

Resource Recovery Order under Section 286A of the Protection of the Environment Operations Act 1997

The processed oyster shell order 2025

Introduction

This order, issued by the Environment Protection Authority (EPA) under clause 286A of the *Protection of the Environment Operations Act 1997* (POEO Act), imposes the requirements that must be met by suppliers of **processed oyster shell** to which 'The processed oyster shell exemption 2025' applies. The requirements in this order apply in relation to the supply of **processed oyster shell** for **application to land** as a **soil amendment** or **liming agent**.

1. Waste to which this order applies

- 1.1. This order applies to **processed oyster shell**. In this order, **processed oyster shell** means **oyster shell** that:
 - (a) has been generated from single seed oysters at NSW oyster aquaculture leases:
 - (b) has been generated from **normal operating conditions** or from a **mass mortality event**; and
 - (c) has undergone desiccation and size reduction.

Processed oyster shell does not include **oyster shell** that has been generated from **stick cultivation**.

2. Persons to whom this order applies

- 2.1. The requirements in this order apply, as relevant, to any person who supplies **processed oyster shell** that has been generated, processed or recovered by the person.
- 2.2. This order does not apply to the supply of **processed oyster shell** to a **consumer** for land application at a **premises** for which the **consumer** holds a licence under the POEO Act that authorises the carrying out of the scheduled activities on the **premises** under clause 39 'waste disposal (application to land)' or clause 40 'waste disposal (thermal treatment)' of Schedule 1 of the POEO Act.

3. Duration

3.1. This order commences on 17 October 2025 and is valid until revoked by the EPA by notice published in the Government Gazette.

4. Generator requirements

The EPA imposes the following requirements on any **generator** who supplies desiccated **oyster shell** to the **processor**.

Stockpiling and desiccation

- 4.1. The **generator** must generate an **oyster shell stockpile** and ensure that **stockpile information (oyster shell)** is presented on a signpost at the base of each **oyster shell stockpile.**
- 4.2. The **generator** must undertake the process of **desiccation** on each **oyster shell stockpile**. Refer to Notes section for additional guidance on **daily global solar exposure**.
- 4.3. The **generator** must wash the **oyster shell stockpile** with freshwater prior to or following **desiccation**.

Notification

- 4.4. On or before each **transaction**, the **generator** must provide the following to the **processor**:
 - a written statement of compliance certifying that all the requirements set out in Clause 4 of this order have been met.
 - a copy of 'The processed oyster shell order 2025'; and
 - a copy of 'The processed oyster shell exemption 2025'.

Record keeping and reporting

- 4.5. The **generator** must keep a written record of the following for a period of six years:
 - Stockpile information (oyster shell) on each oyster shell stockpile as required under clause 4.1;
 - Daily global solar exposure data relevant to the desiccation of each oyster shell stockpile;
 - The quantity (in m³) of **oyster shell** supplied to the **processor**;
 - All written statements of compliance as required under clause 4.4.
 - The name and address of each **processor** to whom the **generator** supplied desiccated **oyster shell**.
- 4.6. The **generator** must notify the EPA within seven days of becoming aware that it has not complied with any requirement in clauses 4.1 to 4.3.

5. Processor requirements

The EPA imposes the following requirements on any **processor** who supplies of **processed oyster shell** to the **consumer**.

Size reduction

- 5.1. Before **size reducing**, the **processor** must ensure that the **oyster shell** does not contain **physical contaminants**.
- 5.2. **The processor** must undertake the process of **size reduction** so that the maximum particle size of **oyster shell** is no greater than 2 mm, to generate **processed oyster shell**.

5.3. The processor must ensure that stockpile information (processed oyster shell) is recorded.

Sampling and testing

- 5.4. The **processor** must carry out the following:
 - 5.4.1. Prepare a written sampling plan which includes a description of sample preparation and storage procedures for the **processed oyster shell**.
 - 5.4.2. Undertake sampling in accordance with the written sampling plan by collecting one **composite sample** per 50 m³ (or part thereof) from each stockpile of **processed oyster shell** generated. Sampling must be undertaken in a way that ensures that the **composite sample** collected is representative of the material from the entire stockpile.
 - 5.4.3. Undertake testing by sending the **composite sample**/s of **processed oyster shell** to an accredited laboratory to test for the chemicals and/or attributes listed in rows 1-3 of Column 1 of Table 1, using the methods described in clause 5.8.
 - 5.4.4. Store the **processed oyster shell** at the **premises** until the test results from clause 5.4.3 are validated as compliant with the absolute maximum concentration or other value listed in Column 2 of Table 1.

Chemical and other material requirements

- 5.5. The **processor** must not supply **processed oyster shell** to any person if the chemical concentration or other attribute of any sample collected and tested as part of the testing of **processed oyster shell** exceeds the absolute maximum concentration or other value listed in Column 2 of Table 1.
- 5.6. The absolute maximum concentration or other value of that attribute in any **processed oyster shell** supplied under this order must not exceed the absolute maximum concentration or other value listed in Column 2 of Table 1.

Table 1

Column 1	Column 2		
Chemicals and other attributes	Absolute maximum concentration (mg/kg 'dry weight' unless otherwise specified)		
1. pH	Not applicable ¹		
2. Electrical conductivity	1 dS/m		
3. Sodium (total)	1%		

Note:

¹ While there is no absolute maximum concentration, pH must be tested in each sample and records kept of the results.

Test methods

- 5.7. The **processor** must ensure that any testing of samples required by this order is undertaken by analytical laboratories accredited by the National Association of Testing Authorities (NATA).
- 5.8. The **processor** must ensure that the chemicals and other attributes (listed in Column 1 of Table 1) in the **processed oyster shell** it supplies are tested in accordance with the test methods specified below or other equivalent analytical methods. Where an equivalent analytical method is used the detection limit must be equal to or less than that nominated for the given method below.
 - 5.8.1. Test method for measuring pH:
 - 5.8.1.1. Sample preparation by mixing 1 part **processed oyster shell** with 5 parts distilled water.
 - 5.8.1.2. Analysis using Method 4A1 Electrical Conductivity (EC) from Soil Chemical Methods Australasia, Rayment and Lyons 2011, or an equivalent analytical method.
 - 5.8.1.3. Report pH in pH units.
 - 5.8.2. Test method for measuring electrical conductivity:
 - 5.8.2.1. Sample preparation by mixing 1 part **processed oyster shell** with 5 parts distilled water.
 - 5.8.2.2. Analysis using Method 3A1 Electrical Conductivity (EC) from Soil Chemical Methods Australasia, Rayment and Lyons 2011, or an equivalent analytical method.
 - 5.8.2.3. Report electrical conductivity in dS/m at 25°C.
 - 5.8.3. Test method for measuring sodium (total):
 - 5.8.3.1. Sample preparation using USEPA SW-846 Method 3050B Acid digestion of sediments, sludges and soils.
 - 5.8.3.2. Analysis using US EPA SW-846 Method 6010C inductively coupled plasma optical emission spectrometry, or an equivalent analytical method.
 - 5.8.3.3. Report sodium as % dry weight.

Packaging of bagged retail products

- 5.9. Where the **processor** supplies or intends to supply **processed oyster shell** in a bagged retail product to another person, they must ensure that the following information is clearly and simply presented on the packaging of the bagged retail product:
 - 5.9.1. Instructions that explain that **processed oyster shell** can only be **applied to land** as a **soil amendment** or **liming agent** (as per clause 6.2 of *The processed oyster shell exemption 2025*);
 - 5.9.2. Instructions that explain that the **consumer** must mix **processed oyster shell** into the topsoil (as per clause 6.3 of *The processed oyster shell exemption 2025*);
 - 5.9.3. A written statement of compliance certifying that all requirements set out in *The processed oyster shell order 2025* have been met.

Notification

- 5.10. On or before each **transaction**, the **processor** must provide the following to each person to whom the **processor** supplies **processed oyster shell**:
 - a written statement of compliance certifying that all the requirements set out of this order have been met:
 - a copy of 'The processed oyster shell order 2025'; and
 - a copy of 'The processed oyster shell exemption 2025'.

Record keeping and reporting

- 5.11. The **processor** must keep a written record of the following for a period of six years:
 - The sampling plan required to be prepared under clause 5.4.1;
 - All stockpile information (processed oyster shell) and test results in relation to processed oyster shell supplied (including all laboratory reports, laboratory chain of custody documentation, and laboratory sample receipts in relation to processed oyster shell);
 - The quantity (in m³) of any **processed oyster shell** supplied;
 - The name and address of each person to whom the processor supplied bulk quantities of processed oyster shell; and
 - All written statements of compliance as required by clause 5.10.
- 5.12. The **processor** must provide, on request, the most recent test results for **processed oyster shell** supplied to any **consumer**.
- 5.13. The **processor** must notify the EPA within seven days of becoming aware that it has not complied with any requirement in clauses 5.1 to 5.9.
- 5.14. The **processor** must make any information available to the EPA upon request that relates to this order.

6. Definitions

In this order:

application to land or apply to land means applying to land by:

- spraying, spreading or depositing on the land; or
- ploughing, injecting or mixing into the land; or
- filling, raising, reclaiming or contouring the land.

bulk quantities means more than 100 kg.

clean, dry and outdoor environment means an outdoor location for the oyster shell stockpile, where the oyster shell stockpile is stored on:

- a dedicated raised mat or mesh structure that optimises aeration of the oyster shell: or
- a dedicated surface with low permeability (e.g. asphalt or concrete) that easily drains and is located away from existing drainage lines. This excludes storing oyster shell directly on soil.

composite sample means a sample that combines five discrete sub-samples of equal size into a single sample for the purpose of analysis.

consumer means a person who applies, or intends to apply, **processed oyster shell** to land.

daily global solar exposure means the total solar energy for a day falling onto a horizontal surface and is measured from midnight to midnight. Daily global solar exposure data is available on the Australian Government Bureau of Meteorology Climate Data Online webpage or by searching for 'BOM climate data online'. This resource provides public access to daily global solar exposure data for the closest weather station available. Refer to Notes section for additional guidance.

desiccation means the process of drying **oyster shell** outdoors. **Desiccation** must be carried out for:

- a minimum period of 90 days; and
- at least 30 days where the daily global solar exposure is greater than 18 MJ/m².

If the minimum period of 90 days does not include at least 30 days where the **daily global solar exposure** is greater than 18 MJ/m², **desiccation** must continue until the **oyster shell stockpile** has been exposed to at least 30 days where the **daily global solar exposure** is greater than 18 MJ/m². Refer to Notes section for additional guidance.

disease outbreaks means the occurrence of disease cases or pests affecting oysters more than normal expectancy, including those caused by viruses, bacteria and/or protozoa such as:

- Marteilia sydneyi (causing QX disease)
- Ostreid herpesvirus -1 microvariant (causing Pacific Oyster Mortality Syndrome)
- Bonamia roughleyi (causing winter mortality)
- Polydora websteri (Mudworm)
- Imogine mcgrathi (Flatworms)

generator means a person who processes **oyster shell** via **desiccation** prior to supply to a **processor**.

liming agent means any **soil amendment** containing calcium carbonate, magnesium carbonate or other materials used to neutralise soil acidity and furnish calcium and magnesium for plant growth.

mass mortality event means predation, disease outbreaks, water temperature fluctuations and flooding events that cause widespread oyster death.

normal operating conditions means the harvesting and processing of oysters. This involves the collection of oysters from the bags, baskets or trays where they are grown and **shucking** of oysters to remove the **oyster flesh** from the **oyster shell**.

NSW oyster aquaculture leases means oyster leases for which there is a NSW aquaculture permit where oysters are bred and raised for their oyster flesh or related products such as pearls. Aquaculture permit means an aquaculture permit issued and in force under Part 6 of the *Fisheries Management Act 1994*.

oyster flesh means the portion of the oyster that is removed from the **oyster shell** for human consumption.

oyster shell means the shell waste generated from Sydney Rock Oysters (*Saccostrea glomerata*), Pacific Oysters (*Crassostrea gigas*), Native Flat Oysters (*Ostrea angasi*) and Akoya Pearl Oysters (*Pinctada imbricata*). The **oyster shell** may contain remnants of the abductor muscle still attached to the shell.

oyster shell stockpile means a stockpile of oyster shell stored in a clean, dry and outdoor environment. The oyster shell stockpile must not contain oyster flesh and must not be greater than 1m in height. If a generator has more than one oyster shell stockpile, the oyster shell stockpiles must be stored so that one stockpile does not mix with other oyster shell stockpiles.

physical contaminant means any natural or anthropogenic material other than oyster

shell, and includes materials such as plastic, glass, metal, rubber, cloth, paper or wood. **premises** has the same meaning as in the POEO Act.

processor means a person who processes desiccated **oyster shell** (that has been received from the **generator**) via **size reduction** prior to supply to a **consumer**.

shucking means the process of opening an oyster using an oyster knife or an automated oyster shucker to wholly remove the **oyster flesh** from the **oyster shell**.

single seed oyster means an individual unattached oyster that is grown from small spat produced by removing wild oysters at a very early age from plastic collectors or produced as single oysters in a shellfish hatchery.

size reduction or **size reducing** means the process in which the particle size of a solid is made smaller using methods such as hammer milling, crushing or grinding. Size reduction must not be used as a method of managing **physical contaminant** loading.

soil amendment means any material that is applied to soil to enhance plant growth or improve soil physical, chemical or biological properties or processes. Soil amendments may contain important fertiliser elements, but the term commonly refers to added materials other than those used primarily as fertilisers (e.g. **liming agents**, compost, animal manures, crop residues).

stick cultivation means traditional growing of wild caught oysters on the sticks that they are caught on. Suitable method for areas subject to significant wave action. 'Stick oysters' may be removed from sticks and fattened on trays or in baskets prior to harvest.

stockpile information (oyster shell) means that the following information is recorded and presented on a signpost at the base of each **oyster shell stockpile**:

- A unique batch identifier (e.g. a stockpile number/code);
- The approximate dimensions of **oyster shell stockpile** in metres;
- The date that the **oyster shell stockpile** commenced **desiccation**;
- The date that marks 90 days following the commencement of desiccation; and
- Instructions that no further oyster shell can be added to the stockpile of oyster shell once desiccation has commenced.

stockpile information (processed oyster shell) means that the following information is recorded for each stockpile of **processed oyster shell**:

- A unique batch identifier (e.g. a stockpile number/code); and
- The approximate dimensions (in metres) and volume (in m³) of the stockpile of processed oyster shell.

transaction means:

- in the case of a once-off supply, the supply of oyster shell or processed oyster shell;
- in the case of ongoing supply, where the supplier and recipient have an ongoing arrangement for the supply of **oyster shell** or **processed oyster shell**, the first supply of **oyster shell** or **processed oyster shell** within a two-year period.

Where an arrangement exists beyond a two-year period, **transaction** means the first supply of **oyster shell** or **processed oyster shell** for every two-year period.

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Notes

The EPA may amend or revoke this order at any time. It is the responsibility of the **generator** and **processor** to ensure it complies with all relevant requirements of the most current order. The current version of this order will be available on www.epa.nsw.gov.au

In gazetting or otherwise issuing this order, the EPA is not in any way endorsing the supply or use of this substance or guaranteeing that the substance will confer benefit.

The conditions set out in this order are designed to minimise the risk of potential harm to the environment, human health or agriculture, although neither this order nor the accompanying exemption guarantee that the environment, human health or agriculture will not be harmed.

Any person or entity which supplies **processed oyster shell** should assess whether the material is fit for the purpose the material is proposed to be used for, and whether this use may cause harm. The supplier may need to seek expert engineering or technical advice.

Regardless of any exemption or order provided by the EPA, the person who causes or permits the application of the substance to land must ensure that the action is lawful and consistent with any other legislative requirements including, if applicable, any development consent(s) for managing operations on the site(s).

The supply of **processed oyster shell** remains subject to other relevant environmental regulations in the POEO Act and Protection of the Environment Operations (Waste) Regulation 2014. For example, a person who pollutes land (s. 142A) or water (s. 120), or causes air pollution through the emission of odours (s. 129) or does not meet the requirements for asbestos waste (s. 144AAB), regardless of this order, is guilty of an offence and subject to prosecution.

This order does not alter the requirements of any other relevant legislation that must be met in supplying this material, including for example, the need to prepare a Safety Data Sheet.

Failure to comply with the conditions of this order constitutes an offence under section 286A of the POEO Act.

Searching for daily global solar exposure information

The Bureau of Meteorology website publishes information for many weather monitoring stations across NSW, including daily data for **daily global solar exposure**. This information can be accessed on the 'Climate Data Online' webpage by following the URL http://www.bom.gov.au/climate/data/ or by searching for 'BOM climate data online'.

The following example shows how to search for the **daily global solar exposure** data for Forster for the first half of 2024, using two different search approaches, as well as how to view the data outputs online or downloaded to a Microsoft Excel spreadsheet.

Searching using the text function

Step 1 Select 'solar exposure' on the drop-down menu to provide data on **daily global solar exposure**. Ensure that the type of data is set to 'daily' not 'monthly'.



Step 2 Search for the weather station nearest to the **oyster shell stockpile** and click the 'Find' button. In this example, 'Forster' was searched. A list of matching towns will be presented. Note that the same NSW town with different co-ordinates may be presented using the text search (as shown below). Take care to select the correct town, as two of these selections are along the NSW coastline, and one is in inland NSW.

2: Select a weather station in the area of interest Forster F	ind	OR - search by Position
Matching towns (click one to select it) Forster, NSW, 32.21°S, 152.53°E Forster, NSW, 32.18°S, 152.51°E Forster, NSW, 30.52°S, 151.67°E Forster, SA, 34.73°S, 139.55°E	Û	More information: Geoscience Australia ⊡ (opens new window)

Step 3 Select the matching town closest to the **oyster shell stockpile**. In this example, the top Forster town was selected. Clicking on a selection brings up a list of nearby weather stations. Select the weather station closest to the **oyster shell stockpile**. In this example, the top weather station was selected. Ensure that the 'only show open stations' is ticked.

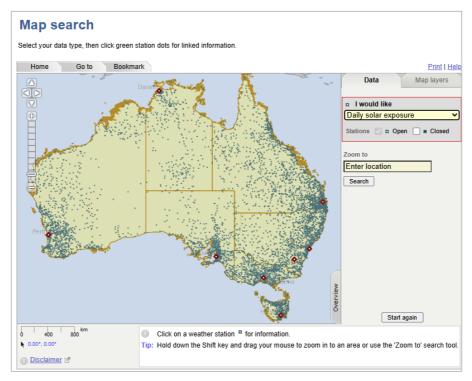
Nearest Bureau stations (click one to select it)	
Only show open stations (may no longer report all data types)	
060150 Forster (Mid Coast Council Enviromon Bas NSW (1.4 no60013 Forster - Tuncurry Marine Rescue NSW (4.3km away) 060158 Whoota NSW (12.1km away) 060149 Forster Pacific Palms SES Enviromon Base NSW (14 060065 Wootton NSW (23.0km away)	More information: for the selected station (opens new window)

Step 4 Select the year that you wish to access the **daily global solar exposure** data for the selected weather station. In this example, 2024 was selected. Once the station number is pre-filled in the following section, click the 'Get Data' button.

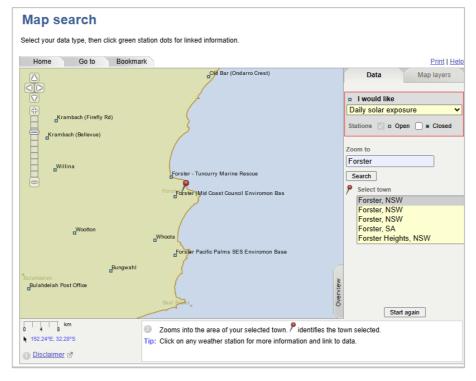
Select year 2024		
3: Get the data		
Station number 060150	Get Data (Opens in new window)	Save Clear
Don't clear this number Note, most s	stations do not collect all data types. Searching will ensure relevant stations.	

Searching using the map function

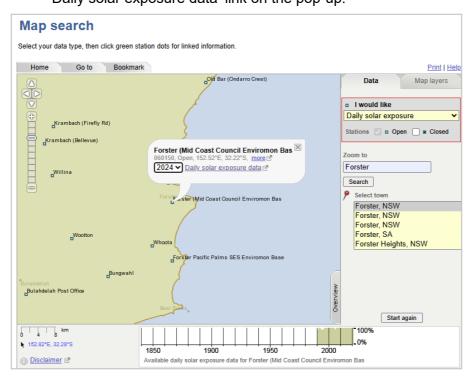
Step 1 Select 'daily solar exposure' on the drop-down menu to update the map on weather stations with available **daily global solar exposure** data. Ensure that the box for 'closed' weather stations is not selected.



Step 2 Either manually zoom to the area where the **oyster shell stockpile** is located or use the 'zoom to' search field to search for the nearest town. In this example, 'Forster' was searched. A list of matching towns will be presented for selection. Clicking on the selection will update the map to that area. In this example, the top selection was selected.



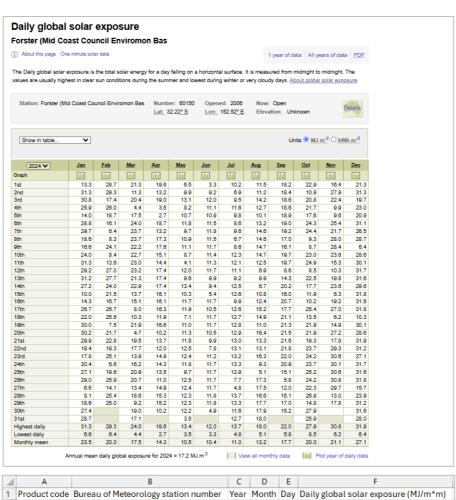
Select the weather station closest to the **oyster shell stockpile** by clicking on the small square icon on the map for that weather station. In this example, the 'Forster (Mid Coast Council Environon Bas' was selected. Selecting the weather station will lead to a pop-up. Select the year that you wish to access the **daily global solar exposure** data. In this example, 2024 was selected. Once the year is selected, click the 'Daily solar exposure data' link on the pop-up.



Viewing and downloading the daily global solar exposure data

Once the daily global solar exposure data has been searched using either of the text or map search approaches above, a new webpage will open containing the relevant **daily global solar exposure** data for the selected weather station in a table format – see below. Ensure that the Units selected is on MJ m⁻².

The information in the table shows the **daily global solar exposure** for each given day in a calendar year. The generator may choose to use the information from this webpage or download the **daily global solar exposure** data by clicking the link above the table called '1 year of data'. Clicking the link will download the **daily global solar exposure** data in a .csv spreadsheet format, where the **daily global solar exposure** data is presented in a single column against each day of the calendar year – see below.



Δ	Α	В	С	D	Е	F
1	Product code	Bureau of Meteorology station number	Year	Month	Day	Daily global solar exposure (MJ/m*m)
2	IDCJAC0016	60150	2024	1	1	13.3
3	IDCJAC0016	60150	2024	1	2	31.3
4	IDCJAC0016	60150	2024	1	3	30.8
5	IDCJAC0016	60150	2024	1	4	25.9
6	IDCJAC0016	60150	2024	1	5	14
7	IDCJAC0016	60150	2024	1	6	28.8
8	IDCJAC0016	60150	2024	1	7	29.7
9	IDCJAC0016	60150	2024	1	8	18.6
10	IDCJAC0016	60150	2024	1	9	16.6
11	IDCJAC0016	60150	2024	1	10	24
12	IDCJAC0016	60150	2024	1	11	31.3
13	IDCJAC0016	60150	2024	1	12	29.2
14	IDCJAC0016	60150	2024	1	13	31.2
15	IDCJAC0016	60150	2024	1	14	27.2
16	IDCJAC0016	60150	2024	1	15	10
17	IDCJAC0016	60150	2024	1	16	14.3
18	IDCJAC0016	60150	2024	1	17	26.7
19	IDCJAC0016	60150	2024	1	18	22
20	IDCJAC0016	60150	2024	1	19	30
21	IDCJAC0016	60150	2024	1	20	30.2
22	IDCJAC0016	60150	2024	1	21	29.9
23	IDCJAC0016	60150	2024	1	22	19.4
24	IDCJAC0016	60150	2024	1	23	17.8
25	IDCJAC0016	60150	2024	1	24	30.4
26	IDCJAC0016	60150	2024	1	25	27.1
27	IDCJAC0016	60150	2024	1	26	29
28	IDCJAC0016	60150	2024	1	27	6.6
29	IDCJAC0016	60150	2024	1	28	8.1
30	IDCJAC0016	60150	2024	1	29	18.6
31	IDCJAC0016	60150	2024	1	30	27.4
32	IDCJAC0016	60150	2024	1	31	28.7
33	IDCJAC0016	60150	2024	2	1	28.7
34	IDCJAC0016	60150	2024	2	2	29.3
35	IDCJAC0016	60150	2024	2	3	17.4