick
charge performance**

**Overwhelmingly long
life when mounted on
regular vehicles**

**High performance
rank**

STOP & START life over 200%

New separator

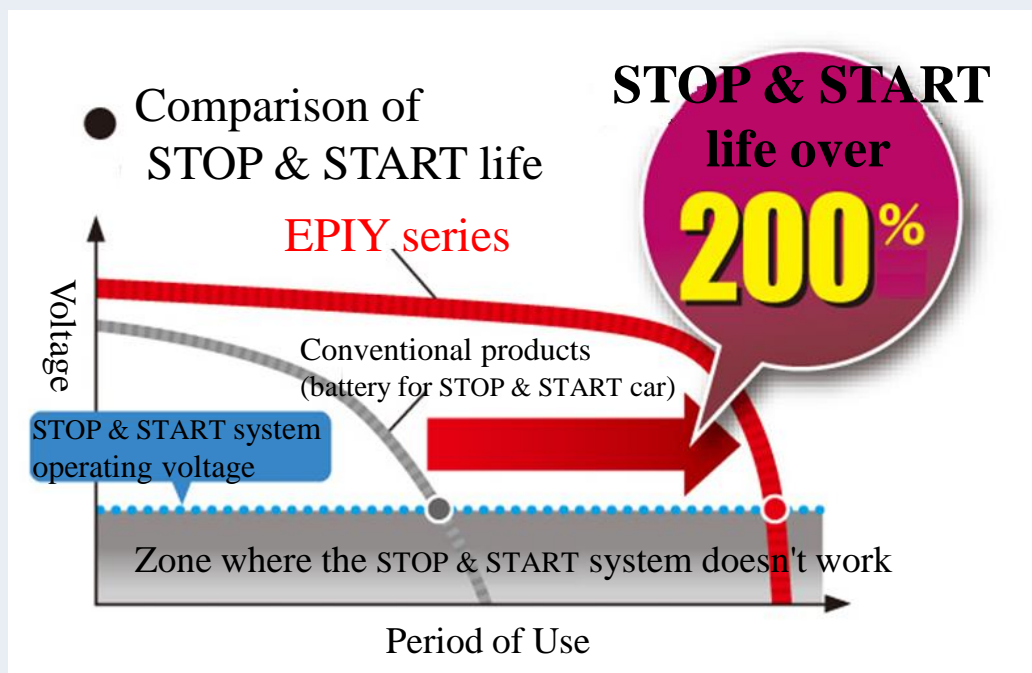
STOP & START life has been improved by suppressing the drop in voltage caused by degradation.

Reduces environmental impact by reducing fuel consumption and CO2 emissions of STOP & START vehicles.

Positive active additive

Increase in the number of plates

ULL structure



Quick Charge Performance over 150%

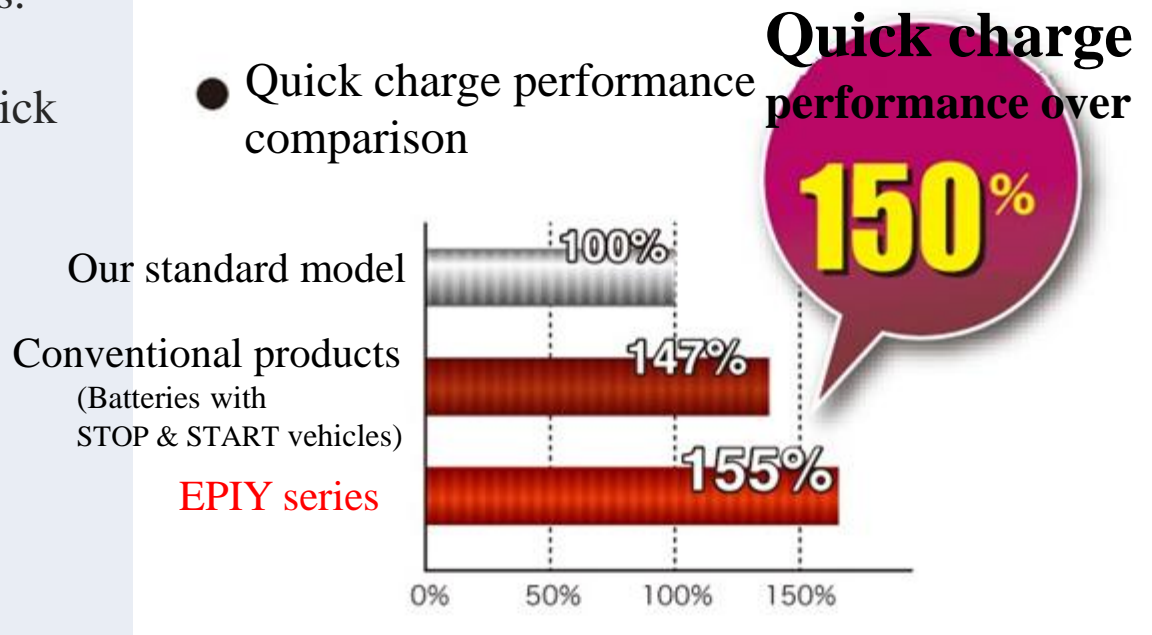
Electrolyte lithium formulation

Batteries in STOP & START vehicles are regularly discharged and need to be charged in shorter periods. Lithium is mixed in the electrolyte to improve quick charge performance. It is also beneficial for vehicles traveling short distances.



Optimization of carbon volume

Increase in the number of plates



Life when installed in regular vehicles over 250%

ULL structure

Increase in the number of plates

When EPIY series is mounted on a normal vehicle (non STOP & START), it achieves an overwhelmingly long life.

As a dual-use model it can also be mounted on standard ignition cars, which are still prevalent in the market

We can make suggestions based on the keyword “long life”.

● Comparison of life when installed in non- START & STOP Vehicles

Life when installed in normal vehicles is over

250%

Our standard

100%

EPIY series

250%

0% 100% 200%

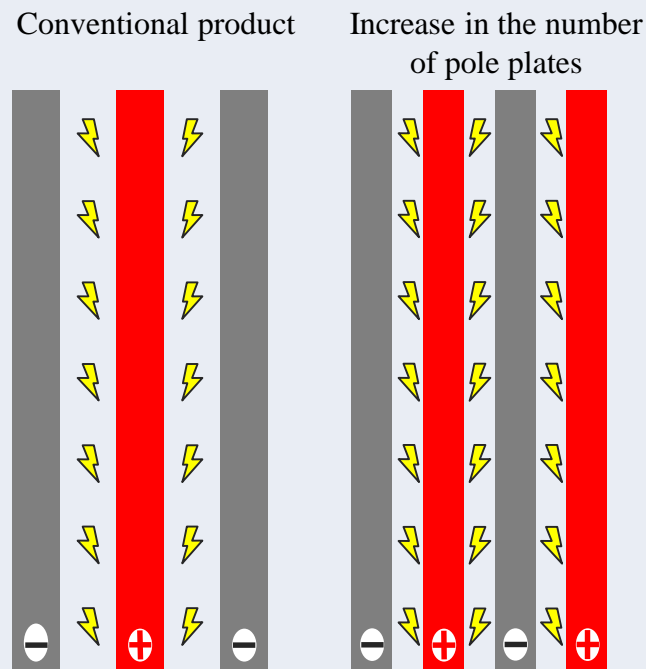
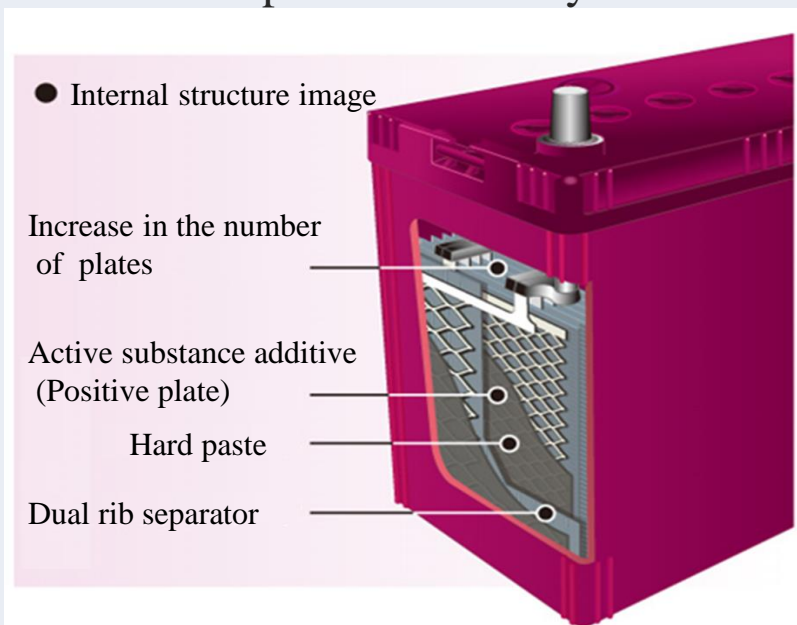
ULTRA LONG LIFE

High performance rank

Increase in the number of plates

Increasing the number of plates increases the reactive surface area and improves performance.

The load on the active material is dispersed by the increase of the reaction surface area. This improves durability.



Features of GS Yuasa EFB-battery (EPIY)

★ **Improve STOP & START life expectancy by over 200%**

Contributing to reduced fuel efficiency and environmental impact by maintaining performance for a long time

★ **Quick charge performance improvement of over 150%**

Reducing battery deterioration due to increased electric discharge
Reliable even in cars with frequent short-haul trips

★ **Life expectancy increased in regular cars by over 250%**

The longest battery life in GS Yuasa's history for passenger cars

★ **Suitable for a wide range of models with high performance requirements**

Can be installed in many Japanese automobile manufacturers's vehicles

★ **Reliable Japanese-made**

High quality Japanese-made EFB batteries delivered by GS Yuasa

Thank you for expanding sales of
YUASA EPIY series.

MADE IN JAPAN

YUASA

AUTOMOTIVE BATTERY

75B24L/N-65

12V 50AH(20HR) /500A(CCA) /73min(RC)

EFB+Li DUAL RIB SEPARATOR / for Start & Stop

ULTRA LONG LIFE

FEATURE

- Maintenance free
- Made in Japan
- Quick charging performance
- Suitable for hot/cold climate
- Perfect fit for Start & Stop
- Indicator installed

Reference: Maintenance of EFB batteries

★ Self-discharging and supplementary charging of the battery

The battery discharges naturally (self-discharges) during storage

If you don't charge it, you won't be able to demonstrate 100% of it's ability.

★ Differences in self-discharge amount between normal JIS batteries and EFB batteries

Generally, EFB batteries for STOP & START vehicles tend to self-discharge faster than ordinary JIS-batteries.

★ Inventory maintenance

STOP & START systems monitor the battery charge status. Therefore, even if a new battery with low-charge is installed, there is a possibility that STOP & START will not work. As a guideline, measure the open-circuit voltage once a month and recharge the battery if it falls below 12.4V.

Reference: The reason for lower CCA rating

★ Reasons EPIY series CCAs are lower than conventional JIS batteries

The battery itself is unchanged. However, since EPIY series is exported to various countries worldwide, we have changed the CCA value so that we can comply with certification in the countries with the strictest standards.

Model name	20HR	CCA	Model name	HR	CCA
55B20L/M-42	38	385	55B20L/M-42	38	385
55B20R/M-42R	38	415	55B20R/M-42R	38	415
75B24L/N-65	50	500	75B24L/N-65	50	500
75B24R/N-65R	50	500	75B24R/N-65R	50	500
95D23L/Q-85	66	650	95D23L/Q-85	66	590
95D23R/Q-85R	66	650	95D23R/Q-85R	66	590
110D26L/S-95	74	720	110D26L/S-95	74	655
110D26R/S-95R	74	720	110D26R/S-95R	74	655
130D31L/T-115	87	795	130D31L/T-115	87	740
130D31R/T-115	87	795	130D31R/T-115	87	740

EFB batteries do not need to be CCA-high only, but also have a trade-off between power and endurance, because they balance early performance (such as 20HR and CCA-value) with critical performance requirements for EFB batteries (such as quick charge performance and STOP & START life performance). GS Yuasa EFB batteries are designed with an emphasis on quick charge performance and STOP-START life performance to meet the requirements of automakers.

Reference: Performance rank display

JIS standard (for normal vehicles)

SBA standard (for STOP & START cars)

5 5 B 2 0 R / M-4 2 R

Performance rank

Size

Terminal polarity

Size

Performance rank

Terminal polarity ※

※ R type only listed

★ What are JIS and SBA standards?

JIS standards: standards established by Japanese Industrial Standards (normal car battery)

SBA standards: standards established by the Battery Manufacturers Association (EFB batteries for STOP & START vehicles)

★ Performance Ranks for EPIY Series

Differences in Performance Ranks between Normal and STOP & START Vehicles

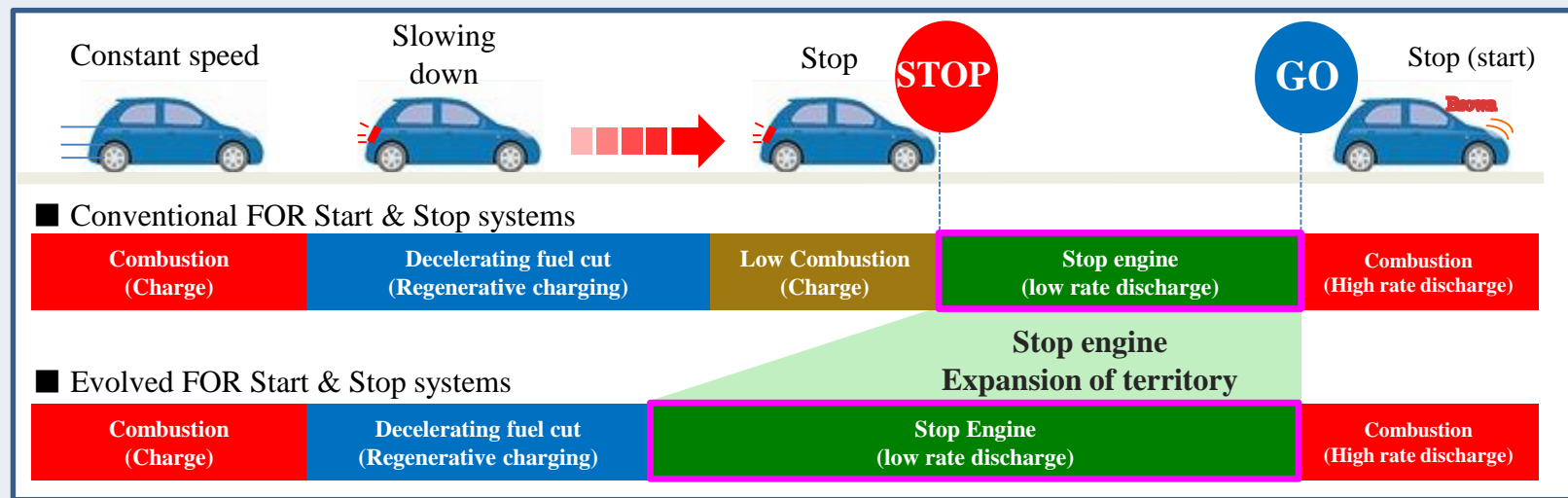
Normal cars •• "Performance rank calculation method after JIS 2006 (New JIS)"

For STOP & START Vehicles ••• "*New car part numbers"

※ The model numbers for new models are shown so that compatibility with new models is easy to understand.

Size	
JIS	SBA
B19	K
B20	M
B24	N
D23	Q
D26	S
D31	T

Reference: Engine stop function ON during deceleration



Without a battery that can recover the energy consumed in a shorter time than ever before it becomes difficult for STOP & START to function.

Nissan stops at about 8km/h.

[\(Link\)](#)

Honda stops at about 10km/h.

[\(Link\)](#)

Suzuki stops when it reaches about 13km/h.

[\(Link\)](#)

It stops when it reaches about 9km/h at Daihatsu.

[\(Link\)](#)

Improve fuel efficiency however, the battery operates at a lower state of charge ~.



END