



**4DS390**  
(8V-390Ah)



## CONSTRUCTION & MAINTENANCE OF DIESEL LOCO ENGINE STARTER

LOW MAINTENANCE BATTERIES

[www.exideindustries.com](http://www.exideindustries.com)



**Construction of  
Exide make  
Low Maintenance  
Diesel Starter  
8V 390 Ah Battery  
Complete with Safety,  
Initial Filling, Charging and  
Operation Maintenance**

## 1.0 CONSTRUCTION

Rugged tubular positive Plates

The Positive Active Material is encased in a one piece, Multi-Tube woven Gauntlet of high tensile acid resistant polyester, with resin impregnated, combines high tensile strength with resilience and enables the electrolyte to penetrate freely whilst acting as an effective retainer for the Active material. It is also capable of withstanding the extreme stresses of expansion and contraction of the active material during regular charge/ discharge encountered in service life.

### 1.1 POSITIVE SPINE & BOTTOM BAR

The Top Frame and Spines of the Positive Plate are High Pressure Casting from a corrosion-resistant low Antimony-Lead Alloy. A Bottom Bar of acid-resistant Plastic, seals the tubes at the bottom and locates the spines of the grid.

### 1.2 FLAT PASTED NEGATIVE PLATES

The Flat Pasted Negative Plates are designed to match the power and long life and efficient service. The Negative active material contains proprietary additives and special expanders for long life & peak power. It is retained firmly in place by sturdy grids designed to lock it in.

### 1.3 NEGATIVE GRID

The casting of lead lattice with special Lead Alloy, to form a skeleton, to hold the Active materials of Pasted Plates and carry the current.

### 1.4 SEPARATORS

The life of any battery depends very much on the quality of separators used between the positive and negative plates. The separators used in Diesel Starter Battery are micro porous Polyethylene envelope type, strong, flexible and resistant to heat and acid, which are sufficient for usage with robust, Tubular Positive Plates. The electric resistance of the separators is extremely low and electrolyte diffusion is excellent.



## 1.5 CELL CONTAINERS

The container is moulded type of highest quality hand rubber to withstand the toughest service condition, with high insulating strength & resistant to acids. Adequate sediment space has been provided at the base to prevent bridging of short-circuits. The containers hold a large enough electrolyte reserve, so that maintenance interval for the batteries is long.

## 1.6 CELL LIDS

The Cell Lid is moulded of high quality PP and are flanged to form a deep through to provide an effective Heat Seal between lid and container.

## 1.7 PILLAR SEALING HIGH QUALITY RUBBER GROMMETS

Pillar sealing- with high quality rubber grommets effectively sealing all the pillar with lids.

## 1.8 TERMINALS

Terminals are lug (suitable for bolted connections) provided on the end cells.

## 2.0 TECHNICAL & DIMENSIONAL DETAILS OF 8V DS390 DIESEL STARTER BATTERY

Type	Voltage	Starting Current (A) *	Capacity @ 30°C(Ah)				Dry Wt. (kg) ± 5%	Wet Wt. (kg) ± 5%	External dimensions of Container (mm) ± 1mm			Overall Height of Block (mm) ± 1mm
			10 hr	8 hr	5 hr	3 hr			Length (mm)	Width (mm)	Height (mm)	
<b>Diesel Starting Battery</b>												
4 DS390	8	760	420	390	360	300	99	128	700	170	400	449

\* -18°C, 3 minutes to an end voltage of 1.0V/cell

## 2.1

### Cranking Specifications at 30°C

	Current (A)	Specification
Initial Cranking Performance	2300	Minimum 8 nos 15 sec cranks till 3.2 V
Sustained Cranking Performance	1400	Minimum 5 mins upto 4.0V

## 2.2

### TECHNICAL DETAILS

Positive	Tubular
Negative	Flat Pasted
Separator	Positive Enveloped
Terminals	Twin Brass Insert Bolt on Poles
Cell Container/Lids	PPCP
Battery Container	Powder Coated HRCA
Inter Cell Connector	Bolt On Insulated Connectors
Cell Dimensions	157mm x 158mm x 441mm (LxWxH)
Acid Specific Gravity	1.260 @ 30°C





Bolt on Inter cell connectors	<ul style="list-style-type: none"> <li>☑ Easier maintenance</li> <li>☑ Improved safety: no more lead burning required</li> </ul>
Insulated connectors	<ul style="list-style-type: none"> <li>☑ Improved safety</li> </ul>
Twin brass insert posts	<ul style="list-style-type: none"> <li>☑ Low resistance, high power output</li> </ul>
Easy removal of cells	<ul style="list-style-type: none"> <li>☑ Simply unbolt &amp; replace faulty cells</li> </ul>
Thick tubular positive plates	<ul style="list-style-type: none"> <li>☑ Long life, operational in harsh environments</li> </ul>

## INITIAL FILLING AND FIRST CHARGE FOR DRY CELLS

## ELECTROLYTE

The Diesel Starter batteries supplied in a dry uncharged condition, require diluted battery grade Sulphuric Acid of Sp. Gr. 1.240 ± 0.05, corrected to a 27°C i.e. the electrolyte for initial filling. This can be prepared by mixing concentrated battery grade Sulphuric Acid (as per IS:266, Latest Revision) of Sp. Gr. 1.840 with Water of approved quality conforming to IS:1089- 1993, Latest Revision. Alternately, diluted Sulphuric Acid of Specific Gravity 1.240±0.005@27°C, conforming to IS: 266-1993, Latest Revision, is readily available, could be procured and used. It is important that the acid and water should be free from harmful impurities like iron, arsenic, ammonia, nitrates and chlorides but below the specified limits as per IS: 266-1993/ Latest Revision, respectively.

## TABLE II

Mixing proportion to prepare dilute Sulphuric (Electrolyte) of Specific Gravity 1.240 ± 0.005 at 27°C for adjustment of Service Specific Gravity, 1.840, will be as per following:

Concentrated Acid Sp. Gravity	Diluted Final Sp. Gravity	Approx Proportion (By Vol.) of Sulphuric Acid & Water
1.840	1.400	One part of acid to 1.5 parts of water respectively
1.840	1.240	0.86 part acid to 2.14 part water respectively

## RELEVANT DATA FOR INITIAL FILLING &amp; CHARGING OF DIESEL STARTER BATTERY

## TABLE III

Cell Type	Electrolyte for initial filling Litres/ Cell Approx. Quantity	Initial Filling Sp. Gravity @27°C	First Charge		Electrolyte Final Sp. Gr. 27°C
			Constant Current DC Amps	Minimum Duration in Hours (Approx.)	
4DS390	5.8	1.240	To Charge at 33 Amps DC continuously till the end of the charge. Total Ah input should be minimum 2200 Ah to 2400 Ah	67 to 73	1.260 ± 0.005 (Sp. Gravity to be adjusted to the above mentioned Sp. Gr. At the end of full charge of cells.

N.B. Rest period of 12 hours, but not more than 24 hours to be given after acid filling. To fill in acid again, to make up to maximum level. During charging, the temperature of electrolyte should not exceed 50°C.



## 4.0 FIRST CHARGE

- 4.1 The initial first charge consists in passing a current into the battery for a number of hours as recommended by the battery makers. It is very important that the instructions regarding initial charging be closely followed, as this charge service needs to completely start its life in the best possible condition so that it is capable of giving rated capacity & performance from the moment it goes into service.
- 4.2 Select a D.C. source of 50% higher voltage and current capacities as compared to the battery voltage and maximum current requirement. Connect the positive source to the positive of the cell/ battery also as marked on the terminals.
- 4.3 The recommended first charge current is 33 Amps D.C. given in table-iii. The total charge input should be minimum 2200 Ah to 2400 Ah.
- 4.4 The initial first charge to be continued at 33 Amps DC constant current, upto 2.75 vpc, till the ends of fully charged conditions are fulfilled, i.e. the sulphates are released from the plates and the negative plates are converted into spongy pure lead (metal). Charging of the cells at the specified rate (33 Amps DC) for minimum 67 hours as indicated in table-III

## 5.0 CLEANLINESS

It is essential that the battery and the battery box be always maintained dry and clean. Water or electrolyte spilled over the top of the cells should be wiped off at once. Should any corrosion occur anywhere in the metal work, neutralize the acid over the area with a 5% weight by volume solution of soda or freshly diluted 1:5 ammonia in water. Wash with clean water. After that wipe dry the parts and protect from further corrosion by applying a thin layer of Vaseline or petroleum jelly. Painting with a good acid resistant paint may also protect the battery box.

## 6.0 MISCELLANEOUS INSTRUCTIONS

### 6.1 GENERAL INSTRUCTIONS (DO'S AND DON'TS)

#### 6.1.1 DO'S

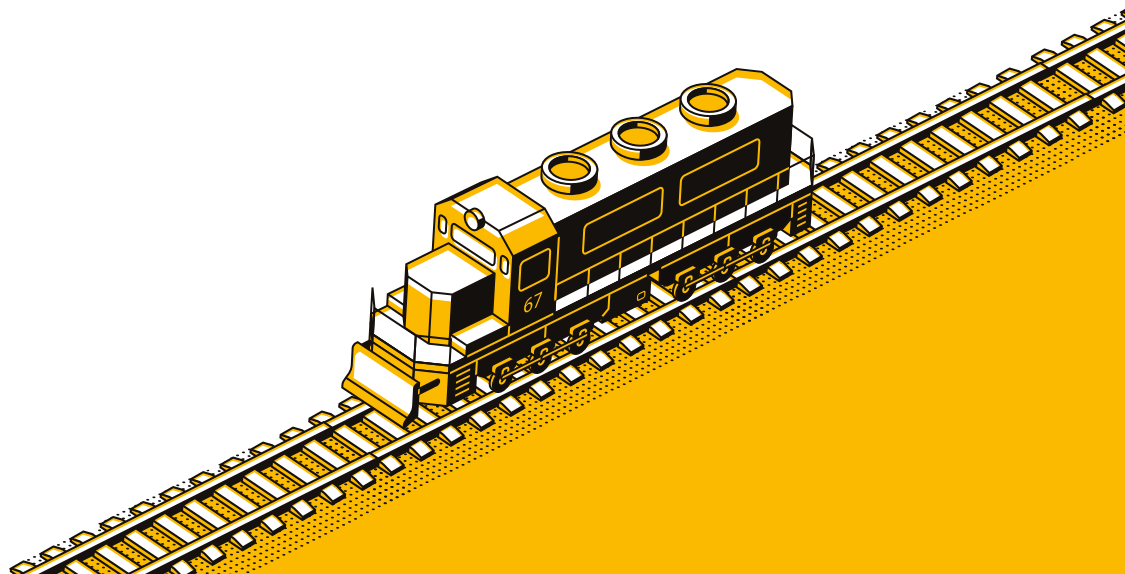
- A. Top up as often as necessary with battery grade water confirming to IS-1069:1993/ Latest Revision.
- B. Keep the vent plugs clean and tightly in position.
- C. To keep the electrolyte at the correct level.
- D. To keep the cell and the battery top and surroundings clean and dry.
- E. Attend to weak cells immediately.
- F. Keep all electrical connections tight. Check for any heating up.
- G. Take precautions particularly during charging.
- H. Take particular care not to bridge/ short the terminals with spanner while tightening terminal nuts and bolts.
- I. Give equalizing charge as recommended.
- J. Ensure battery box in the diesel loco engine, are well ventilated.

#### 6.1.2 DON'TS

- A. Do not work on battery or in diesel-loco engine unless main battery leads are disconnected from line.
- B. Never allow a naked flame, sparks or lighted pipe or cigarette near the battery.
- C. Leave no metallic tools/items on the top of the cells.
- D. Do not exceed "finishing" rate when cells are gassing.
- E. Cells must not be discharged below 1.8 volts per cell & should not be kept in discharged condition for long period.
- F. Avoid overcharging and also overfilling, to avoid spillage and accelerate corrosion.
- G. Electrolyte temperature should not exceed 50°C.
- H. If any charged cell or battery, to be kept for emergency, these should be on 'Trickle Charge' mode or periodic freshening charge to be given on regular interval, at least every 28 days, if not 20 days.

## 7.0 CONCLUSION

The life and performance of lead acid batteries mainly depends on the correct initial filling and charging (IFC) duly monitored. If monitoring during IFC is done, at that point we should find the lagging or defective cells and do the needful. If a battery bank has defective cells from the beginning, this will affect the healthy cells also, as the charging/discharging current will be more. The most vital point is the care and maintenance, which will definitely increase the life and performance of the diesel local battery.





QUICK  
NOTES

A series of horizontal dashed lines for writing notes.

- Norway
- UK
- Canada
- Croatia
- Poland
- Greece
- Malta
- Israel
- Jordan
- Egypt
- Bahrain
- Qatar
- Peru
- Argentina
- Mali
- Nigeria
- Botswana
- South Africa
- Zambia
- Tanzania
- Mozambique
- Kenya
- Mauritius
- UAE
- Spain
- Lebanon
- Yemen
- Sri Lanka
- Malaysia
- New Zealand
- Australia
- Singapore
- Indonesia
- Brunei
- Philippines
- Thailand
- Cambodia
- Vietnam
- Hong Kong
- Taiwan
- Bangladesh
- China
- Japan
- Korea
- Afghanistan
- Oman
- Kuwait
- Armenia
- Finland
- Germany
- Scotland
- Uganda
- Zimbabwe



**EXIDE\***



**DYNEX**

**INDEX**

**CHLORIDE\***



\* Wherever we own the brand



**Exide Industries Limited, India**

**Head Office Kolkata: 'Exide House', 59E Chowringhee Road, Kolkata- 700 020**  
**Phone: +91 33 2283 2120 / 2133, Fax: +91 33 2283 2637/ 2283 2632**

**Corporate Marketing Office : Kolkata: 6A, Hatibagan Road, Entally, Kolkata- 700 014**  
**Phone: +91 33 2286 6158 / 59, Fax: +91 33 2286 6186**  
**Visit Us at: [www.exideindustries.com](http://www.exideindustries.com)**

**E-Mail: [sourabhad@exide.co.in](mailto:sourabhad@exide.co.in)**