



**PRODUCT  
SPECIFICATION**

DOC

NO.:

REV.:

SHEET :\_\_1 of 13

ECN NO .:

# 153Ah, and the product specification document

**Model number: ELE897**

**Material number P / N: FC-NF3-ELE897-4 AEL**

Product design preparation	Product design approval	Sales approval	Project approval	Quality assurance approval
Bao-yu wang	To youlei			

Customer confirmation	sign one's name	date
	customer code:	
	corporate seal:	

**Confidential: () Level 3 privacy () Level 2 high density (V) Level 1 low density**

--- CATL Confidential ---



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update log

edition	description	date	Recognize the state
V1.0	Normal pole	2017.11.30	SOP
V2.0	Side window envelope	2018.02.08	SOP
V3.0	New powder suppliers	2018.05.26	SOP
V4.0	Update the cycle test conditions	2018.06.06	SOP



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Customer requirements

Model number: ELE897

Version: V3.0

Ask customers to write information about their needs and communicate with CATL in advance. If the customer has special applications or operating conditions that are different from those described in this document, CATL may design and manufacture the product in accordance with special customer requirements.


	special requirements	standard
1		
2		
3		
4		
5		

customer code: \_\_\_\_\_ sign: \_\_\_\_\_ date: \_\_\_\_\_

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**Terms defined**

term	definition
product	The "product" in this specification refers to the 150Ah 3.65V rechargeable ternary lithium-ion system power battery produced by CATL.
client	Means the buyer in the CATL EV Product Sales Contract.
CATL	Means the seller in the CATL EV Product Sales Contract.
PN	In order to distinguish the battery application in different use areas or under different application conditions, the CATL is the material number defined for the 150Ah 3.65V rechargeable lithium battery.
Peripheral ambient temperature	The ambient temperature of the battery. The temperature tolerance is $\pm 2^{\circ}\text{C}$ .
Battery management system (BMS)	An effective tracking and control system used by customers to monitor and record the operating parameters of the product throughout the term of service. The tracking and recording parameters include but are not limited to voltage, current, temperature, etc., to control the operation of the product and ensure that the operating environment and operating conditions of the product comply with the provisions of this specification.
Battery temperature	The temperature of the cell measured by the temperature sensor, the temperature sensor and the measurement line are agreed by the CATL and the customer.
Fresh battery status	Refers to the status within 7 days from the date of battery manufacture
C-Rate charge rate	The ratio of the charge current to the capacity value of the battery measured by the battery management system. For example, when the battery capacity is 150Ah and the charging current is 150A, the charging rate is 1C; when the battery capacity is 120Ah and the charging current is 120A, the charging rate is 1C.
Cycle recurrence	The battery is charged in one cycle according to the specified charge and discharge standard. The cycle includes short-term normal charging or regenerative charging and discharge processes, during which only normal charging occurs without regenerative charging; the discharge can be formed by some partial discharge combinations.
date of manufacture	Manufacturing date of the battery. The date code marked on the top sticker of each battery is the date of manufacture.
Open-circuit voltage (OCV)	No battery voltage measured without any load and circuit.



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Resigable  
capacity

After the battery is stored, select the capacity measured by the standard charge and discharge conditions listed in Article 2.2 and 2.4 of this specification  
Mean values of the secondary measurements.

Product supply  
agreement


Transaction terms of this specification product signed by CATL and Customer.

Standard  
charging

The charging mode as described in Clause 2.2 of this specification.


Standard  
discharge

The discharge mode as described in clause 2.4 of this specification.

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Charging Status (SOC)	The ratio of the actual charging amount of the battery to the full charge amount represents the charging state of the battery. The charging status of 100% SOC indicates that the battery is fully charged to 4.3V, and the charging status of 0% SOC indicates that the battery is fully discharged to 2.8V (refer to the standard charge and discharge process).
temperature rise	The conditions specified in this specification, such as the increase of the cell temperature during charging or discharge.
measurement unit	"V" (Volt) volt (V), voltage unit "A" (Ampere) Ampere (A), current unit "Ah" (Ampere-Hour) Ampere-hours (Ah), load unit "Wh" (Water-Hour) watt-hours (Wh), energy units "Ω" (Ohm) Ohm (Ω), resistance unit "m Ω" (MilliOhm) milliohm (m Ω), resistance unit "°C" (degree Celsius) Degree Celsius (°C), in temperature unit "mm" (millimetre) mm (mm) in length "s" (second) seconds (s), time unit "Hz" (Hertz) Hz (Hz), frequency unit



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1. Scope of application		
clauses and subclauses	content	remarks
product model	ELE897	
Product status	SOP	
Product batch	Products offered in May 2018 and later	

## 2. Product electrical performance index

### 2.1 Summary

No.	parameter	size of product	condition
2.1.1	Cell capacity	$\geq 153\text{Ah}$ $\geq 150\text{Ah}$	50A (1 / 3C) current discharge 150Ah (1C) current discharge
2.1.2	discharge energy	$\geq 566\text{Wh}$ $\geq 547\text{Wh}$	50A (1 / 3C) current discharge 150Ah (1C) current discharge
2.1.3	Operating voltage range	2.8–4.3V 2.5–4.3V 2.1–4.3V	temperature $T > -5^{\circ}\text{C}$ $-20^{\circ}\text{C} < \text{temperature } T \leq -5^{\circ}\text{C}$ temperature $T \leq -20^{\circ}\text{C}$
2.1.4	Battery internal resistance (1 KHz)	$\leq 0.37\text{m}\Omega$	New battery at 70% SOC status
2.1.5	Lower warehouse OCV	3.863~3.893V	Lower o voltage range of cell
2.1.6	Operating temperature (charging)	$-20 - 55^{\circ}\text{C}$	Refer to Section 2.2
2.1.7	Operating temperature (discharge)	$-30 - 55^{\circ}\text{C}$	Refer to Section 2.3
2.1.8	cycle life	$\geq 1500$ recurrence	$25 \pm 2^{\circ}\text{C}$ , 1C / 1C, and capacity decay to 80%
2.1.9	Scope of SOC use is recommended	5% - 95%	
2.1.10	Battery weight	And 2,670 grams	N.A.
2.1.11	Cell size	Please refer to Article 9 of this specification	N.A

### 2.2 Charging mode / parameters

#### 2.2.1 Standard charging conditions (mode)

No.	parameter	size of product	condition
2.2.1.1	Standard charging current	50A	$25 \pm 2^{\circ}\text{C}$

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2.2.1.2	Standard charging voltage	The maximum size of the single cell is 4.3V	
2.2.1.3	Standard charging mode	50A constant current is continuously charged to the maximum of 4.3 volts, and then at a constant voltage of 4.3 volts to the lower current limit of $7.5\pm0.3$ A	


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2.2.1.4	Standard charging temperature	25±2℃						Battery temperature			
2.2.2 Other charging conditions											
Slow charging strategy:											
	temperature	<-20℃	-20℃	-10℃	0℃	5℃	15℃	25℃	50℃	55℃	>55℃
	Maximum charging current (C)	not allow charge	0.05	0.05	0.1	0.2	0.33	0.33	0.33	0.33	not allow charge
	Charge cut-off voltage of xx mV		4100								
	After the first current drop time charging current (C)		0.05	0.05	0.10	0.15	0.20	0.33	0.33	0.20	
	Charge cut-off voltage of xx mV		4260								
Fast charging strategy:											
	temperature	<-20℃	-20℃	-10℃	0℃	5℃	15℃	25℃	50℃	55℃	>55℃
	Maximum charging current (C)	Chargin g is not allowed	0.10	0.20	0.33	0.53	0.73	1.20	0.50	0.33	Chargin g is not allowed
	Charge cut-off voltage of xx mV		3758								
	After the first current drop time charging current (C)		0.05	0.12	0.2	0.25	0.4	0.85	0.50	0.33	
	Charge cut-off voltage of xx mV		3810								
	After the second current drop current		0.05	0.05	0.10	0.20	0.33	0.85	0.50	0.2	

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charging current (C)									
Charge cut-off voltage of xx mV	4100								
After the third current drop charging current (C)	0.05	0.05	0.10	0.15	0.20	0.33	0.33	0.20	
Charge cut-off voltage of xx mV	4260								

2.3 Discharge mode / parameters			
No .	parameter	size of product	condition
2.3.1	Standard discharge	50A	25±2℃
2.3.2	Maximum continuous discharge current	300A	Temperature rise is below 10℃

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2.3.3	Standard discharge temperature	25 ±2℃	Battery temperature
2.3.4	Discharge temperature range	-30 - 55℃	If the cell temperature exceeds the discharge temperature range, the discharge is stopped

#### 2.4 Pulse discharge mode

Pulse discharge refers to the pulse discharge of the cell during the use of the product. The pulse discharge must strictly comply with the charging state and cell temperature condition described in this specification. The size and duration of the pulse current must strictly comply with all the charging states and the cell temperature listed in the table below. Violation of pulse discharge conditions may cause permanent damage to the cell and thus eliminate CATL from product quality liability.

##### 2.4.1 Minimum pulse-discharge cut-off voltage

≤-20℃	≤-5℃	>-5℃
2.1V	2.5V	2.8V



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## 2.4.2 Almitted pulse discharge power and duration

SOC	working temperature											
	<-30℃	-30℃	-20℃	-15℃	-5℃	0℃	10℃	25℃	45℃	50℃	55℃	>55℃
≥20%	not allow	92W	181W	226W	345W	419W	930W	1696W	1696W	848W	160W	not allow
discharge time	not allow	30s	30s	30s	30s	30s	30s	30s	30s	30s	30s	not allow

2.4.3 After each pulse discharge, the battery shall have a dormant period that should be equal to or longer than the duration of the regeneration pulse. During the dormant period, the battery can be in the standard discharge state or charging state, or can be in the zero current inworking state, but during the dormant period, the battery is not allowed to pulse discharge phenomenon.

## 2.5 Regeneration pulse charging mode


Regeneration pulse charging refers to the reverse charging of the cell by the pulse current during the use of the product. Regeneration pulse charging must strictly meet the charging state and cell temperature conditions described in this specification. The size and duration of the pulse current must strictly comply with all the charging states and the cell temperature listed in the table below. Violation of regenerative pulse charging conditions may cause permanent damage to the cell and thus exempt CATL from product quality liability.

### 2.5.1 Maximum regenerative pulse charging voltage is 4.3V

### 2.5.2 Allowed regeneration pulse charging power and duration

SOC	working temperature								
	<-30℃	-20℃	-15℃	-5℃	0℃	10℃	25℃	50℃	>55℃
≤80%	not allow	66w	91w	172w	228w	312w	526w	666w	not allow
charging interval	not allow	15s	15s	15s	15s	15s	15s	15s	not allow

2.5.3 After each regeneration pulse recharge, the battery shall have a dormant period, which should be equal to or longer than the duration of the regeneration pulse. During the dormancy period, the battery can be

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To be in the discharge state, can also be in the zero current inworking state, but in the dormant period, the battery is not allowed to occur regenerative pulse charging phenomenon.

#### 2.6 High and low temperature discharge capacity

No.	parameter	size of product	Conditions (cell surface temperature)
2.6.1	25℃ discharge capacity	≥153Ah	25℃ Standard charge \ 25℃ 50A, discharge to 2.8V
2.6.2	55℃ discharge capacity	≥153Ah	25℃ Standard charge \ 55℃ 50A, discharge to 2.8V
2.6.3	-20℃ discharge capacity	≥122Ah	25℃ Standard Charge \ -20℃ 50A, discharge to 2.8V


#### 2.7 Battery self-discharge performance

No.	parameter	size of product	condition
2.7.1	self-discharge rate	And 4% for every 30 days	Ship cells within three months, standard charging to 70% charging state, 25℃ temperature storage

### 3. Temperature rise of the battery cell

Temperature rise in this specification refers to the battery surface temperature after discharge minus the battery surface temperature before discharge. Battery temperature rise should be measured in a room with relatively stable ambient temperature and sufficient space. Each cell temperature measurement shall select a corrected temperature sensor for recording time data.

No.	parameter	size of product	condition
3.1	Continuous discharge temperature rise	≤15℃	Each cell was discharged at 150A for 10min
3.2	Pulse discharge temperature rise	≤10℃	In any charging state, each battery was discharged at 450A and current for 30 seconds

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#### 4. Safety and reliability

This product meets the test requirements of GBT 31485-2015.

Safety testing must be conducted with the consent of CATL and under the guidance of a professional, otherwise testing is strictly prohibited.

#### 5. End of product life management

5.1 To ensure the safe application of batteries, customers need to establish an effective tracking system to monitor and record the internal resistance of each battery. The measurement method and calculation method of internal resistance require mutual discussion and agreement between the customer and CATL. When the internal resistance of the used battery exceeds 100% of the initial internal resistance of the battery. Any violation of this requirement will exempt CATL from product quality assurance liability under the Product Sales Agreement and this Specification.

5.2 Cell life judgment conditions reference 2.1.9 cycle life.

#### 6. Application conditions

The Customer shall ensure that the following battery-related application conditions are strictly followed:

6.1 The customer shall configure the battery management system to closely monitor, manage and protect each battery.

6.2 The Customer shall provide CATL with the detailed design scheme, system characteristics, framework, system data, format and other relevant information of the battery management system for CATL.





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The system was evaluated and a battery management file was established.

6.3 The customer is obliged to notify the CATL of the module of the CATL.

6.4 The customer shall keep the complete working condition monitoring data of the battery operation during the warranty period, and use it as a reference for the division of product quality responsibilities. If there is no test data for analysis, CATL shall not assume the product quality assurance responsibility.

6.5 The Battery management system shall meet the following most basic detection and control requirements:

No.	parameter	size of product	Protect the action
6.5.1	Charging termination	4.3V	Charge charging when the battery voltage reaches 4.3V
6.5.2	First-stage of overcharge protection	Greater than or equal to 4.3V	Stop charging when the battery voltage reaches 4.3V
6.5.3	Secondary overcharge protection	Greater than or equal to 4.35V	When the battery voltage reaches 4.35V and lock the battery management system until the technician solves the problem
6.5.4	discharge off	2.8V	Stop the discharge When the battery voltage reaches 2.8V, minimize the current
6.5.5	First level of overrelease protection	Minimum of 2.5V	Stop the discharge When the battery voltage reaches 2.5V, minimize the current
6.5.6	Second level of overrelease protection	Minimum of 2.1V	When the battery voltage is below 2.1V, lock the battery management system until the technician solves the problem
6.5.7	short-circuit protection	Short circuit is not allowed	Disconnect the battery from the current runner during a short circuit (circuit)
6.5.8	overcurrent protection	Refer to clause 2.3 for discharge requirements	The battery management system controls the discharge current according to the specification
6.5.9	overheat protection	Refer to clauses 2.2 to 2.3	Stop the charge / discharge when the temperature exceeds that specified in this specification
6.5.10	Charging time is too long for protection	Charging time is within 8 hours	If the charging time is longer than 8 hours, the charging will be terminated

6.6 Avoid the battery from reaching the overdischarge state. When the battery voltage is below 2.1 volts, the battery interior may be permanently damaged, and then the CATL, the product



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quality assurance liability, fails. According to Article 2.3.5 of this specification, when the actual discharge cut-off voltage is below the standard discharge cut-off voltage, the system internal energy consumption is reduced to a minimum and the dormancy time is extended before recharging. The customer needs to train the user to recharge in the shortest possible time to prevent the battery from entering the overdischarge state.

6.7 The battery shall avoid charging under the low temperature conditions prohibited in this specification (including standard charging, fast charging, emergency charging and regeneration charging), otherwise unexpected capacity reduction may occur. The battery management system shall be controlled according to the minimum charge and regeneration charge temperature. Charging is prohibited below the temperature specified in this specification, otherwise, CATL is not liable for quality assurance.

6.8 The heat dissipation of the cell should be fully considered in the design of the electric box. CATL shall not bear the quality assurance responsibility for the cell or battery overheating damage caused by the heat dissipation design of the electric box.

6.9 The waterproof and dustproof problems of the electric cell should be fully considered in the design of the electric box, and the electric box must meet the waterproof and dustproof grades stipulated by the relevant national standards. CATL shall not be liable for quality assurance for the damage to the cell or battery (such as corrosion, rust, etc.) caused by waterproof and dust-proof problems.

## **7. Security precautions**

7.1 Never immerse the battery in water.

7.2 Prohibit to expose batteries into fire or beyond a high temperature conditions specified in clauses 2.1.7 and 2.1.8 of this specification,



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Otherwise it could cause a fire. In any normal use situation, the temperature of the cell should not exceed 60 degrees Celsius. If the cell temperature in the battery exceeds 60 degrees Celsius, the battery management system needs to close the battery and stop the battery operation.

7.3 No short circuit in the positive and negative poles of the battery, otherwise the strong current and high temperature may cause personal injury or fire. Because the positive and negative electrodes of the battery are exposed to the plastic protective cover, there should be sufficient safety protection to avoid short circuit during the assembly and connection of the battery system.

7.4 Connect the positive and negative electrodes of the battery in strict accordance with the labels and instructions, and reverse charging is prohibited.

7.5 No battery overcharge, otherwise, battery overheating and fire accidents. In the battery installation and use, the hardware and software need to be implemented multiple overcharge failure safety protection. The minimum protection requirements are provided in Article 6.1.4 and Article 7 of this specification.11

7.6 In accordance with this Specification No6.1.4.10After charging, the normal charging should be finished. When the continuous charging time exceeds the reasonable time limit, the battery overheating phenomenon may cause thermal runaway and fire. A previous timer shall be installed for protection. Once the charging current reaches the overcharge state and cannot be terminated, the timer will work to terminate the charging, see Article 7.11 of this specification.

7.7 The customer shall safely secure the battery to the solid plane and safely bind the power cor in place to avoid friction causing arc and spark.

7.8 It is strictly prohibited to connect plastic batteries or plastic. Incorrect electrical connection mode may cause overheating during battery use.

7.9 When the electrolyte leaks, avoid skin and eye contact with the electrolyte. In case of contact, clean the area and seek help from your doctor for water. No person or animal is allowed to swallow any part or substances contained in the battery.

7.10 Try to protect the battery from mechanical vibration, collision and pressure impact, otherwise the battery may shortcircuit, produce high temperature and fire.

7.11 Inappropriate termination of charging may occur during battery charging. For example charging beyond the allowed charging time, charging is terminated if the charging voltage is too high, or charging is terminated if the charging current is too strong. The above phenomenon is defined as "inappropriate termination of charging". When this occurs, it may mean leakage of the battery system or failure of some components. Continuing to charge the battery before the root cause is found and thoroughly resolved may cause the battery overheating or fire. When the above phenomenon occurs, the battery management system should use the automatic lock function to prohibit the subsequent charging, and remind the user to return the vehicle loaded with the battery to the dealer for system maintenance. The battery can only be recharged after comprehensive inspection by certified technicians to determine the root cause and be thoroughly solved and improved.



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### 8 Risk warning

#### 8.1 Warning statement

##### warn

The battery is potentially dangerous, and appropriate protective measures must be taken during operation and maintenance!

Incorrectly operating the test experiments described in this specification may result in serious personal injury and property loss!

The battery must be operated with the correct tools and protective equipment.

Maintenance of batteries must be performed by persons with battery expertise and safety training.

Failure to comply with the above warnings may cause multiple disasters.

#### 8.2 Hazard type:

The customer is aware of the following potential hazards during the use and operation of the battery:

8.2.1 The operator may be damaged by chemicals, electric shock or arc during operation. Although the human body responds differently to the DC and alternating current, the DC voltage higher than 50 volts is equally harmful to the human body, so the customer must take a conservative posture in the operation to avoid the current damage.

8.2.2 There are some chemical risks arising from the electrolyte in the battery.

8.2.3 When operating batteries and selecting personal protective equipment, customers and their employees must consider the above potential risks to prevent accidental short circuit, arc, explosion or thermal runaway

