



**S A M P L E
S P E C I F I C A T I O N**

DOC NO. : _____
REV. : _____
SHEET : _____ of _____
ECN NO. : _____

Cell sample specification book

Model number: 34207

P / N : FC-F23-34XXL0-006L

Product design preparation	Project Manager for approval	Product design approval	Quality assurance and approval
H u XiaoKun			

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

Confidential: () Level 3 Privacy () Level 2 High density (V) Level 1 low density



SAMPLE SPECIFICATION

DOC NO .: _____

REV .: _____

SHEET : 2 of _____

catalogue

Terms defined.....	5
1. Sample description.....	7
2. Sample electrical performance index.....	7
2.1 Summary.....	7
2.2 Charging mode / parameters.....	7
2.3 Discharge mode / parameters.....	8
2.4 Pulse discharge mode.....	9
2.5 Regeneration pulse charging mode.....	9
2.6 High and low temperature discharge capacity.....	10
2.7 Battery self-discharge performance.....	10
3. Cell temperature rise.....	11
4. Safety and reliability.....	11
5. End of product life management.....	12
6. Application conditions.....	12
7. Safety precautions.....	14
8 Disclaimer	15
9 Risk warning	16
9.1. Warning statement.....	16
9.2 Hazard type:.....	16
10 Other considerations.....	16
11 Cell drawings.....	17



**S A M P L E
SPECIFICATION**

DOC NO .: _____

REV .: _____

SHEET : 3 of _____

update log

edition	description	date	Recognize the state



S A M P L E SPECIFICATION

DOC NO .: _____

REV .: _____

SHEET : 4 of _____

Customer requirements

model:

edition:

Ask customers to write information about their needs and communicate with CA T L in advance. If the customer has some special applications or operating conditions that are different from those described in this document, CATL can design and produce the product in particular request.

	special requirements	standard
1		
2		
3		
4		
5		

customer code: _____ sign: _____ date: __

	S A M P L E S P E C I F I C A T I O N	DOC NO .: _____ REV .: _____ SHEET : <u> 5 </u> of _____
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Terms defined	
term	definition
product	The "product" in this specification refers to the XXX X rechargeable lithium iron phosphate power battery produced by CATL.
client	Is the buyer in the CATL EV Product Sales Contract.
CATL	Referto the seller in CATL EV Product Sales Contract.
P N	To distinguish the battery application to different use areas or to different application conditions, the CATL defines the material number for the XXXX rechargeable lithium battery.
Peripheral ambient temperature	The ambient temperature of the battery.
Battery management system (BMS)	An effective tracking and control system for customers to monitor and record product operating parameters throughout the service period. 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 as measured by the temperature sensor connected to the battery, the temperature sensor and the measurement line selection are jointly agreed upon by the CATL and the customer.
Fresh battery status	Refers the state within 7 days from the date of manufacture
C-Rate charging multiplier	The ratio of the charging current to the capacity value of the battery measured by the battery management system. For example, when the battery capacity is 72Ah and the charging current is 14.4A, the charging ratio is 0.2C; when the battery capacity drops to 48Ah and the charging current is 9.6A, the charging ratio is 0.2C.
Cycle recurrence	The battery shall be charged in one cycle according to the prescribed charge and discharge standard. The cycle includes a short period of normal charging or a combination of regenerative charging and discharge processes, during which there is sometimes only normal charging and no regenerative charging. A discharge can be formed by a combination of some partial discharges.
date of manufacture	Manufacturing date of the battery. The clear date code marked on the top sticker of each associated battery is the date of manufacture.

	S A M P L E S P E C I F I C A T I O N	DOC NO .: _____ REV .: _____ SHEET : <u> 6 </u> of _____
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Open-circuit voltage (OCV)	The voltage of the battery that was measured without any load and circuit access.
Resigable capacity	After the battery is stored, the capacity measured by the standard charge and discharge conditions listed in Article 2.2.3, 2.3.1 and 2.2.3.5 is the maximum value of the charge and discharge standards given in Articles 2.2.3, 2.2.3.1 and 2.3.5 of this Specification.
Product Supply Agreement	Transaction terms signed by CATL and the Customer.
Standard charging	Charging mode as described in clause 2.2.3 of this specification.
Standard discharge	The discharge current of 36A as specified in clause 2.3.1 of this specification and the discharge mode of the minimum 2.0V voltage as described in clause 2.3.5 of this specification.

Charging status (SOC)	All the linear relationships of the state of the battery charging capacity, measured in ampere hours or in watt hours, without a load. For example, if the capacity of 72Ah is regarded as 100%SOC, then when the capacity is 0Ah, the SOC is 0%.
temperature rise	The conditions specified in this specification, such as the increase of the cell temperature during the charging process or the discharge process.
measurement unit	"V" (Volt) volt (V), voltage unit
	"A" (Ampere) amp (A), current unit
	"Ah" (Ampere-Hour) amp-hours (Ah), load unit
	"Wh" (Watt-Hour) Watt-Hours (Wh), energy units
	"Ω" (Ohm) Ohm (Ω), resistance unit
	"m Ω" (MilliOhm) milliohms (m Ω), resistance unit
	"°C" (degree Celsius) degrees Celsius (°C), temperature unit
	"mm" (millimetre) mm (mm), in length
	"s" (second) seconds (s), time unit
	"Hz" (Hertz) Hertz (Hz), frequency unit

	S A M P L E S P E C I F I C A T I O N	DOC NO .: _____ REV .: _____ SHEET : <u> 7 </u> of _____
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1. Sample description			
clauses and subclauses		content	remarks
Sample model		34207	
Sample status		C appearance	
Sample range		FC -F 23-34XXL0-006L	Liyang mass production
2. Sample electrical performance index			
2.1 Summary			
No .	parameter	size of product	condition
2.1.1	Cell capacity	≥23Ah	25°C 7.5A(0.33C) Current discharge
2.1.2	minimum capacity	≥22.5Ah	
2.1.3	discharge energy	≥73.6Wh	23A(0.33C) Current discharge
2.1.4	nominal voltage	3.22V	25 ± 2C, 0.3C / 0.3C, newbattery status
2.1.5	Operating voltage range	2.5–3.65V 2.0–3.65V	temperature T>0°C temperature T<0°C
2.1.6	Battery internal resistance (1KHz)	0.9~1.8 m Ω (range)	New battery at 50%SOC status
2.1.7	Shipping voltage	3.295~3.305mv	50%SOC
2.1.8	Operating temperature (charging)	-20 – 60°C	Refer to Section 2.2
2.1.9	Operating temperature (discharge)	-30 – 60°C	Refer to Section 2.3
2.1.10	cycle life	≥2000 recurrence	25 ± 2°C, 11.5A/23A charge and discharge, capacity attenuation to 70%SOH
2.1.11	The SOC usage scope is recommended	3% - 100%	25°C
2.1.12	Battery weight	402±10g	N .A .
2.1.13	Cell size	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	7.5A	25°C

	S A M P L E S P E C I F I C A T I O N	DOC NO .: _____
		REV .: _____
		SHEET : <u> 8 </u> of _____

2.2.1.2	Standard charging voltage	3.65V	
2.2.1.3	Standard charging mode	0.3C CC to3.55V , 0.2C CVto3.65V cut-off current100mA	
2.2.1.4	Standard charging temperature	25±2℃	Battery temperature
2.2.2 Please refer to the cell parameter table for other charging conditions 2.3 Standard discharge mode / parameters			
No .	parameter	size of product	condition
2.3.1	Standard discharge	0.33C	25℃
2.3.2	Maximum continuous discharge current	3C	60s
2.3.3	Standard discharge temperature	25±2℃	Battery temperature
2.3.4	Discharge temperature range	-30℃~60℃	If the temperature of the cell exceeds the discharge temperature range



SAMPLE SPECIFICATION

DOC NO. : _____

REV. : _____

SHEET : 9 of _____

2.4 Pulse discharge mode

Pulse discharge refers to the cell pulse discharge during the use of the product. The pulse discharge 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 cell temperature listed in the table below.

Violation of pulse discharge conditions may cause permanent damage to the cell and thereby exempt CATL from product quality liability.

2.4.1 Minimum pulse discharge cutoff voltage

<-20°C	≤-5°C	>-5°C
2.0V	2.0V	2.0V

2.4.2 Allowed pulse discharge power and duration (adjusted according to sample status)

SOC	Battery temperature								
	<-20°C	≥ -20°C	≥ -15°C	≥ -5°C	≥0°C	≥10°C	≥25°C	≥50°C	≥60°C
≥20%	<39W /30s	39W /30s	48W/30s	67W/30s	79W /30s	99W /30s	128W/30s	141W/30s	not allow

2.4.3 After each pulse discharge, the battery needs 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 in the zero current inactive state, but during the dormant period, the battery is not allowed to pulse discharge again.

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 thereby exempt CATL from product quality liability.

	S A M P L E S P E C I F I C A T I O N	DOC NO .: _____ REV .: _____ SHEET : <u>10</u> of _____
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2.5.1 Maximum regenerative pulse charging voltage is 3.65V

2.5.2 Allowable regenerative pulse charging current and duration

SOC	Battery temperature								
	<-20℃	≥ -20℃	≥ -15℃	≥ -5℃	≥ 0℃	≥ 10℃	≥ 25℃	≥ 50℃	≥ 60℃
≤80%	not allow	2.3A	2.3A	4.6A	4.6A	7 A.5	11.5A	11.5A	Charge and discharge are not allowed
Refilling time	not allow	60s	60s	60s	60s	60s	60s	60s	

2.5.3 After each regeneration pulse charge, the battery needs a dormant period, which should be equal to or longer than the duration of the regeneration pulse. During the dormant period, the battery can be discharged or operated without zero current, but during the dormant period, the battery is not allowed to charge again.

2.6 High and low temperature discharge capacity (according to the sample state)

No .	parameter	size of product	Conditions (test ambient temperature)
2.6.1	25℃ discharge capacity	100%	25℃ Standard Charge \ 25℃ 23A, discharge to 2.0V
2.6.2	55℃ discharge capacity	≥100%	25℃ Standard Charge \ 55℃ 23A, discharge to 2.0V
2.6.3	-20℃ discharge capacity	≥65%	25℃ Standard Charge \ -20℃ 23A, discharge to 2.0V

2.7 Battery self-discharge performance

No .	parameter	size of product	condition
2.7.1	self-discharge rate	First-month: 3.5% 2% Every 30 days	Standard charge to 100% charge state, 25℃ temperature storage

	S A M P L E SPECIFICATION	DOC NO. : _____ REV. : _____ SHEET : <u>11</u> of _____
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3. The temperature of the cell rises

Temperature rise in this specification refers to the battery surface temperature after discharge minus the battery surface temperature before discharge. Battery temperature rise

shall be measured in a room with relatively stable ambient temperature and large enough space. Each battery temperature measurement shall select a corrected temperature sensor that can record time data.

No .	parameter	size of product	condition
3.1	Continuous discharge temperature rise	$\leq 10^{\circ}\text{C}$	Each battery was discharged for 10min at 23A current
3.2	Pulse discharge temperature rise	$\leq 10^{\circ}\text{C}$	Each battery was discharged at a current of 69A for 30 seconds in any charging state

4. Safety and reliability

4.1 Risk items: drop test (single negative electrode falling down, risk of open valve leakage at night);

4.2 Restriction regulations: The cell shall not be applied to the vertical discharge in the module (M / P needs to verify the vibration and drop safety);



SAMPLE SPECIFICATION

DOC NO. : _____

REV. : _____

SHEET : 12 of _____

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 and calculation of internal resistance requires discussion and agreement by the customer and CATL. When the internal resistance of the used battery exceeds 100% of the original internal resistance of this battery. Violation of this requirement will exempt CATL from product quality assurance liability under the Product Sales Agreement and this Specification.

5.2 Cell life determination conditions refer to 2.1.9 cycle life.

6. Application conditions

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

6.1. Customers 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 to design and evaluate the system and establish a battery management file.

6.3 Without the consent of CATL, customers shall not modify or change the design and framework of the battery management system to not affect the performance of the battery.

6.4 The customer shall keep the complete monitoring data of the battery operation and serve as a reference for the product quality responsibility division. CATL shall not be liable for product quality assurance if complete monitoring data are not available during the duration of the battery system.

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	3.65V	Charge charging when the voltage of the battery reaches 3.65V
6.5.2	Level 1 overcharge protection	More than or equal to 3.8V	When the battery voltage reaches 3.8V, the charging is terminated
6.5.3	Level 2 overcharge protection	More than or equal to 4.0V	When the battery voltage reaches 4.0V, terminate the charge, and lock the battery management system until the technician solves the problem
6.5.4	discharge off	2.0V	Stop the discharge When the battery voltage reaches 2.0V, minimize the current



SAMPLE SPECIFICATION

DOC NO. : _____

REV. : _____

SHEET : 13 of _____

6.5.5	First level of overrelease protection	Minimum of 1.9V	Stop the discharge when the battery voltage reaches 1.9V, minimizing the current
6.5.6	Level 2 overrelease protection	Minimum of 1.8V	When the battery voltage is below 1.8V, 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 (circuit) during the short circuit
6.5.8	overcurrent protection	Refer to clause 2.3 for discharge requirements	The battery management system controls the discharge current to the specifications
6.5.9	overheat protection	Refer to Articles 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 is terminated
6.6 Avoid the battery from reaching the overdischarge state. When the battery voltage is below 1.8 volts, the interior of the battery may be permanently damaged, and then the CATL's product quality assurance responsibility 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 sleep time is extended before recharging. Customers need to train users to recharge in the shortest possible time to prevent batteries from coming in			



SAMPLE SPECIFICATION

DOC NO.: _____

REV.: _____

SHEET : 14 of _____

Overplay status.

6.7 The battery shall not be charged under low temperature conditions (including standard charging, fast charging, emergency charging and regeneration charging) as prohibited in this specification, otherwise an unexpected capacity reduction may occur. The battery management system shall be controlled at the minimum charging and regenerative charging temperature. Charging is prohibited at temperatures lower than those specified in this specification, otherwise, CATL shall not be liable for quality assurance.

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

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

7. Safety precautions

7.1 Never immerse the battery in water.

7.2 It is forbidden to expose batteries into fire or to high temperature environments exceeding the temperature conditions specified in Articles 2.1.7 and 2.1.8 of this specification, otherwise it may lead to fire. In any normal use situation, the cell temperature should not exceed 60°C. 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 at the positive and negative poles of the battery, otherwise the strong current and high temperature may cause personal injury or fire. Since the positive and negative electrodes of the battery are exposed to the plastic protective covers, sufficient safety protection should be provided to avoid short circuits when the battery system is assembled and connected.

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

7.5 No battery overcharging, otherwise, battery overheating and fire accidents. In the battery installation and use, the hardware and software need to implement multiple overcharge failure safety protection. The minimum protection requirements are specified in clauses 6.1.4 and clause 7.11 of this specification.

7.6 Normal charging shall be completed after charging according to Article 6.1.4.10 of this specification. When the continuous charging time exceeds the reasonable time limit, the battery overheating phenomenon may cause thermal runaway and fire. The last timer shall be installed for protection. Once the charging current reaches the overcharging 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 securely attach the battery to the solid plane and safely bind the power cord in place to avoid friction and cause arcs and sparks.

	S A M P L E S P E C I F I C A T I O N	DOC NO .: _____ REV .: _____ SHEET : <u>15</u> of _____
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7.8 Do not package batteries with plastic or make electrical connection with plastic. Incorrect electrical connections may cause overheating during battery use.

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

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

7.11 Inappropriate charging termination phenomenon may occur during the battery charging process. For example: beyond the allowable charging time, charging voltage is too high, charging or charging current is too strong. The above phenomenon is defined as "inappropriate termination of charging". When the above phenomenon occurs, it may mean leakage of the battery system or failure of some components. Continuing charging the battery until the root cause is found and completely solved can cause overheat 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 restored after a comprehensive inspection by certified technicians, determined the root cause and thoroughly solved and improved.

8. Disclaimer

8.1 If the sample demand unit is not used in accordance with the provisions specified in this specification, if any problems occur with the sample demand cell unit, all responsibilities shall be borne by the sample demand unit, and CATL shall not bear any responsibility.

.28 If the sample demand unit is not used in accordance with the specification, causing a social impact, and affecting the reputation of CATL,



SAMPLE SPECIFICATION

DOC NO.: _____

REV.: _____

SHEET : 16 of _____

The CATL will hold the sample demand unit accountable. According to the extent of the impact on the CATL, the sample demand unit shall provide compensation to the CATL

9. Risk warning

9.1 Warning Statement

warn

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

Incorrect operation of the test experiment as described in Article 2.6 of this specification may cause serious personal injury and property damage!

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

Battery maintenance must be performed by people with battery expertise and safety training.

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

9.2 Hazard type:

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

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

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

9.2.3 When operating the battery and choosing personal protective equipment, the customer and his employees must consider the above potential risks to prevent accidental short circuit, arc, explosion or thermal runaway

10 Other considerations

10.1. After the module welding is Bursba r, pay attention to the height change of the pole column relative to the top cap;

10.2. The QR code level of the electric cell roof cover: Grade C level or above;

11 Cell drawings



等轴测视图
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