Model	C33-V2	Spec No.	PBRI-C33-V2-01-D06-01	Version NO.	B

SPECIFICATION OF PRODUCT

(Model) : C33-V2

Designed	Designer Checked	QC Checked	Sales Checked	Approved

Customer Signature
(Company name) :
批 (Approved by) :
(Signature Date) :

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(Customer Request)

NO.	Special Requirements	Specification
1		
2		
3		
4		
5		

(Customer Code) : _____

(Signature) : _____

(Date) : _____

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Revision History

Revision NO.	**Date**	**Description**	**Author**
A	2024.5.7	First Edition	Miya
B	2024.6.12	1. Add the standard of cell welding diameter 2. Correct the form of the air transport knife card	Miya

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Catalogue

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(Definition of Terms)

Terms	Definition
Product	"Product" in this specification refers to 15 Ah rechargeable cylindrical lithium ion battery produced by EVE Power Co., Ltd.
customer	Refers to the buyer in the product sales contract of EVE Power Co., Ltd.
Environment Temperature	The ambient temperature where the cell is located.
Cell temperature	The temperature measured by temperature sensor installed at the center of cell surface
Rate	The ratio of the charge/discharge current to the rated capacity value. For example, the battery capacity is 15Ah, when the charging or discharging current is 15A, the charging or discharging rate is 1C.
State of charge (SOC)	Under no-load conditions, the ratio of the battery capacity state to the rated capacity measured in Ah or Wh. For example, if the capacity is 15Ah as 100% SOC, when the capacity is 0Ah, the SOC is 0%.
Standard charging	The charging mode described in Article 3.3 of this specification.
Standard discharging	The discharging mode described in Article 3.4 of this specification.
AC resistance (ACR)	Inject 1kHz sine wave current into the positive and negative poles of the cell, and the internal resistance obtained, which abbreviated as ACR.
DC Resistance (DCR)	The ratio of the voltage changes of the battery to the corresponding current change under working conditions.
Pulse Current	The current or voltage pulses that appear periodically are called pulse currents. The pulse currents appear either in the same direction or in alternating positive and negative directions.

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（Unit of measurement）

No.	Unit	Abbreviation	Type of units
1	毫(Millivolt)	mV	Voltage
2	(Mill ampere)	mA	Current
3	(Ampere-Hour)	Ah	Capacity
4	(Watt-Hour)	Wh	Energy
5	(Milliohm)	mΩ	Resistance
6	(Degree Celsius)	℃	Temperature
7	(Millimeter)	mm	Length
8	(second)	s	Time
9	(Minute)	min	Time
10	(Hour)	h	Time
11	(Hertz)	Hz	步 Frequency

Model	C33-V2	Spec. NO	**PBRI-C33-V2-01-D06-01**	Version NO.	B

1. (Basic Information)

1.1. (Scope)

This product specification has been prepared to specify the cylindrical rechargeable lithium-ion cell to be supplied to customer by EVE Power Co., Ltd.

1.2. (Description)

Sealed Secondary Portable Li-Ion Cell.

1.3. (Model Name)

EVE——C33-V2

① ②③④

① The letter "EVE" defines EVE Power Co., Ltd.

② The letter "C" defines Cylindrical

③ The letter "33" defines the diameter of the cell.

④ The letter "V2" defines the second-generation product.

2.(Specification Parameters)

2.1. (Basic Parameters)

Item	Specification		Remarks
0.33C Capacity@3650-2500mV	≥15000	mAh	0.33C discharge
1C Capacity@3650~2500mV	≥14500	mAh	1C discharge
AC-IR	≤2.5	mΩ	AC 1 kHz@25°C 30%SOC
DC-IR	≤8	mΩ	@25°C 30%SOC
End-of-charge Voltage	3650	mV	
End-of-charge Current	750	mA	0.05C
End-of-discharge Voltage	T>0°C@2500 T≤0°C@2000	mV	
Nominal Voltage	3200	mV	
Standard Charging current	7500	mA	0.5C
Standard Discharge current	15000	mA	1.0C
Pulse Charge current(<10s)	30000	mA	2.0C
Pulse Discharge current(<10s)	45000	mA	3.0C

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Operating Temperature Range	Charging Temp.	0~10℃	≤3000mA
		10-45℃	≤7500mA
		45-50℃	≤6000mA
		50-55℃	≤3000mA
	Discharging Temp.	-20~60℃	
	Storage Humidity	≤70% RH	
Monthly self-discharge rate	≤3.0	%/month	25℃, shipment state, new cell storage after 3 months 25℃

2.2. (Product Specification)

2.2.1. (Dimension and Weight)

NO.	Item	Specification	Test Method Chapter
1	Cell Dimension	Middle Diameter: Φ33.3± 0.2 mm (coated)	3.5.1.
		Weld Diameter: Φ33.3± 0.3 mm (coated	3.5.1
		Height : 140.8 ± 0.5 mm (pole contained)	3.5.1
		Shoulder Height : 136.36 ± 0.25 mm (pole not contained)	3.5.1.
2	Cell Weight	263.9±6g	3.5.2.

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2.2.2. (Electrical Performance)

NO.	Test Item		Specification	Test Method Chapter
1	Capacity	0.33C discharge	≥15000mAh	3.5.4.1
2		1C discharge	≥14500mAh	3.5.4.1
3	Temperature Dependence of Discharge Capacity (1.0C discharge)	-20℃ Retention Ratio	≥70%	3.5.4.2.
4		-10℃ Retention Ratio	≥80%	3.5.4.2.
5		0℃ Retention Ratio	≥85%	3.5.4.2.
6		25℃ Retention Ratio 45℃	100%	3.5.4.2.
7		Retention Ratio 45°	≥95%	3.5.4.2.
8		60℃ Retention Ratio	≥95%	3.5.4.2.
9	100% SOC Temperature Charge Retention and Regain	28d，25℃ 100%SOC	Retention Ratio≥97% Self-discharge Ratio≤3%	3.5.4.3.
10		28d，45℃ 100%SOC	Recovery Ratio≥95%	3.5.4.3.
11		7d, 55℃ 100%SOC	Retention Ratio≥95% Recovery Ratio≥96%	3.5.4.3.
12	Life	25℃ Cycle Life	After 2000 cycles, Capacity retention≥80% Initial capacity	3.5.4.4.
13		45℃ Cycle Life	After 1000 cycles, Capacity retention≥70% Initial capacity	3.5.4.5.

2.2.3. (Safety Performance)

The cell can meet the requirements of GB38031-2020 and the following items:

NO.	Test Item	Specification	Citing Standard	Test Method Chapter
1	Over-charge Test	No explosion, no fire	IEC62660-2-2010	3.5.5.1.
2	Drop Test	No explosion, no fire	GB/T 36276-2018	3.5.5.2.
3	Seawater immersion	No explosion, no fire	GB/T 31485-2015	3.5.5.3.
	Low Pressure Test	No explosion, no fire, no leakage	UN38.3	3.5.5.4.
5	Vibration Test	No explosion, no fire, no leakage	UN38.3	3.5.5.5.
	Temperature Shock Test	No explosion, no fire, no leakage	UN38.3	3.5.5.6.

2.3 (Outline Dimensions)

See the attachment (Fig. A).

2.4. (Appearance)

There shall be no such defects as rust, discoloration, leakage which may adversely affect commercial value of the cell.

3. (Standard Test Condition)

3.1. (Environment Condition)

Unless otherwise specified, all tests stated in this Product Specification should be conducted at temperature 25°C±2°C and humidity 65%±20% RH.

3.2. (Measuring Equipment)

The accuracy of measuring instruments and meters should meet the following requirements:

(1) (Volt measuring Equipment): ±0.1%;

(2) (Amp measuring Equipment): ±0.1%;

(3) (Temp measuring Equipment): ±0.5°C;

(4) (Dimension measuring Equipment): ±0.01mm;

(5) (Weight measuring Equipment): ±0.1g。

3.3. (Standard Charge Method)

The "Standard Charge" means charging the cell at a constant current of 0.5C until the voltage is 3650mV, then charge at a constant voltage of 3650mV until its current is less than 0.05C. For test purpose, charging shall be performed at 25±2°C. Unless otherwise specified, it indicates "Standard Charge".

3.4. (Standard Discharge Method)

The "Standard Discharge" means discharging the cell at a constant current of 1.0C until the voltage is 2500mV. For test purpose, discharging shall be performed at 25±2°C. Unless otherwise specified, it indicates "Standard Discharge"

3.5. (Test Method)

3.5.1. (Dimension)

Use a caliper to measure the diameter, and height gauge to measure height of the cell.

3.5.2. (Weight)

Use an electronic scale to measure the weight of the battery.

3.5.3. (Internal Resistance)

ACR: At 25±2°C, when the SOC is 30 % at ambient temperature, test the cell with a frequency of AC 1kHz.

DCR: At 25±2°C, the cell is discharged to 2000mV with a current of 0.5C, rest for 3 min, and discharged at to 2000mV with a current of 0.1C. Rest for 2 min. charge with constant current of 0.5C for 42min. Then rest for 30 min, and record the voltage V_1 at the end of the period. Put a 30 s discharge pulse current of 2 C and record the voltage V_2 at the end of the pulse, and calculate the DCR = (V1-V2) ×1000/30 (mΩ).

3.5.4. (Electrical Characteristics)

3.5.4.1. (Discharge Capacity)

0.33C discharge capacity: Fully charge in standard charging form at 25±2°C, rest for 30 minutes, and then discharge at 0.33C to 2500mV. Cycle 5 times and record the maximum discharge capacity.

1C discharge capacity: Fully charge in standard charging form at 25±2°C, rest for 30 minutes, and then discharge at 1C to 2500mV. Cycle 5 times and record the average discharge capacity for the last three times.

3.5.4.2. (Temperature Dependence of Discharge Capacity)

Capacity calibration: At 25±2°C, the cell is charged to 3650mV with constant current of 0.5 C, then charge at constant voltage of 3650mV until decreases to 0.05 C, and rest for 30 minutes; Discharge at a constant current of 1 C to a cutoff of 2500mV and record the discharge capacity. Then, the cell is fully charged according to the standard charging method at 25±2°C.

Low temperature discharge: Rest at -10/0±2°C for 12 hours, and then discharge at 1C to 2000mV at -10/0±2°C. Record the discharge capacity, and the capacity retention = the specific temperature discharge capacity/calibration capacity.

-20°C discharge: Rest at -20±2°C for 24 hours, and then discharge at 1C to 1500mV at -20±2°C. Record the discharge capacity at 2000mV, and the capacity retention = the specific temperature discharge capacity/calibration capacity.

High temperature discharge: Rest at 45/60±2°C for 6 hours, then discharge at 1C at 45/60±2°C to 2500mV, record the discharge capacity, and the capacity retention =the specific temperature discharge capacity/calibration capacity.

3.5.4.3. (100% SOC Temperature Charge Retention and Regain)

Capacity calibration is carried out according to standard charging and discharging method, recording the discharge capacity C_0; Then, the cell is fully charged according to the standard charging method. After that, rest the cell at 25±2℃ /45±2℃ for 28D/7D, and discharge it to 2500mV with constant current of 0.5 C under the environment of 25±2℃. The discharge capacity is recorded as discharge retention capacity. Then, cycling three times according to the standard charging and discharging method (record the third time as the discharge recovery capacity). Capacity retention rate=discharge retention capacity/calibration capacity×100%, capacity recovery rate=discharge recovery capacity /calibration capacity × 100%。

3.5.4.4. (25°C Cycle Life)

At ambient temperature of 25 ± 2 °C, Charge the cell to 3500mV with constant current of 0.5 C, then switching to constant voltage charging to 0.05 C to cut off, and rest for 30 min. Discharge to 2750mV with constant current of 0.5 C and rest for 30 min. Repeat charge and discharge and cycle 2000times.

3.5.4.5. (45°C Cycle Life)

At ambient temperature of 45 ± 2 °C, Charge the cell to 3500mV with constant current of 0.5 C, then switching to constant voltage charging to 0.05 C to cut off, and rest for 30 min. Discharge to 2750mV with constant current of 0.5 C and rest for 30 min. Repeat charge and discharge and cycle 1000times.

3.5.5. (Safety Test)

All below tests are carried out on the equipment with forced ventilation and explosion-proof device. Before test, all cells should be charged in accordance with 3.3.

3.5.5.1. (Over-charge Test)

At ambient temperature of 25℃ ± 2 ℃, the cell is charged to 2.0 times cut-off voltage. After completing above

steps, observe for 1h at ambient temperature.

3.5.5.2. (Drop Test)

At ambient temperature of 25 ± 2℃, drop the cathode and anode terminal of the cell down freely from the height of 1.5m to the cement ground once. After completing above steps, observe for 1h at ambient temperature.

3.5.5.3. Seawater immersion Test)

At ambient temperature of 25 ± 2℃, completely immerse the battery cell in a 3.5% NaCl solution (mass fraction, simulated seawater composition at room temperature) for 2h.

3.5.5.4. (Low Pressure Test)

At ambient temperature of 25 ± 2℃, the cell is placed in a low-pressure(11.6kPa) box for 6h. After completing above steps, observe for 1h at ambient temperature.

3.5.5.5. (Vibration Test)

At ambient temperature of 25 ± 2℃, the cell is fixed on the following vibration fixture for vibration. Starting from 7Hz, maintain a maximum acceleration of 1gn until the frequency reaches 18Hz, then maintain the amplitude at 0.8mm (total deviation of 1.6mm) and increase the frequency until the maximum acceleration is 8gn (frequency is about 50Hz). The next step is to maintain the acceleration at 8gn until the frequency increases to 200Hz; x, y, z axis for 3h each, totaling 9h. After completing above steps, observe for 1h at ambient temperature.

(Refer to UN38.3)

3.5.5.6. (Temperature Shock Test)

At ambient temperature of 25 ± 2℃, conduct high and low temperature impact tests at 72 ± 2℃ and -40 ± 2℃, store at extreme temperature for 6 hours, with a high and low temperature limit transition time (≤30min). After conducting 10 cycles, store at room temperature (20 ± 5℃) for 24h.

(Refer to UN38.3)

4. (Cell Operation Instruction and Precautions)

4.1. (Storage Recommendations)

4.1.1. (Short Period Storage)

* Storage the cell at temperature of 0°C ~ 45°C (less than 3 months), low humidity and no corrosive gas atmosphere.

电芯短期存放（不超过 3 个月）应储存在 0°C~45°C 温度范围，低湿度和不含腐蚀性气体的环境中。

* No press on the cell

4.1.2. (Long Period Storage)

5. After charging, the cell should be used as soon as possible to avoid loss of usable capacity due to self-discharge. If long-term storage is required, adjust the cell SOC to 15%~40%. The recommended storage conditions are: 0°C ~ 35°C, relative humidity ≤ 60%.

* The SOC of the cell should be kept at 15% ~ 40% during storage. In order to prevent the performance differences after long-term storage (more than three months), perform a standard charge-discharge cycle every 3 months. It is recommended that the storage time after receiving the cells should not exceed half a year to avoid quality problems due to storage overdue.

4.2. (Transportation and Handling Requirements)

* It is not allowed to ship with inflammable, explosive and corrosive articles in the same vehicle during transportation, and stacking is prohibited during large package transportation; The product shall not be exposed to rain, snow and other liquid substances without any protection, or suffer mechanical damage;

* While handling, lift trucks or special tools shall be used to load and unload products; Handle with care, do not throw or squeeze, which may cause cell damage or personal injury. It is strictly prohibited to put cells together with corrosive substances such as acid and alkali.

4.3. (Operation Instruction)

4.3.1. (Charging)

* Charge the cell in an ambient temperature range of 0°C to 55°C.

* Charge the cell at a constant current of 7500mA until 3650mV is attained.

4.3.2. (Discharging)

* Recommended cut-off voltage to 2500mV for temperature above 0°C and 2000mV for temperature below 0°C. Discharge rates greater than 45000mA are not recommended.

* For maximum performance, discharge the cell in an ambient temperature range of -20°C to 60°C.

Remarks：

a) Avoid charging the cell at low temperatures (including but not limited to standard charge, quick charge, emergency charge and regenerative charge) prohibited by this specification, otherwise unexpected capacity reduction may occur. The battery management system should be controlled according to minimum charging and regenerative charging temperatures. Charging at temperatures lower than specified in this specification is prohibited, otherwise, EVE will not bear all relevant responsibilities such as quality assurance liability and loss compensation caused thereby.

b) The heat dissipation of battery should be fully considered in the design of cell pack; EVE is not responsible for the quality assurance caused by overheating due to the heat dissipation design of cell pack.

4.3.3. (Product End-life Management)

The cell life is limited. Customers should establish an effective tracking system to monitor and record the internal resistance and capacity of each cell during its life. The measurement method and calculation method of internal resistance and capacity need to be discussed and agreed between the customer and EVE. When the internal resistance of the cell in use exceeds 150% of the initial internal resistance of the cell, or the capacity is less than 70% of the nominal

capacity, the cell should not to be operated. Violation of this requirement will exempt EVE from its responsibility for product quality assurance in accordance with the product sales agreement and this specification, as well as all related liabilities such as loss compensation caused thereby.

4.3.4. (Standard Cell Precaution)

* It is strictly forbidden to immerse the cell in water. When it is not in use, it should be placed in a cool and dry environment.

严禁将电池浸入水中，保存不用时，应放置于阴凉干燥的环境中。

* Do not over-charge the cell. During cell installation and use, hardware and software must be protected against multiple over-charge failures.

禁止电池过充，在电池安装和使用中，硬件和软件需实行多重过充失效安全保护。

* If improper charge termination occurs, the root reasons shall be found and resolved before reuse to avoid negative effects on electrical and safety performances.

电池非正常终止充电时，为避免未知原因对电池性能及安全的影响，需明确根本原因并彻底解决后再使用。

* It is forbidden to over-discharge. During the normal use of the cell, charge the cell regularly to keep the voltage above 2.8 V, so as to avoid over-discharge

禁止过放电。在电池正常使用过程中，为防止过放电，电池应定期充电，将电压维持在2.8V以上。

* It is forbidden to use metal to directly connect the positive and the negative of the cell to short-circuit.

禁止用金属直接连接电池正负极短路。

* During use, please connect the positive and the negative of the cell strictly according to the labels and instructions, and reverse charging is forbidden.

在使用中，严格按照标识和说明连接电池正负极，禁止反向充电。

* It is forbidden to transport or store the cell with metallic, such as knife, coin, necklaces, etc.

禁止将电池与金属制品，如刀，硬币和项链等等。

* It is forbidden to use or place the cell at high temperature or flame environment. Otherwise, cell overheat, function failure or life shorten may occur.

* Do not subject the cell to mechanical shocks, collision and pressure impact.

不要使电芯承受机械冲击，碰撞及压力冲击。

* It is forbidden to knock, throw, step on or bend the cell and directly pierce the battery with nails or other sharp objects. Do not use the cell with conspicuous damage or deformation.

* Please use a special charger for lithium-ion batteries when charging.

充电时请采用锂离子专用充电器。

* It is forbidden to directly weld the cell.

严禁直接焊接电池。

* It is forbidden to use it in places with strong static electricity and strong magnetic fields;

严禁在强静电和强磁场的地方使用。

* If the cell leaks and the electrolyte spills onto the skin or clothes, immediately wash the affected area with running water. If the cell leaks and the electrolyte enter the eyes, mouth, nose and other open parts of the human body, immediately wash with plenty of water and seek medical treatment immediately, otherwise serious injuries will be caused to the human body. No person or animal is allowed to swallow any part of the cell or any substance contained in the cell. No person or animal is allowed to swallow any part of the cell or any substance contained in the cell.

* If the cell emits peculiar smell, heat, discoloration, deformation, or any abnormality during use, storage, or charging, immediately remove the cell from the device or charger and stop using it.

* It is forbidden to mix different types of cells in the same battery system.

* It is prohibited to disassemble the product without the written consent of EVE.

* The blue sleeve and the black insulating mat of cell, that encapsulate the cell both provide insulation protection. For safety, the cell must be used with the sleeve and the insulating mat. EVE does not assume any after-sales service or warranty responsibility for problems caused by using the cell without the sleeve or the insulating mat.

4.4.(Others)

For the sake of safety assurance, if there are equipment design, lithium ion cell system protection circuit, fast charging and other special application, please consult EVE first. Any matters not mentioned in this specification must be negotiated and determined by both parties.

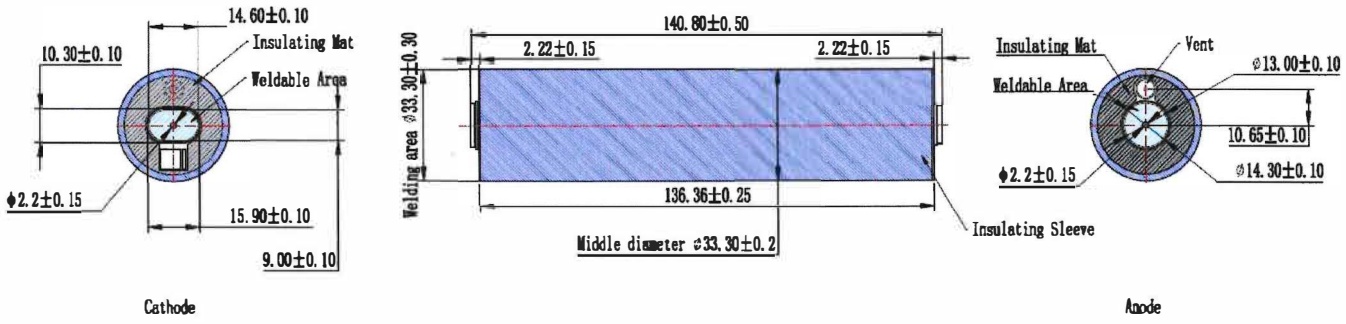
This specification is written in both Chinese and English. In case of any conflict between the English version and the Chinese version, the Chinese version shall prevail.

5. （Disclaimer）

If the product demand unit or user does not use the product in accordance with the provisions of this manual, EVE will no longer bear all relevant responsibilities such as product quality assurance liability and loss compensation caused thereby. In case of any negative impact on EVE's reputation due to the above-mentioned acts, EVE reserves the right to investigate the legal liability of the product demand unit.

6. （Consultation）

（Attachment I: C33-V2 Drawing）



A （Figure A）

(Attachment II: C33-V2 Air Transport Packing)

Each box contains 60 PCS cell, as shown in figure B.

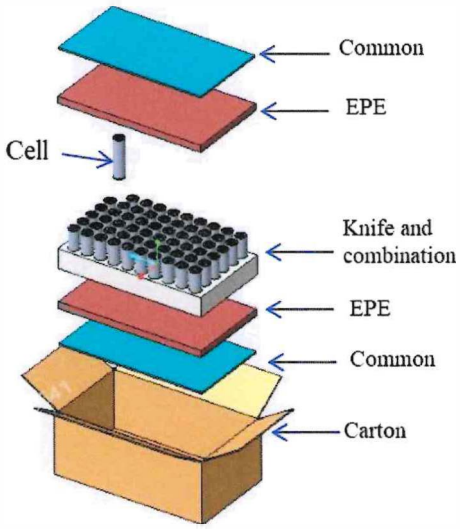


Figure B (B)

Each card board has 40 boxes, divided into 5 layers, as shown in figure C.

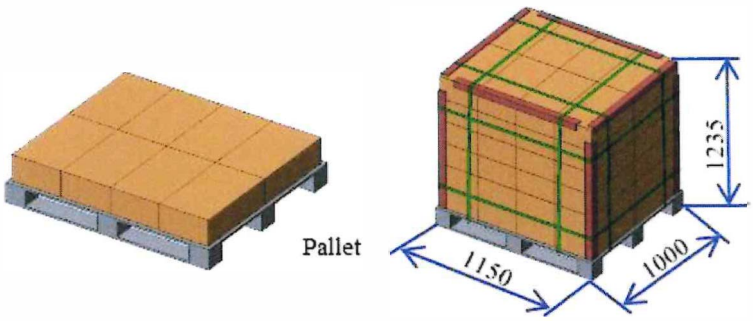


Figure C (Unit:mm)

(Attachment II: C33-V2 Sea and AirTransport Packing)

Each EPP box contains 138 pcs cell, as shown in figure D.

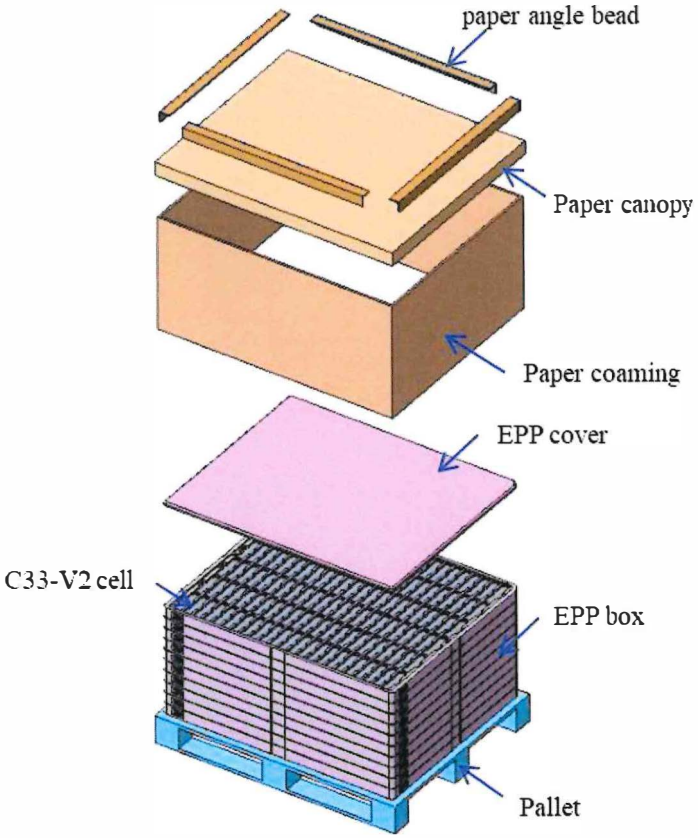


Figure D (Unit:mm)

Single pallet stacking with 9 layers of EPP boxes, using three-layer pallet stacking for sea transportation, as shown in Figure E.

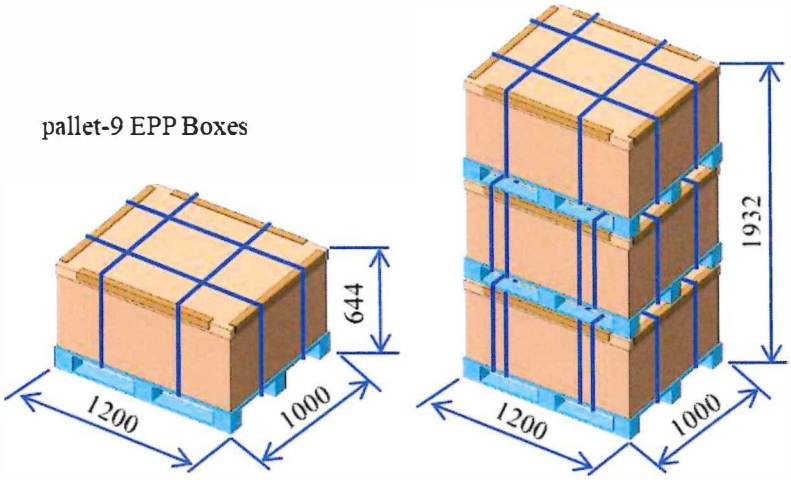


Figure E (Unit:mm)

Land transpotation adopts stacking 18 layers of EPP boxes, as shown in figure F.

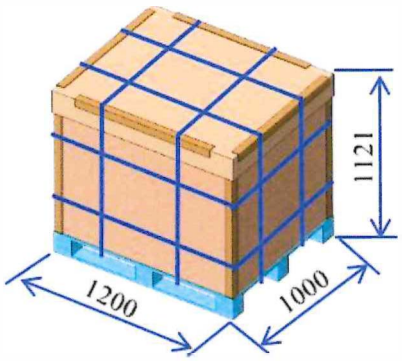


Figure F (Unit:mm)