GEARs
GHG Emission, Authentic Reporting Sys'

EEXI Calculation program (User manual)

February 2022

KR
KOREAN REGISTER

1. Function composition

The KR-GEARs EEXI program consists of a Main page, Calculation page and log page.

The main functions are shown in the table below.

1.1 Main page

Function	Details
Main page	• Ships registered on the EEXI calculation page are shown as a list • You can check the status of drawing approval of the submitted EEXI Technical File / Onboard management Manual • Displays the type of vessel and the drawing approval status of the registered ships on EEXI calculation page in a graph.

1.2 Calculation page

Function	Details
Ship Particular	• Create basic information of the ship and link necessary data when calculate EEXI • In case of KR registered vessel, data field registered in KR e-fleet is automatically linked.
Ship Speed	• Calculate ship speed at 75% or 83% (EPL) of MCR according to the ship's speed-power table, and configure it to be graphed. • If there is no speed-power table, the speed calculation is derived according to the alternative method of EEXI

	calculation guidelines. Also you can manually enter the ship speed directly.
Calculation	• Calculated attained and required EEXI value • Check the result value used for calculation • Input the necessary data for application of dual fuel or correction factors
Application	• Application letter for drawing approval of EEXI Technical file and Onboard management can be fill out only for KR registered vessels. • Creation of EEXI technical file and Onboard management plan

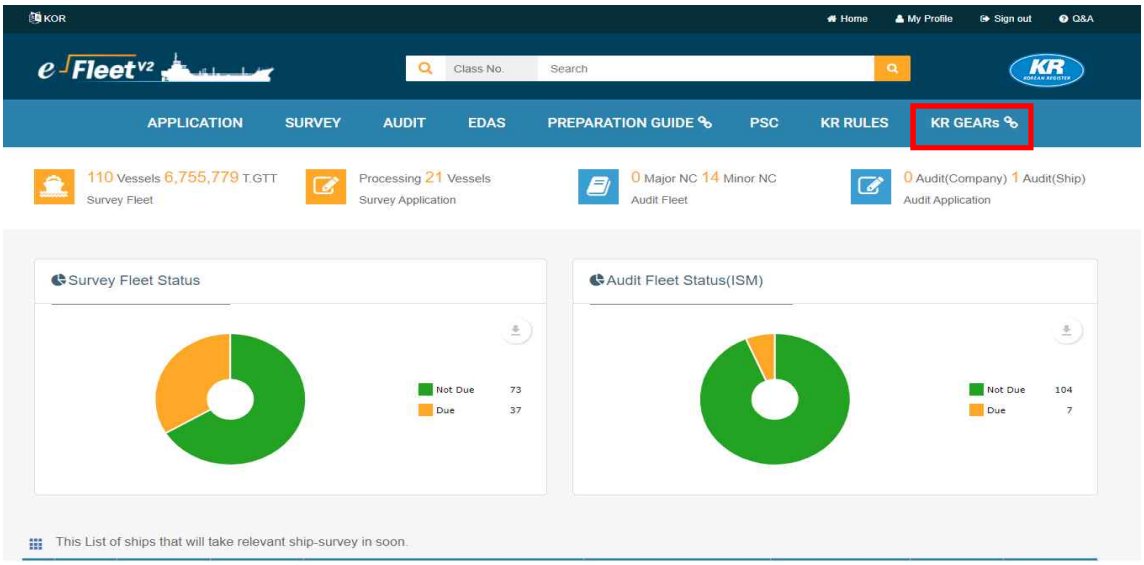
1.3 Log page

Function	Details
User log	• Check the user log for program use

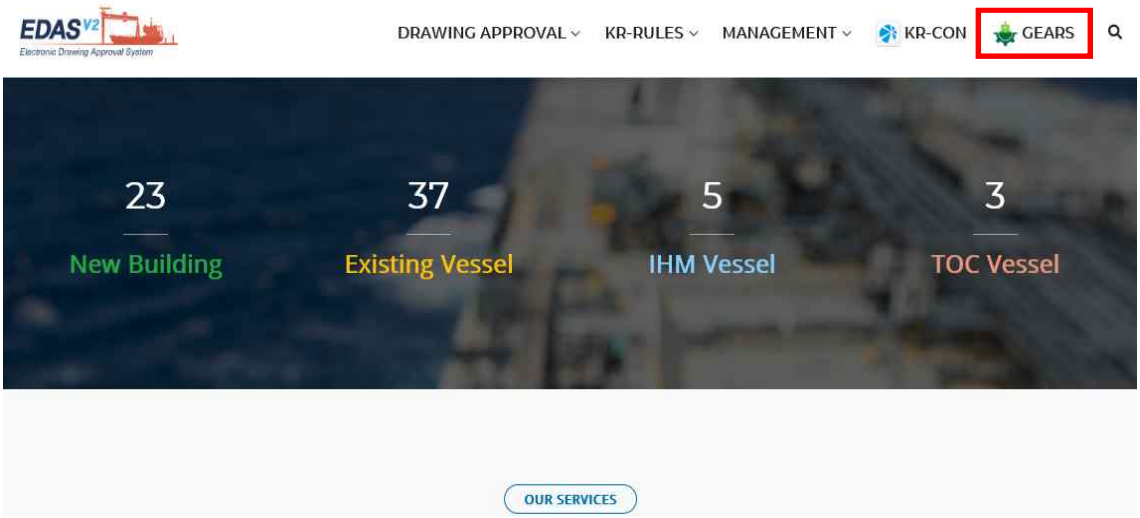
2. Login (https://gears.krs.co.kr)

1) If you have a KR E-fleet (for Ship Owner) & KR EDAS (for Ship Builder or Designer) registration account, you can log in through the corresponding ID/PW.

If you have any inquiry regarding the use of this program, please contact decarbonization@krs.co.kr.



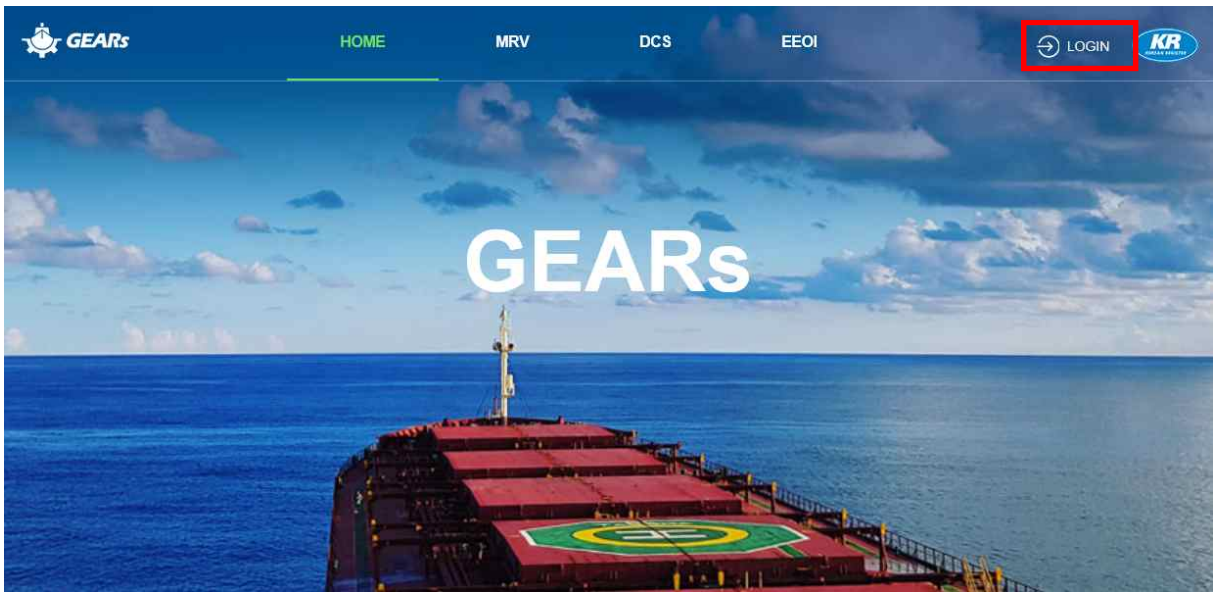
KR e-Fleet Main



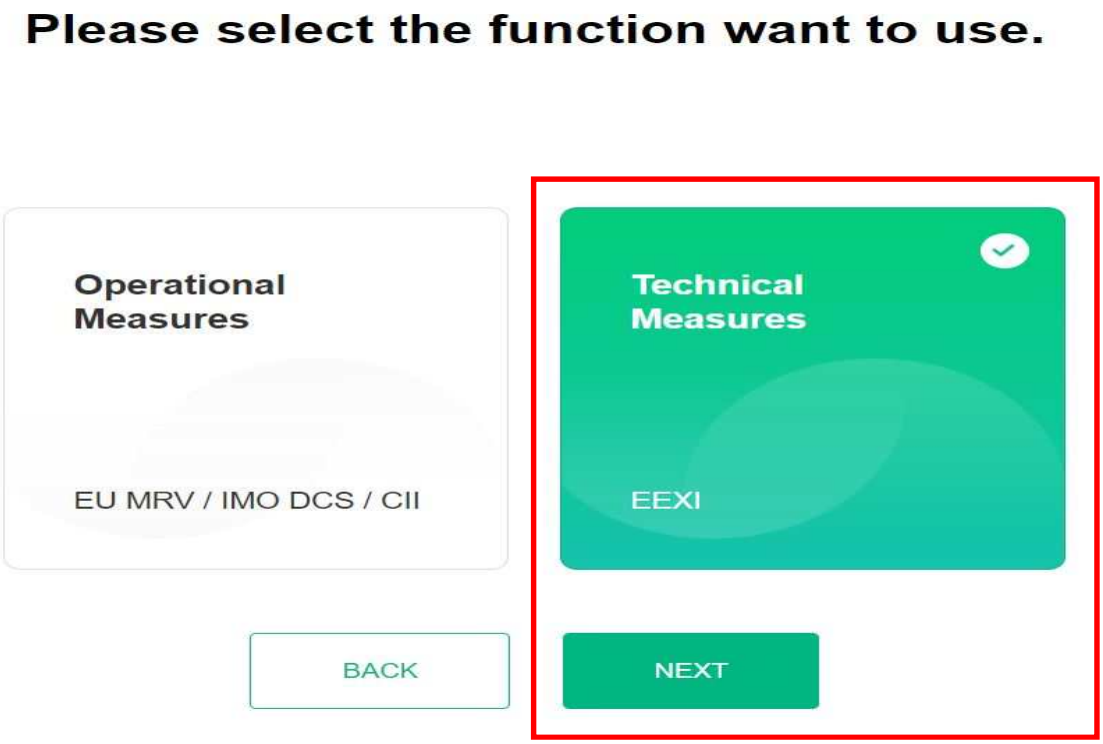
KR EDAS Main

2) If you don't have a KR E-fleet & KR EDAS registration account, you can create an ID/PW by sending the request E-mail to decarbonization@krs.co.kr.

And then you can use KR GEARs after login.



3) After log in KR GEARs, select the EEXI function and click the NEXT button

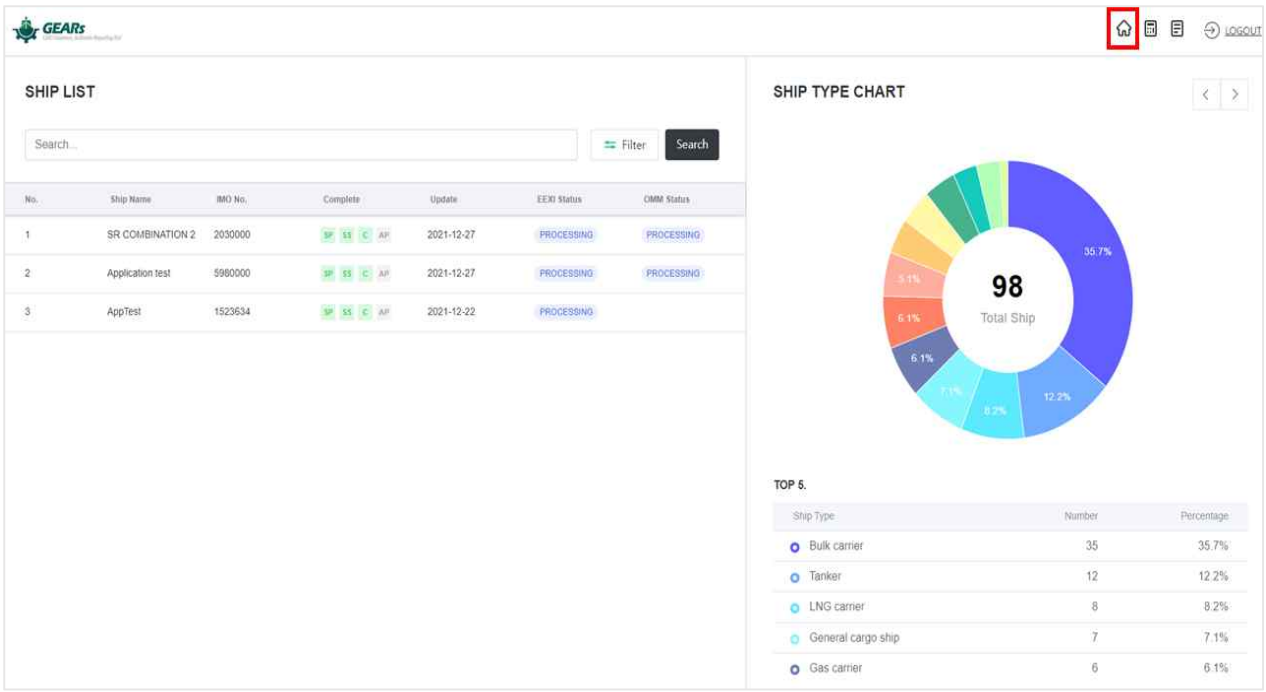


3. Main page

3.1 Main page

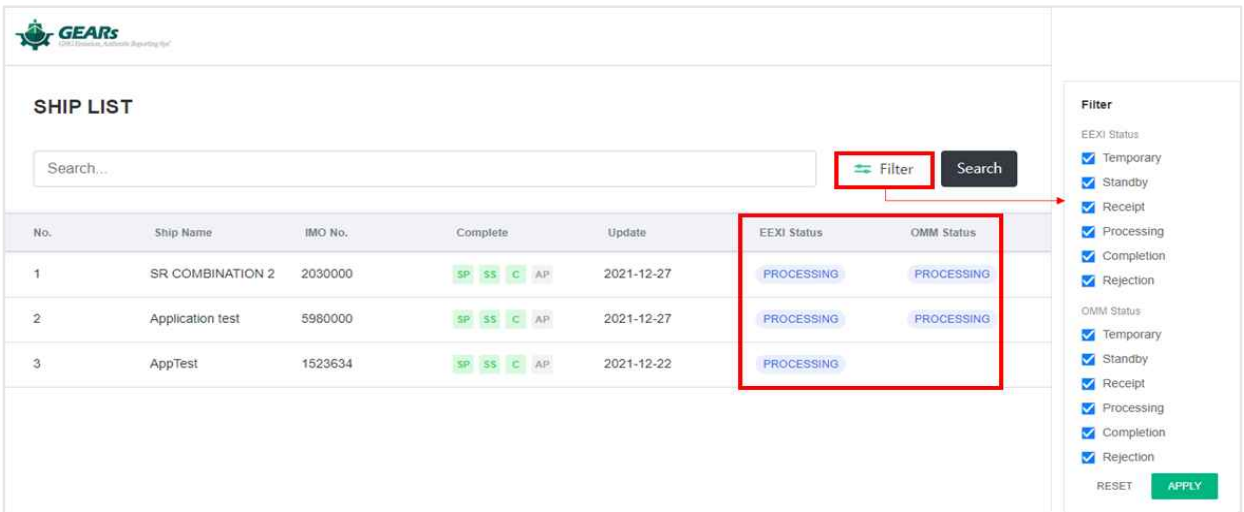
1) On the main page, a list of ships registered in the calculation page and drawing approval status for each ship is displayed.

In addition, the current status of ship type and drawing approval is displayed as a graph.

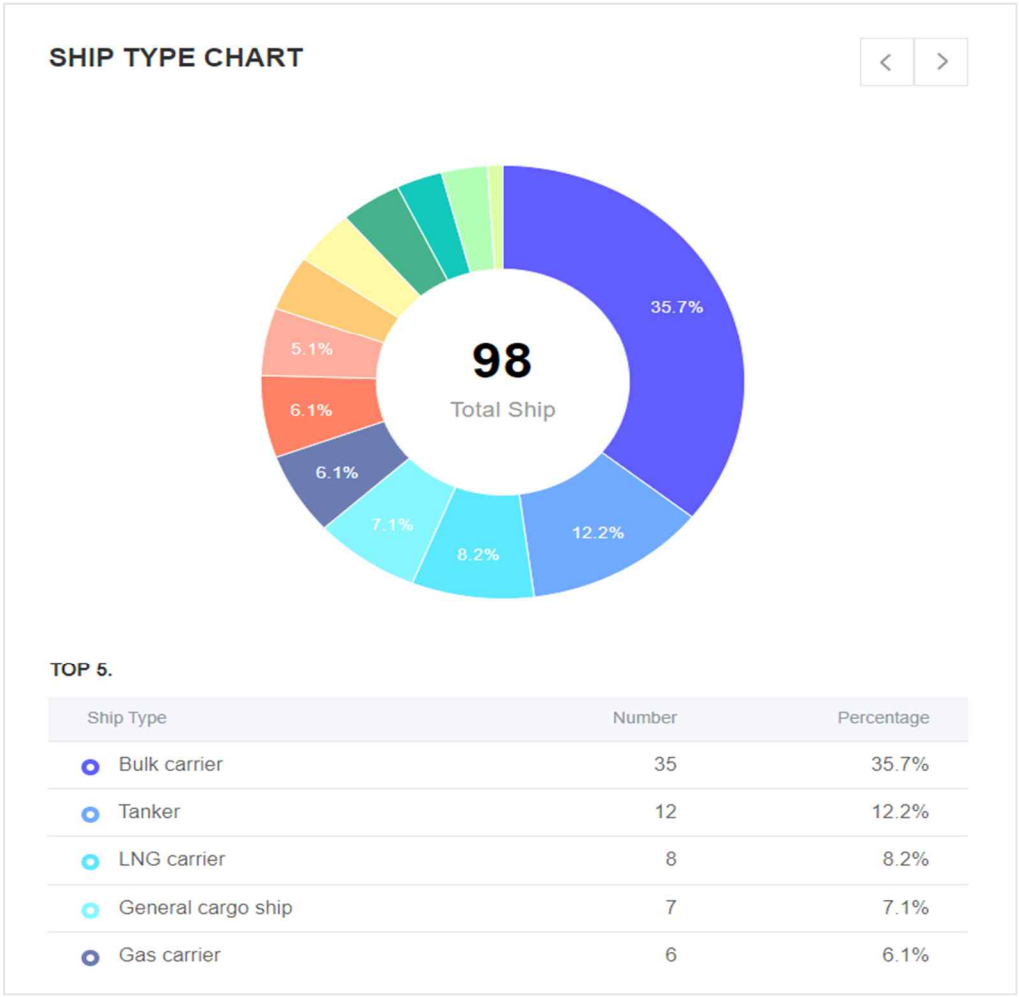


<Main page>

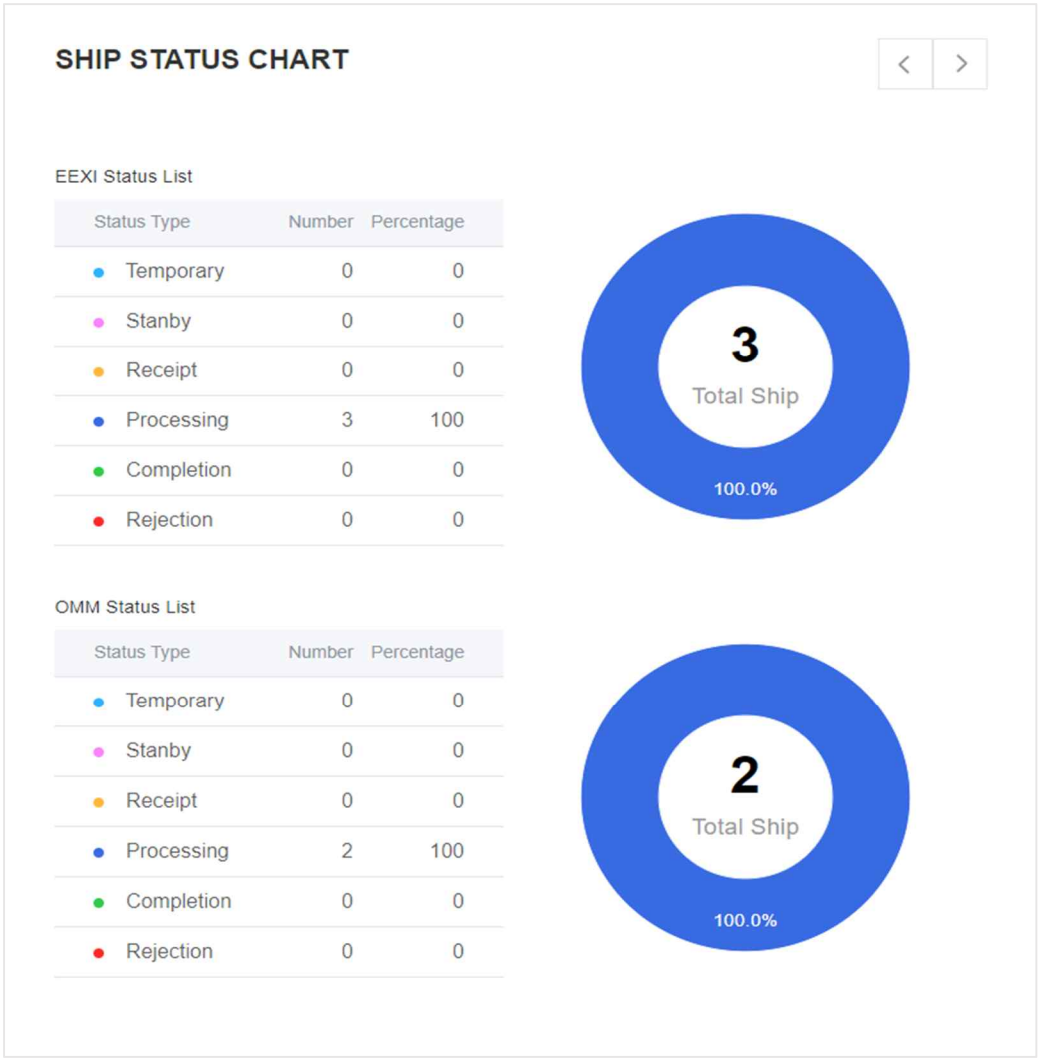
2) Ships registered on the EEXI calculation page appear on the SHIP LIST, and the drawing approval status can be filtered through the Filter button.



3) You can check the status of ship types registered on the EEXI calculation page and drawing approval in a graph.



<Ship type chart>



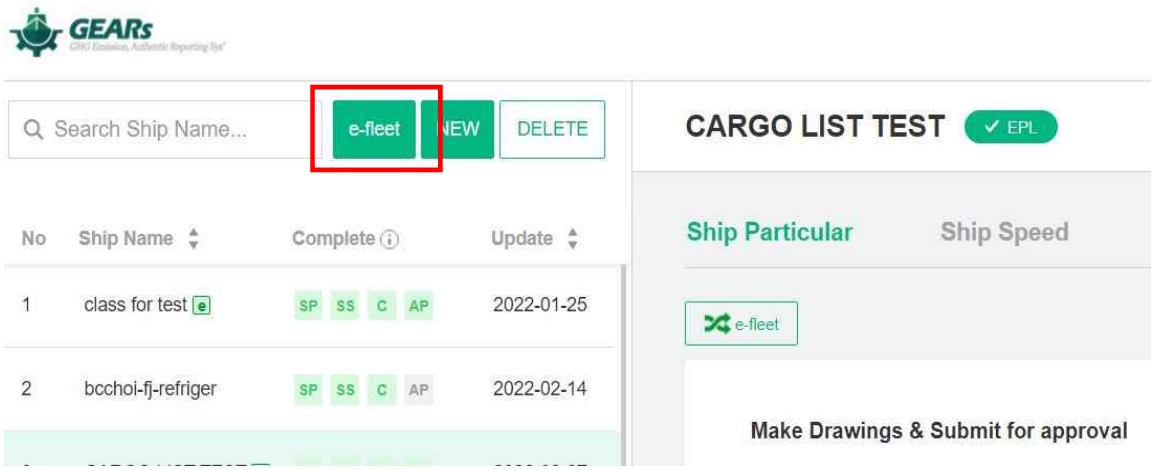
<Drawing approval status>

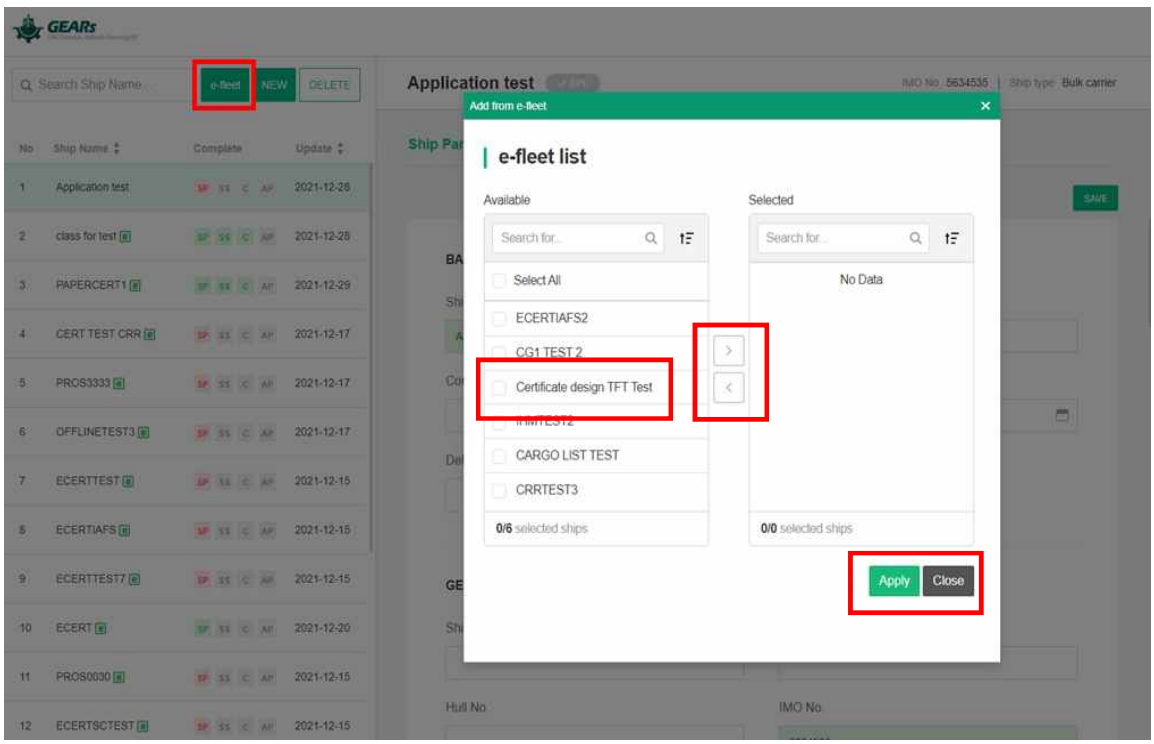
4. Create a new ship / Ship Particulars

4.1 Create a new ship

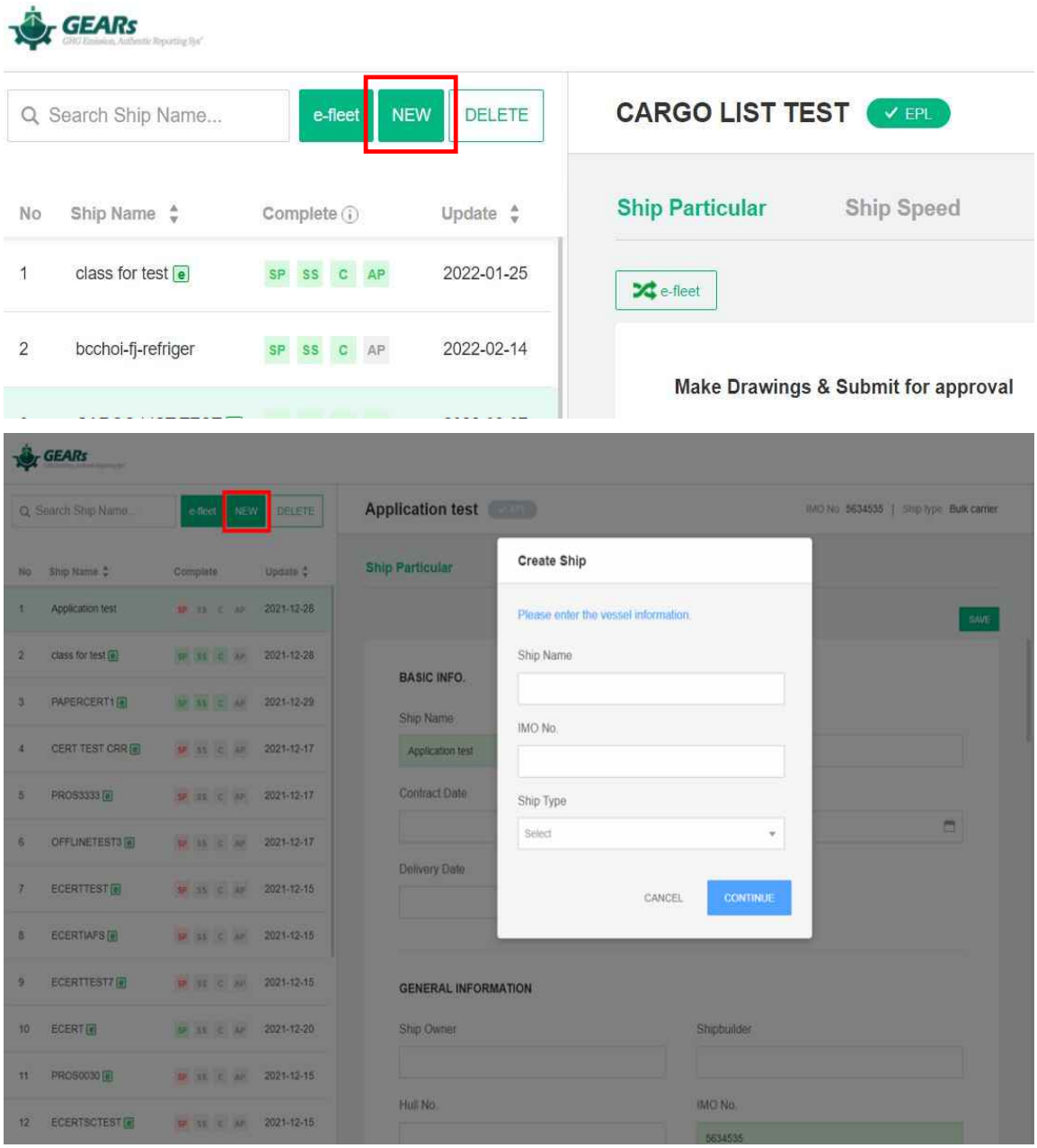
1) In case of KR registered ships, you can add a create ship registered to the KR e-fleet through the e-fleet button.

In the case of ship creation through the e-fleet button, main input data such as ship name, IMO No, principal particulars are automatically entered into the input field.



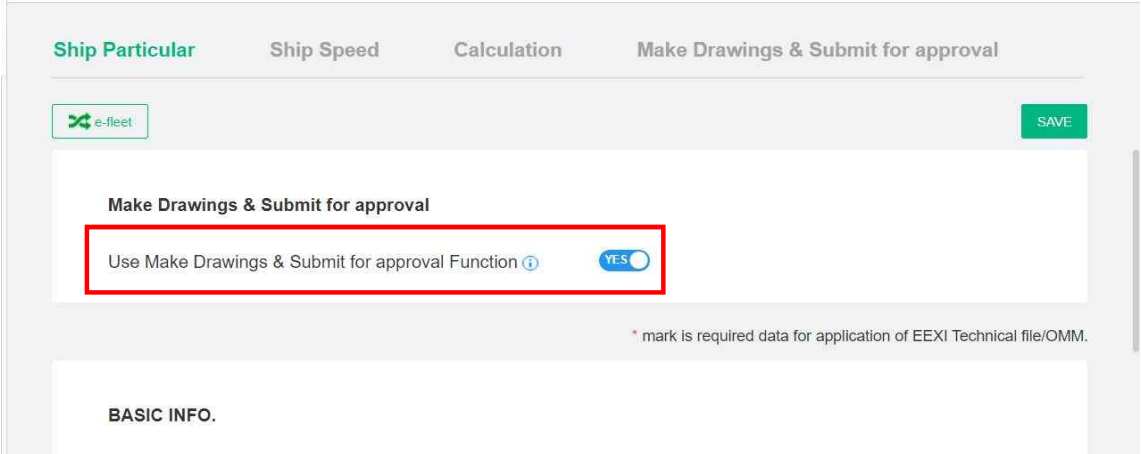


2) In case of ships not registered in KR, you can add a create ship through the NEW button.

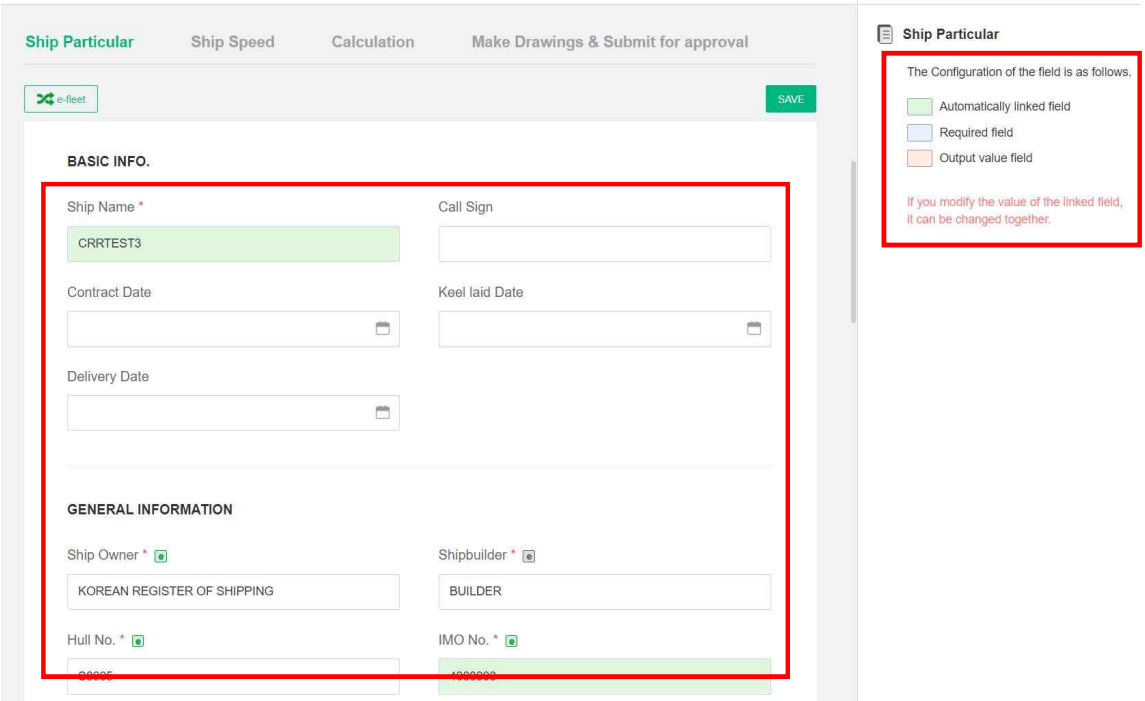


4.2 Ship Particular

1) Please activate the toggle button to YES for creation of EEXI Technical File and Onboard Management Manual and approval submission.

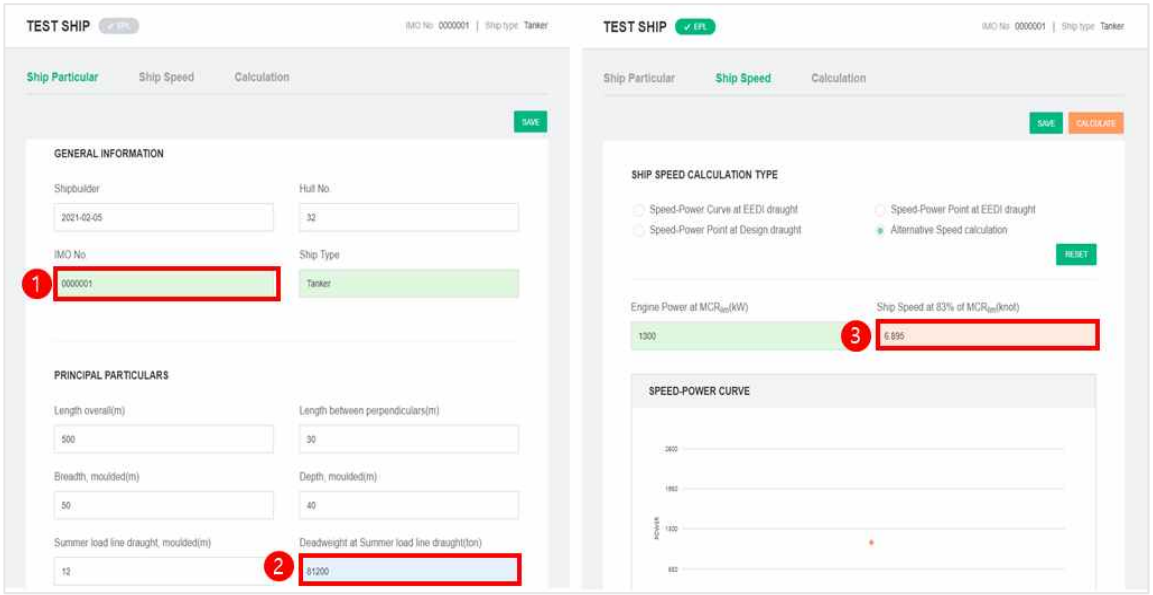


2) Enter the input data by referring to the color of the field description on the right.



3) The configuration of field colors is as below table.

No	Color	Description
1	Green	- Required data - Automatically linked field
2	Blue	- Required data - Required filed for EEXI calculation
3	Red	- The result value calculated when click the calculate button.
4	(*) mark	- Required data - Required field for make drawings(EEXI technical file/OMM)

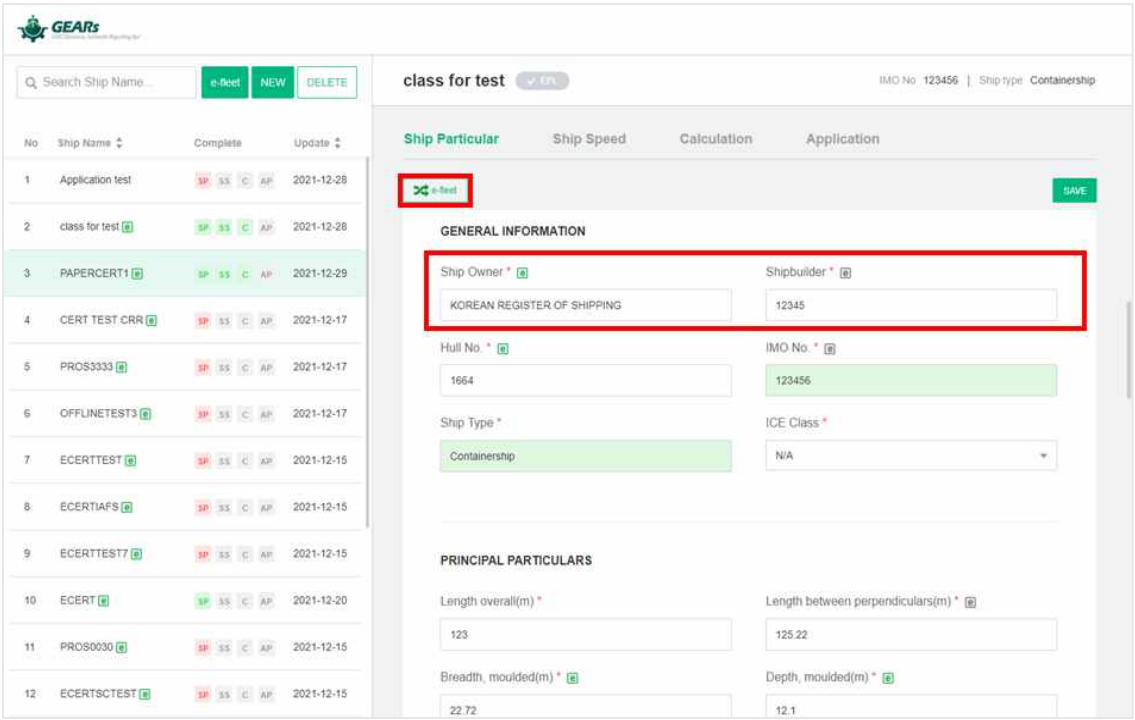


4) In case of KR registered ships, data from e-fleet automatically linked and in this case the e-fleet icon is displayed on the right. (e)

4-1) If the data registered in the e-fleet matches the data entered in EEXI field, the icon (e) is activated.

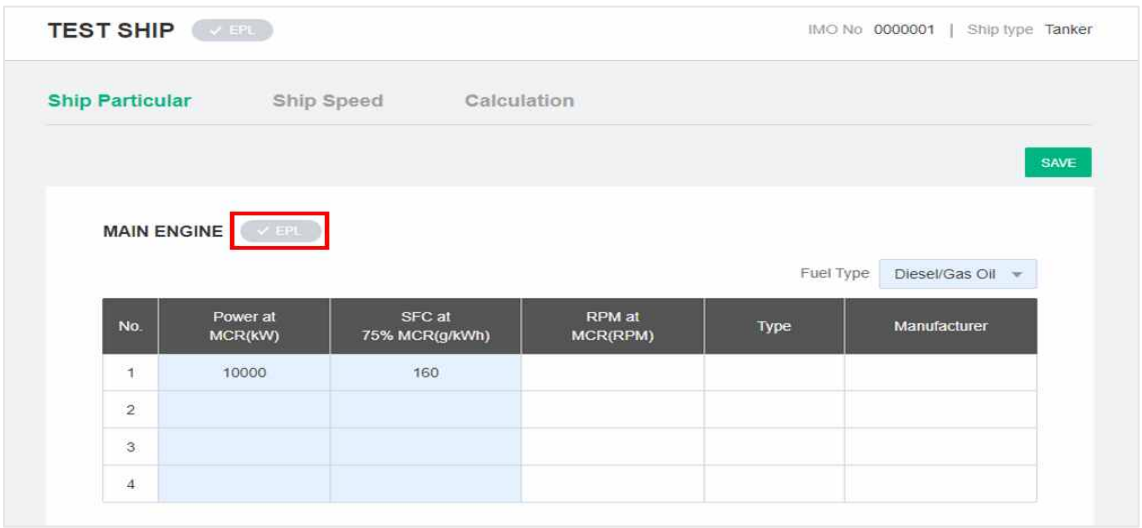
4-2) If the data registered in the e-fleet changed by manually input, the icon (e) is activated.

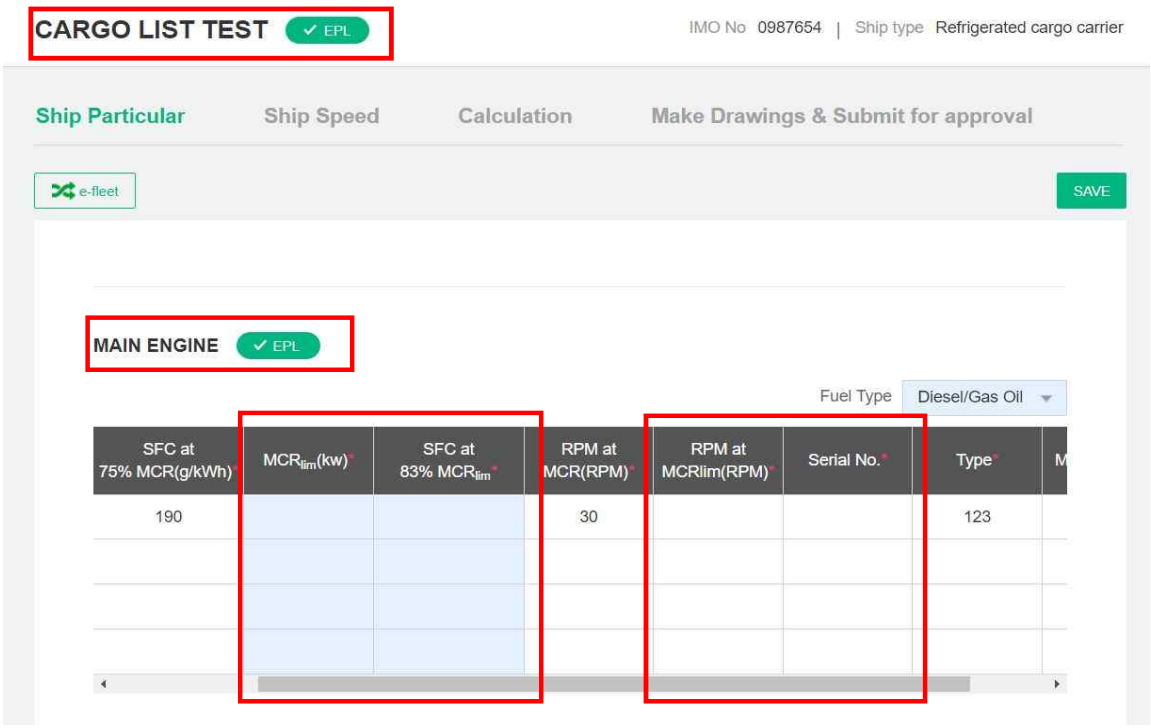
4-3) e-fleet data could be synchronized again by clicking the e-fleet button at the top. (e-fleet)



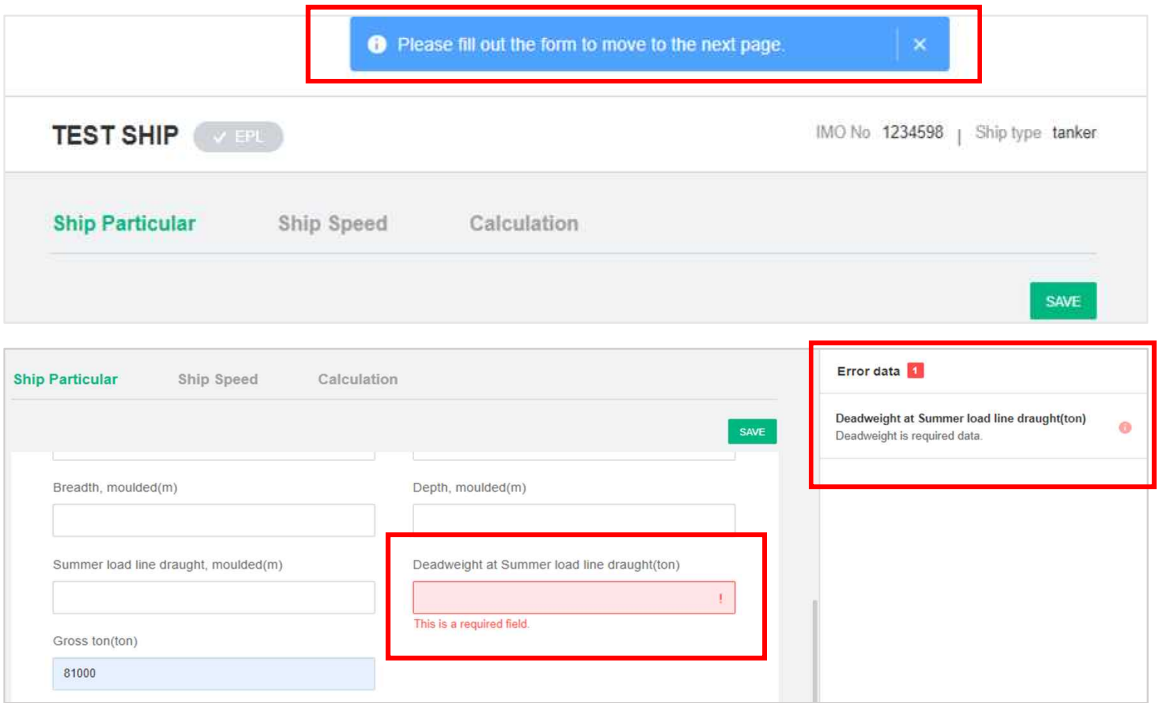
5) In the case of EPL applied ships, data is entered by activating the EPL button.

If you click the EPL(Engine Power Limit) button in the MAIN ENGINE category, additional fields are created for inputting limited power(hereafter referred to as MCRlim) and SFC(hereafter referred to as SFClim) values, and the EPL button next to the ship name is activated.

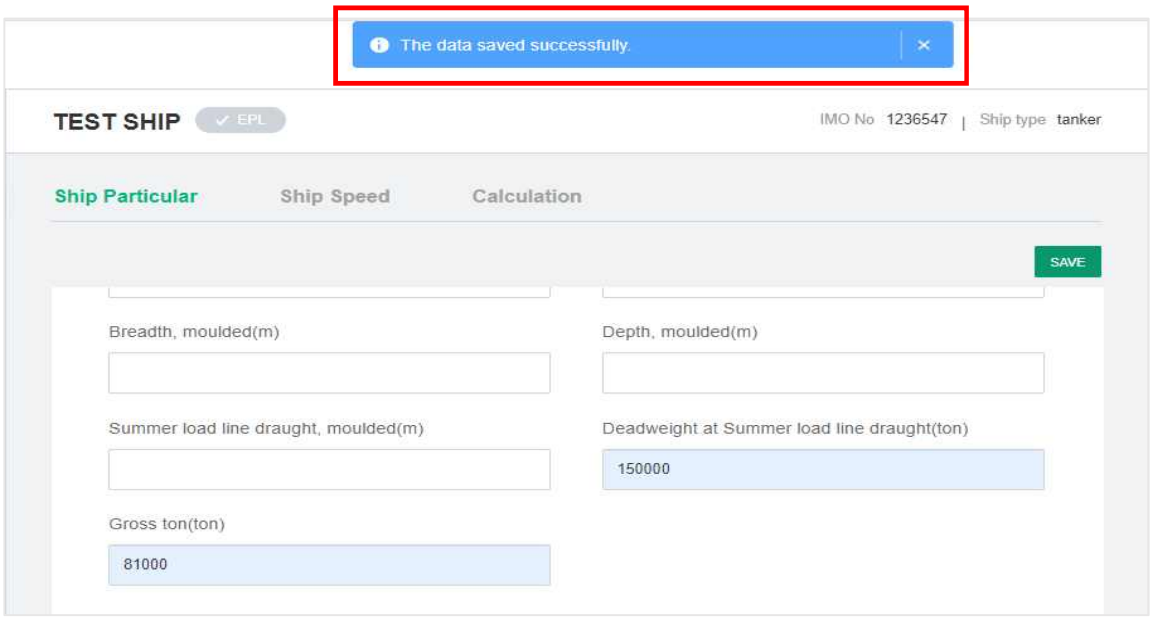




6) If you click the next tab (Ship Speed) without completing the required data input on the Ship Particular tab, a warning message asking you to enter the data value is displayed and an error message is displayed in the description on the right. Clicking on an error will move you to the corresponding input field.



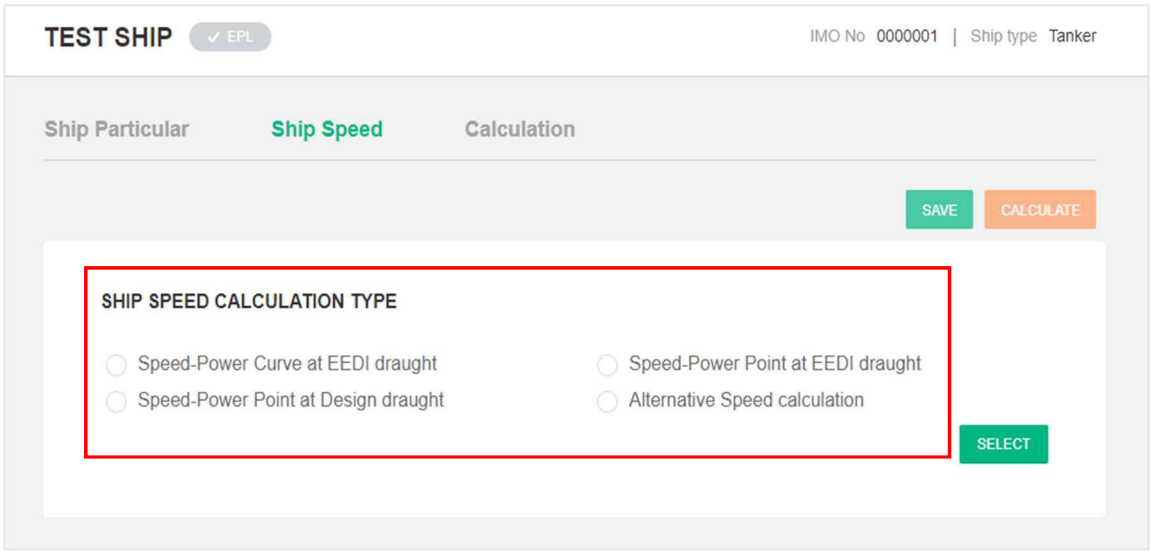
7) If you input all the required data and press SAVE button, you can move to the next tab(Ship Speed) with a message "The data saved successfully"



5. Ship Speed

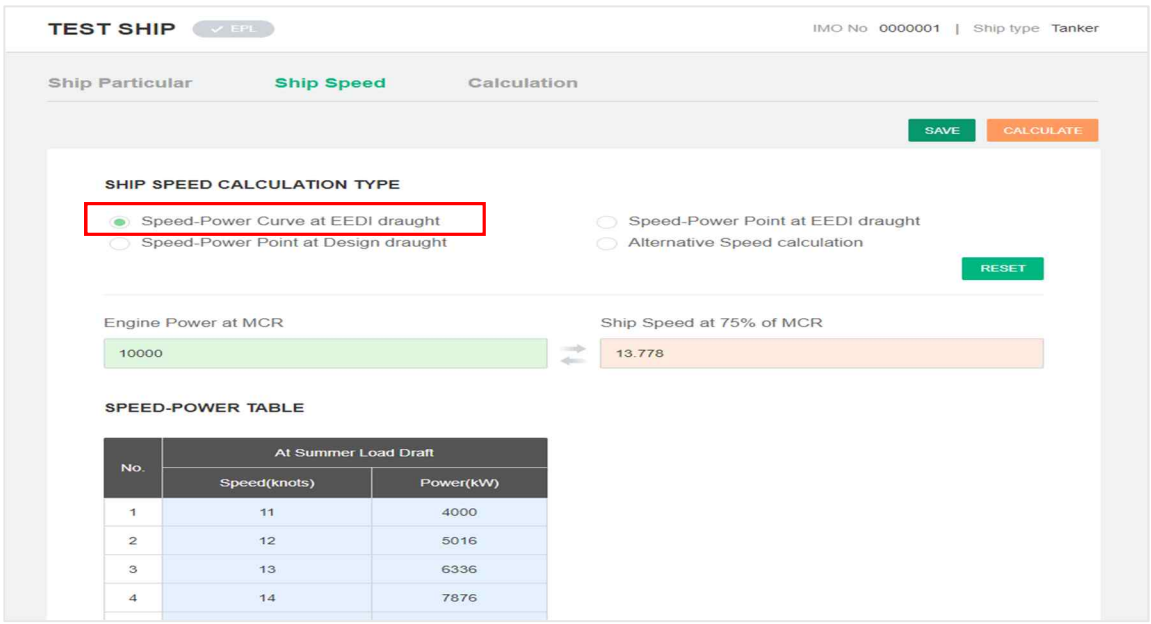
1) On the Ship Speed tab, ship speed and graph are derived according to the input values of the Speed-Power table. In cases where the Speed-Power curve is not available or the sea trial report does not contain the EEDI or design load draft condition, ship speed can be obtained from alternative speed calculation.

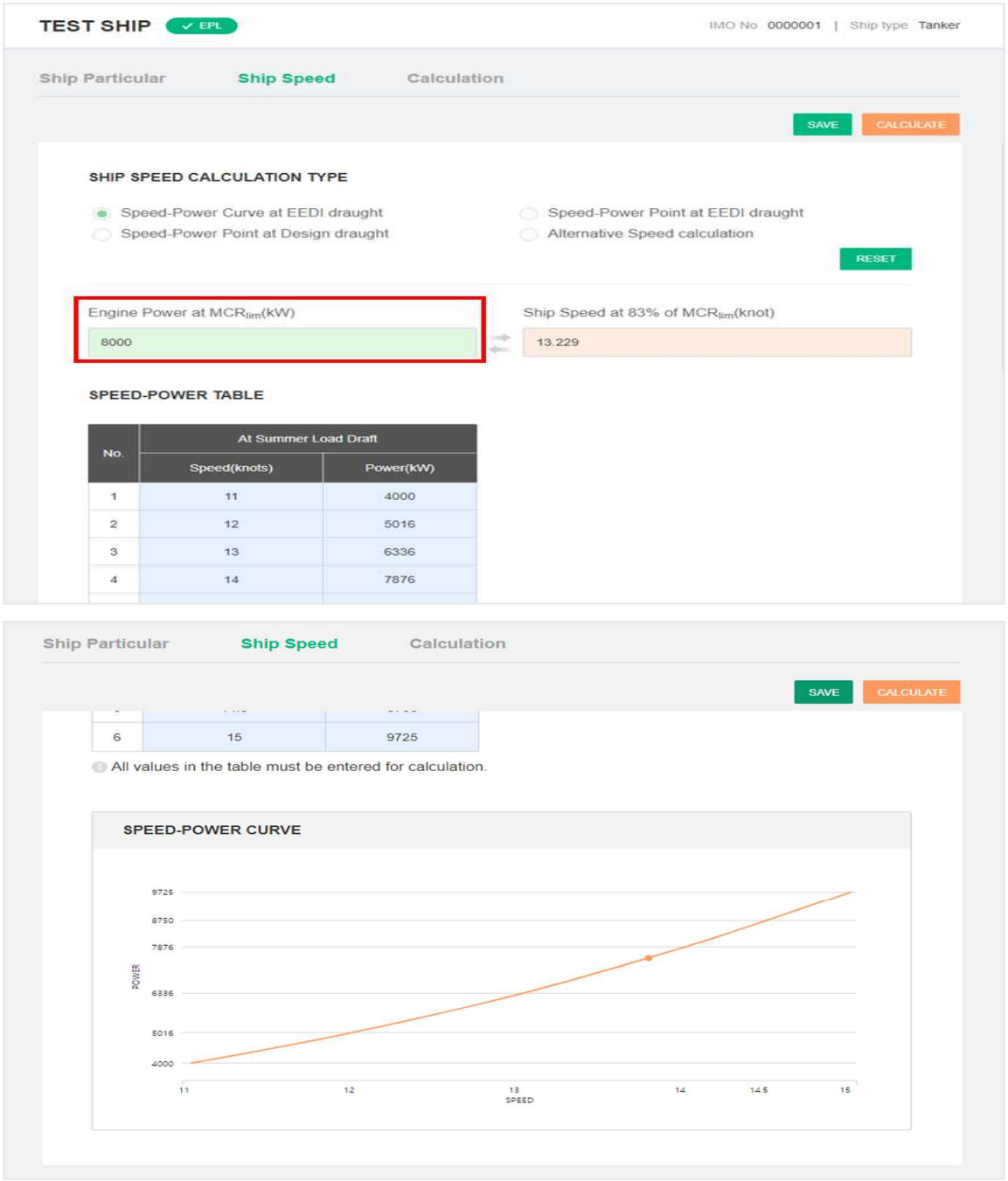
Also, you can manually input the ship speed value directly and save it. By pressing the select button, you can activate the desired calculation formula.



2) Speed-Power Curve at EEDI draught

If you input the speed-power table with select Speed Power Curve at EEDI draught and click the calculation button, the ship speed is automatically calculated and displayed in the red field with speed-power curve.





When EPL is activated, ship speed calculated reflecting the MCRlim.

3) Speed-Power Point at EEDI draught

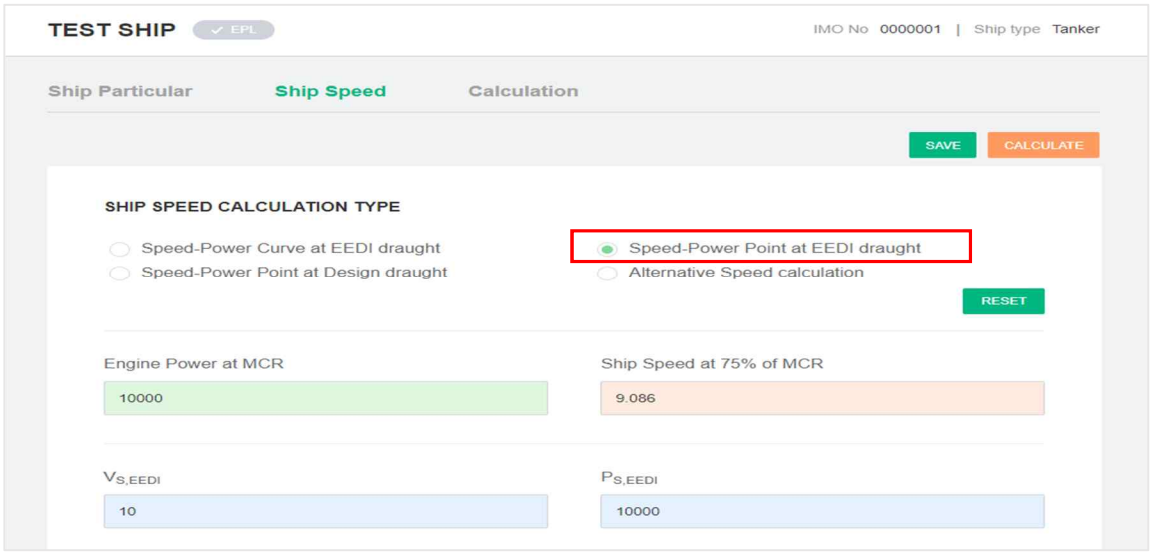
This option can be selected when there is only one point result value, not a speed-power curve(several points).

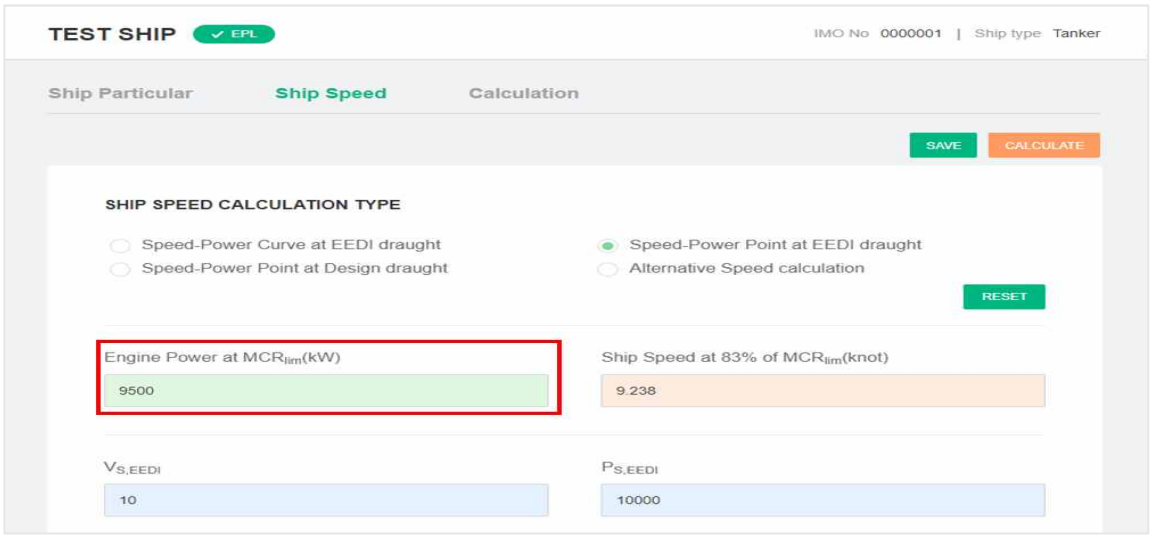
The field values are defined as the below table.

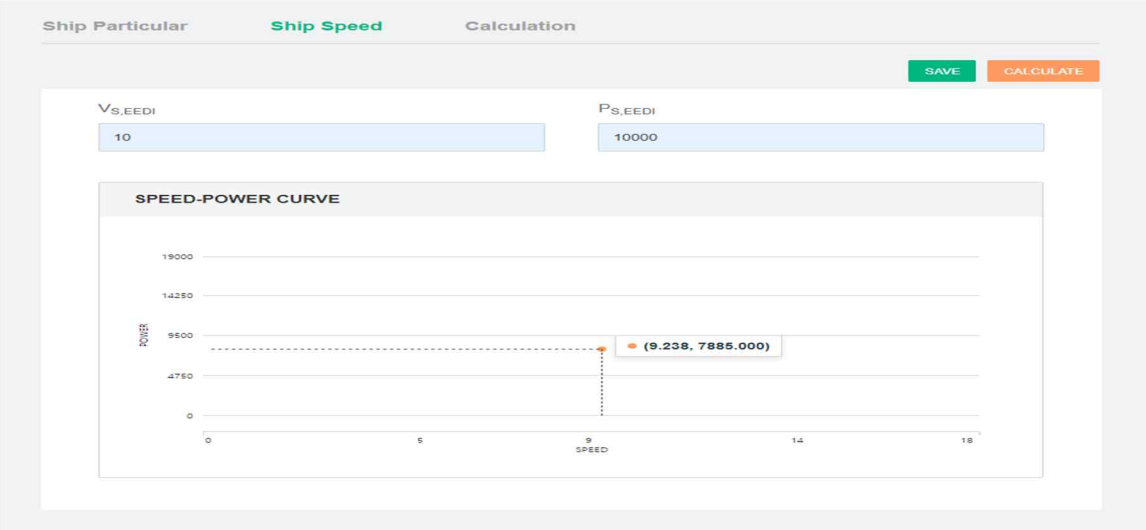
Item	Definition
Vs,EEDI	Sea trial service speed under the EEDI draught

Ps,EEDI	Power of the main engine corresponding to Vs,EEDI

If you click the calculation button after input Vs,EEDI and Ps,EEDI values, the ship speed is automatically calculated and displayed in the red field, and a point plotted on the speed-power curve.







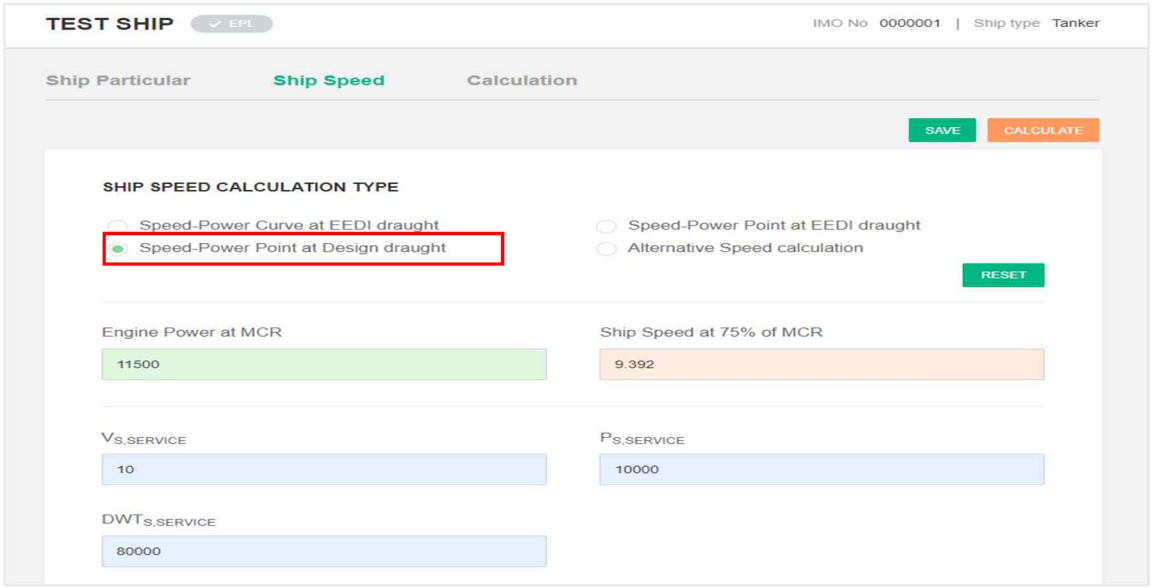
4) Speed-Power Point at Design draught

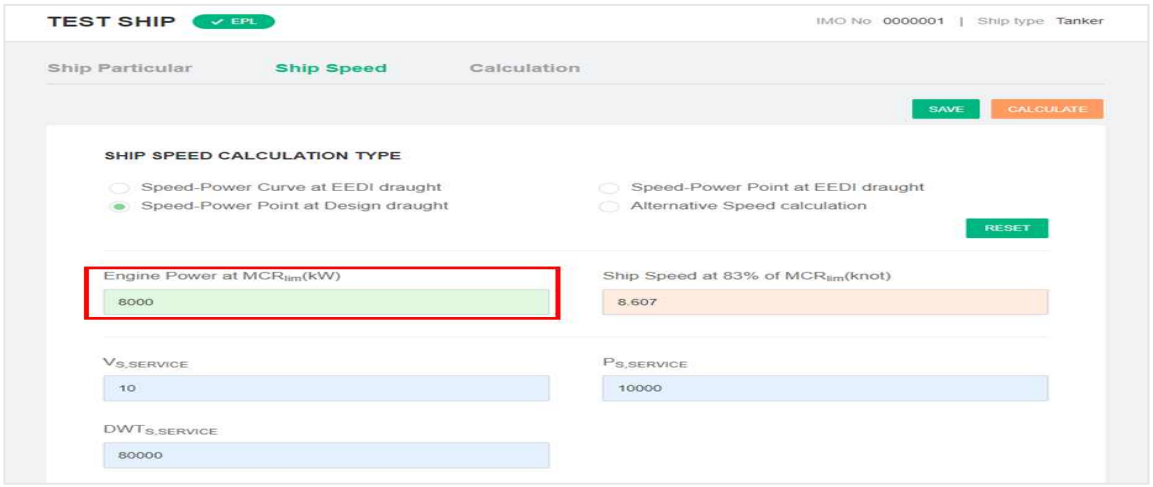
This option can be selected when the speed-power curve of design draught is available only for containers, bulk carriers or tankers.

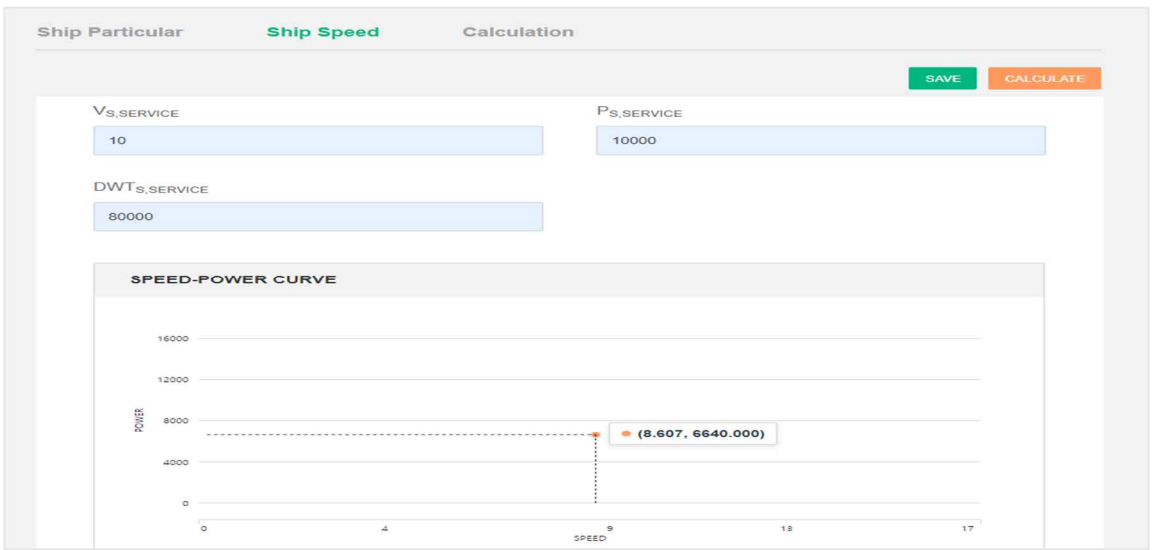
The field values are defined as the below table.

item	Definition
Vs,service	Sea trial service speed under the design load draught
DWTs,service	Deadweight under the design load draught
Ps,service	Power of the main engine corresponding to Vs,service
k	Scale coefficient

If you click the calculation button after input Vs,service and Ps,service, DWTs,service values, the ship speed is automatically calculated and displayed in the red field, and a point plotted on the speed-power curve.



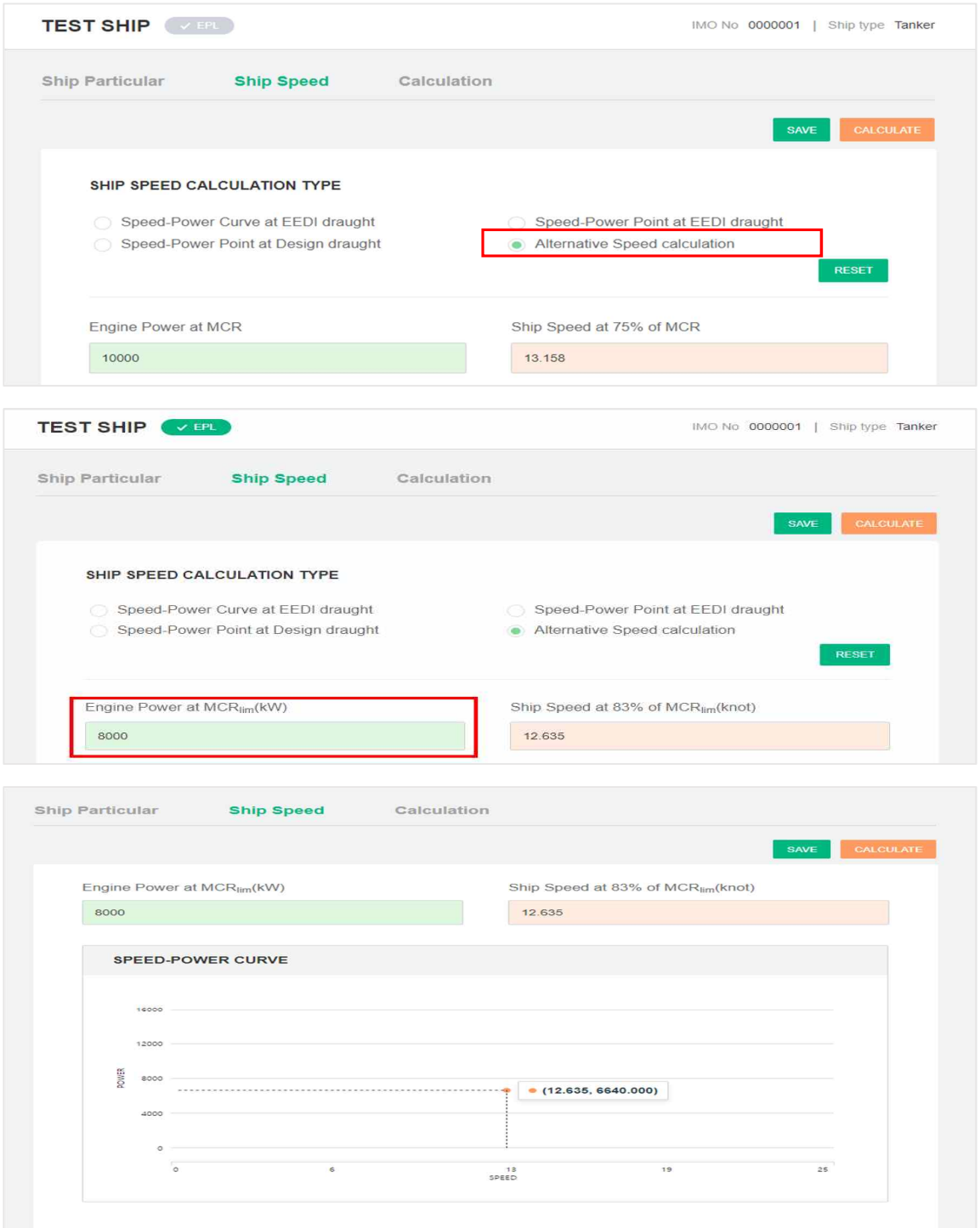




5) Alternative Speed calculation

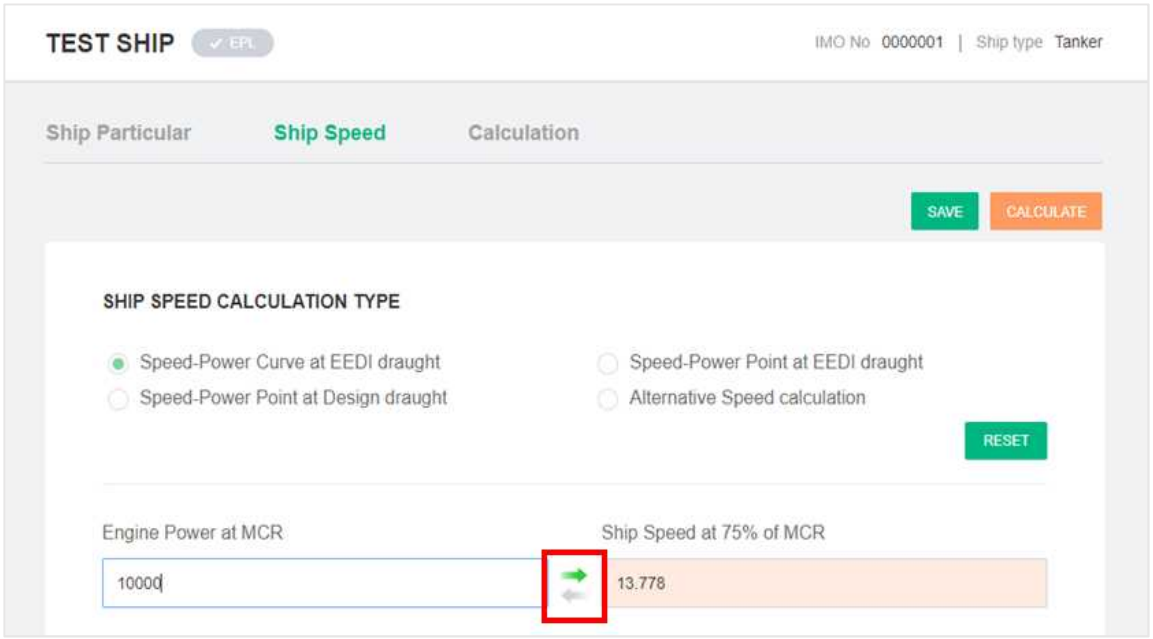
This option can be selected where the Speed-Power curve is not available or the sea trial report does not contain the EEDI or design load draft condition.

If you click the calculation button after Engine Power at MCR, the ship speed is automatically calculated and displayed in the red field, and a point plotted on the speed-power curve.

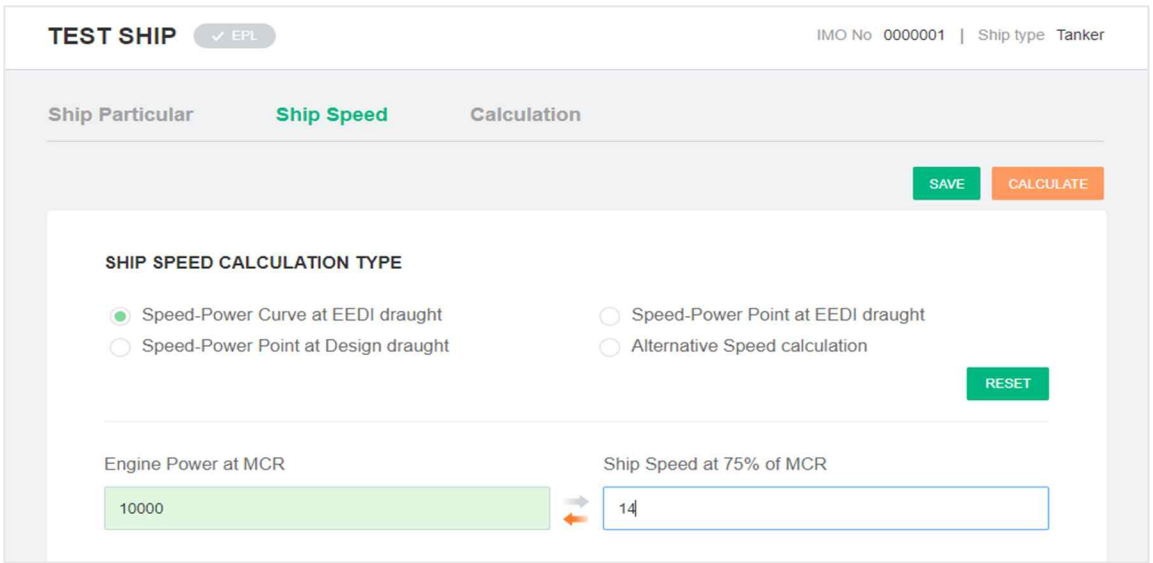


When the Use Speed Power Curve at EEDI draught is selected, if you adjust the Engine Power at MCR and pressing the arrow, then corresponding speed value can be calculated.

(Conversely, if you press the arrow after adjusting the speed, the corresponding Engine Power at MCR value can be calculated)



If the user knows the speed value, you can directly input the speed value manually.

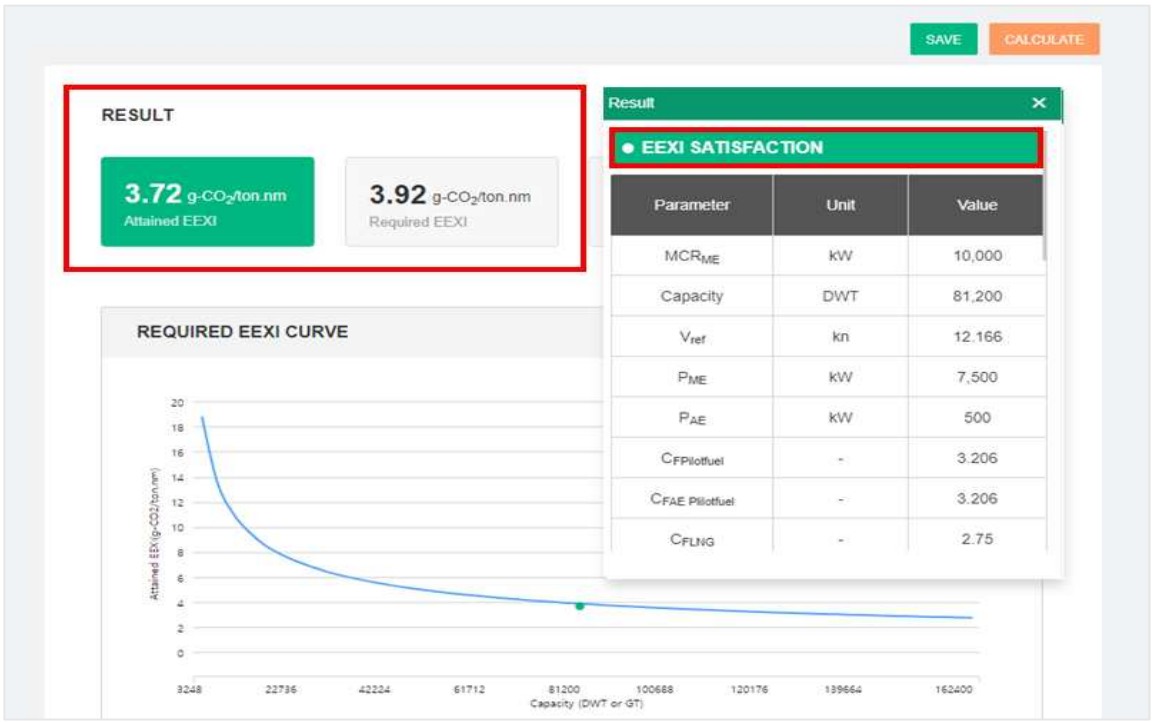


6. Calculation

Based on the ship's specifications entered on the Ship Particular tab and ship's speed calculated on the Ship Speed tab, the EEXI result value can be calculated on the Calculation tab.

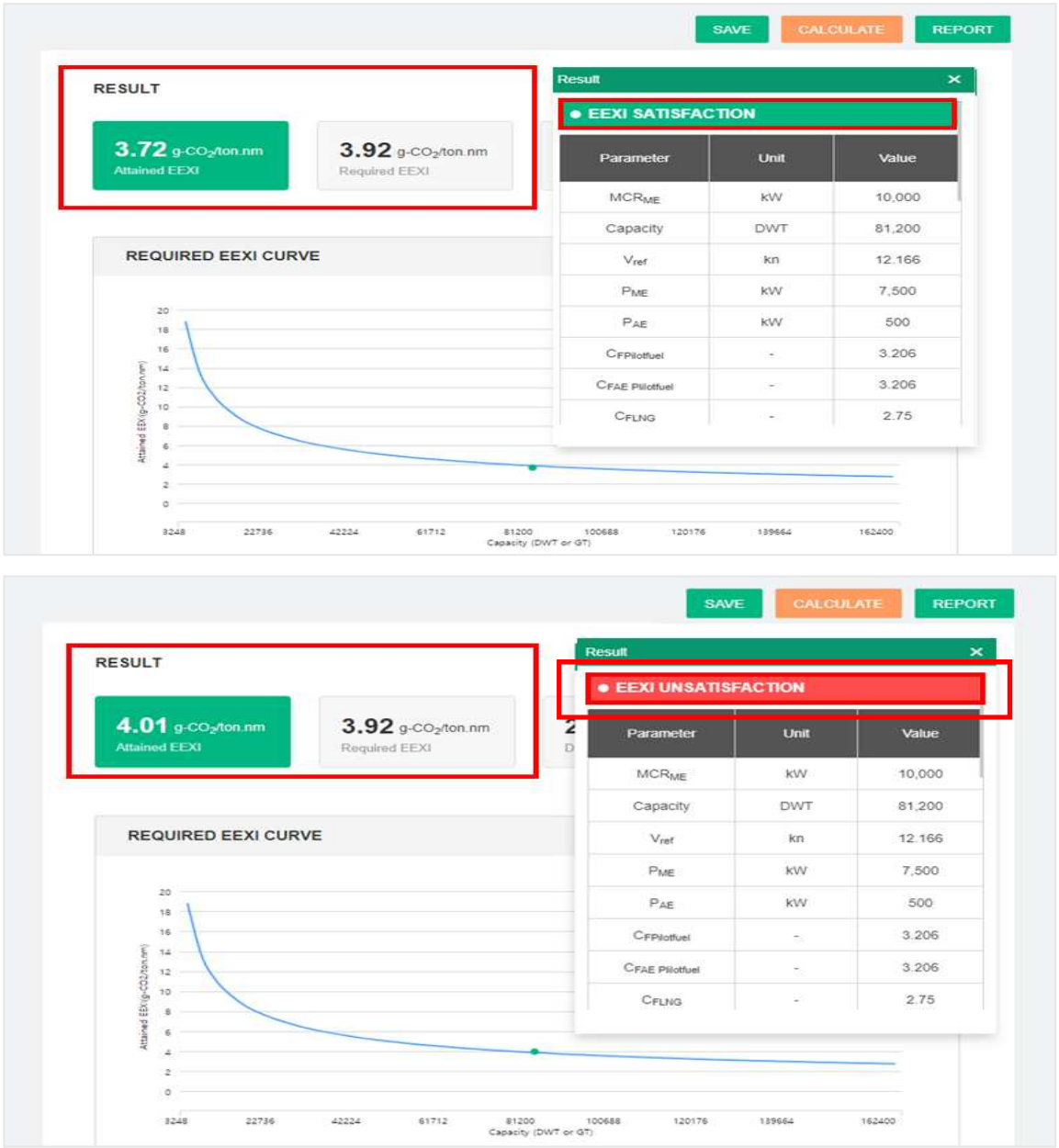
1) When you click the calculate button, the attained and required EEXI value is calculated through the information entered on the Ship Particular / Ship Speed tab, and the result used in the calculation is displayed in the pop-up.

   When EPL is applied, EEXI is calculated as the EPL applied value.

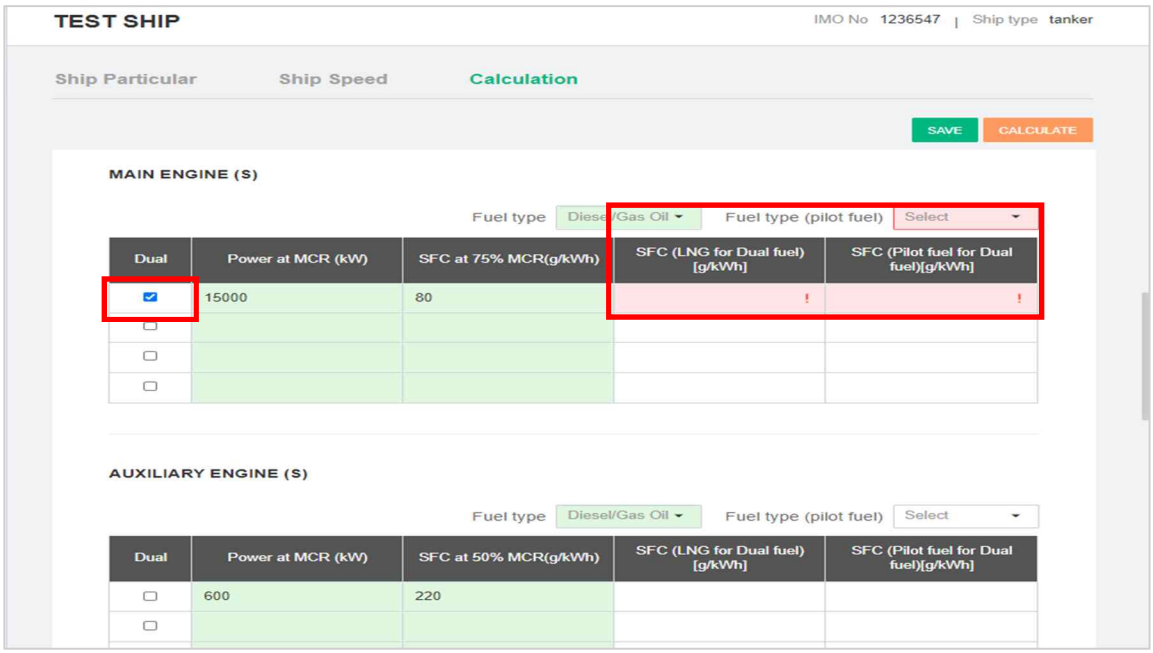


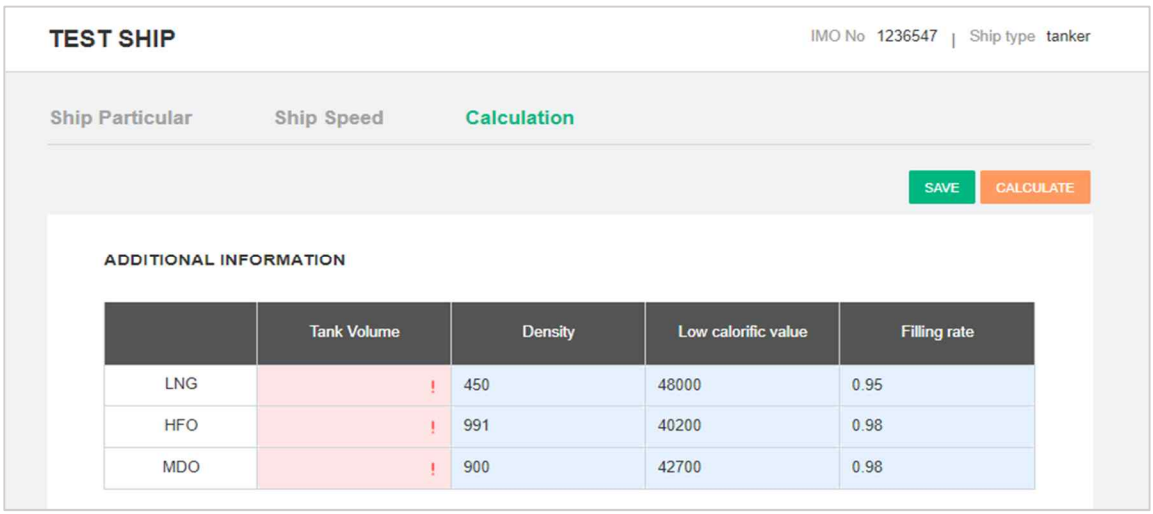
2) If the Attained EEXI value is less than or equal to the Required EEXI value, In the pop-up window, the text 'EEXI SATISFACTION' is displayed with a green light.

   Conversely, if the Attained EEXI value is greater than the Required EEXI value, In the pop-up window, the text 'EEXI UNSATISFACTION' is displayed with a red light.



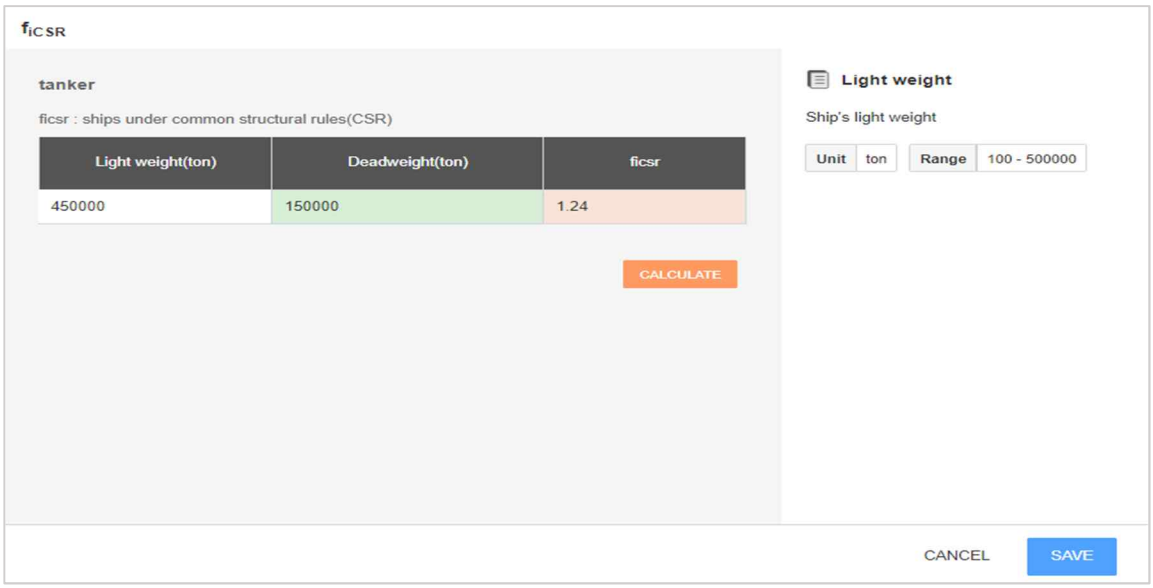
3) Check the Dual checkbox in Main Engine / Auxiliary Engine, values that were not required data become required data, indicating data entry, and creating an additional information window.



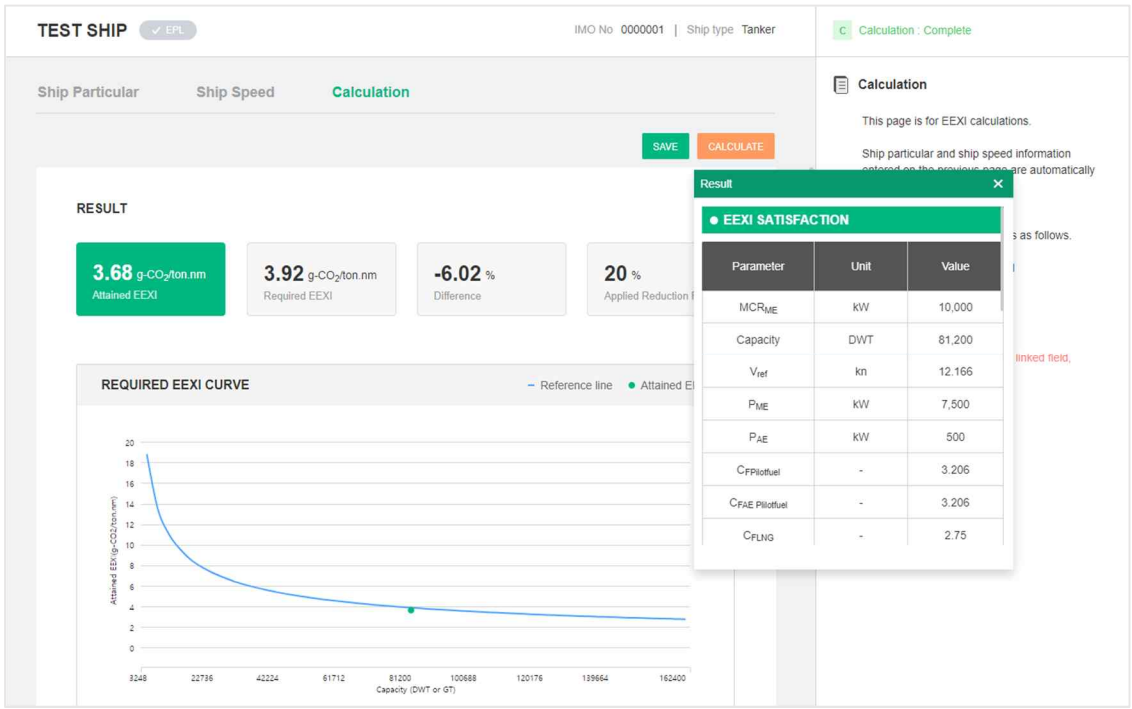


4) At the Bottom of the calculation tab, there is a function to calculate the correction factor applied to each specific ship type. Add and reset is possible with the +/- icon.

5) If you click the +button next to the correction factor, a window where you can calculate the correction factor appears. After input the required data, press the calculate button to automatically calculate the correction factor, and click the SAVE button to save the calculated value.



6) If you save all the additionally input data and click the CALCULATE, the values are reflected and EEXI is re-calculated



7) If you click the SAVE button after checking the calculated value, the REPORT button is activated. When you click the REPORT button, a report reflecting the calculation result is output.

EEXI RESULT

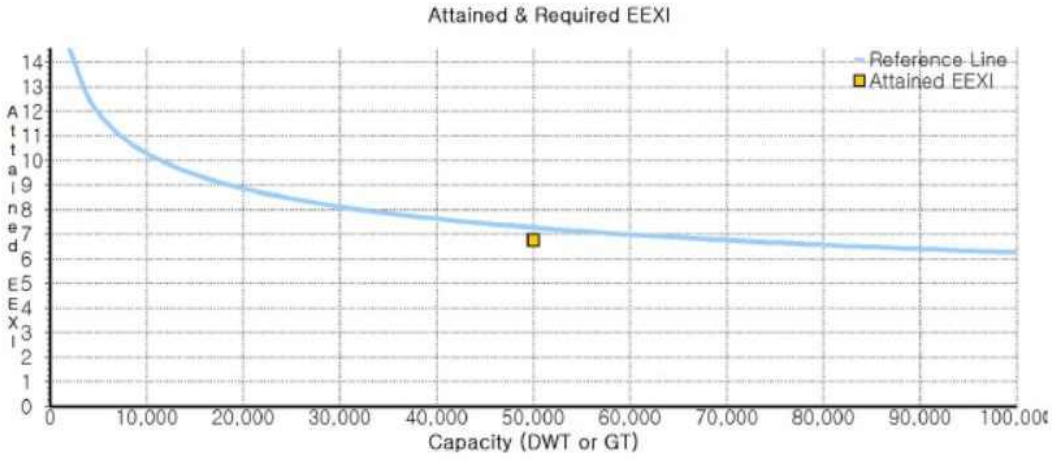
Ship Name	IMO No.	Ship Type	DWT
bc-TEST-general	8877665	General cargo ship	50,000

CALCULATED PURSUANT TO

- 2021 GUIDELINES ON THE METHOD OF CALCULATION OF THE ATTAINED ENERGY EFFICIENCY EXISTING SHIP INDEX (Res. MEPC.333(76))

	MCR (or EPL)	Att. EEXI	Req. EEXI	Att. / Req.-1 (%)	Vref	SFC for M/E	SFC for A/E
Before EPL	20,000	9.63	7.27 30.00%	32.46	18.307	190.00	215.00
After EPL	10,000	6.77	7.27 30.00%	-6.88	15.029	190.00	215.00

The calculated Att. EEXI value (Before EPL) of the ship is not satisfied with the Req. EEXI value. As a result of the calculation, the ship owner should find the cost-effective solutions such as EPL or ESD.



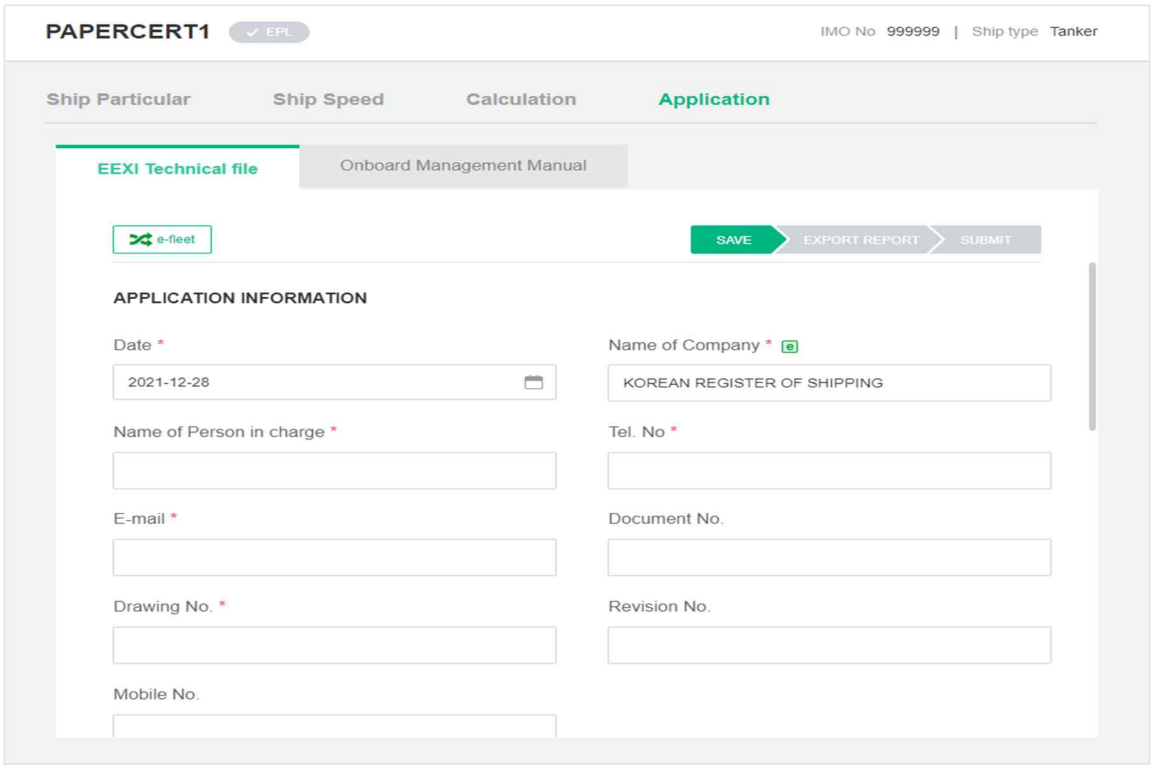
CONDITIONS OF CALCULATION

- EEXI value is calculated according to IMO GUIDELINES ON THE METHOD OF CALCULATION OF THE ATTAINED ENERGY EFFICIENCY EXISTING SHIP INDEX (EEXI).
- Format of this document is only summary of EEXI calculation result and this is not format of EEXI technical file.

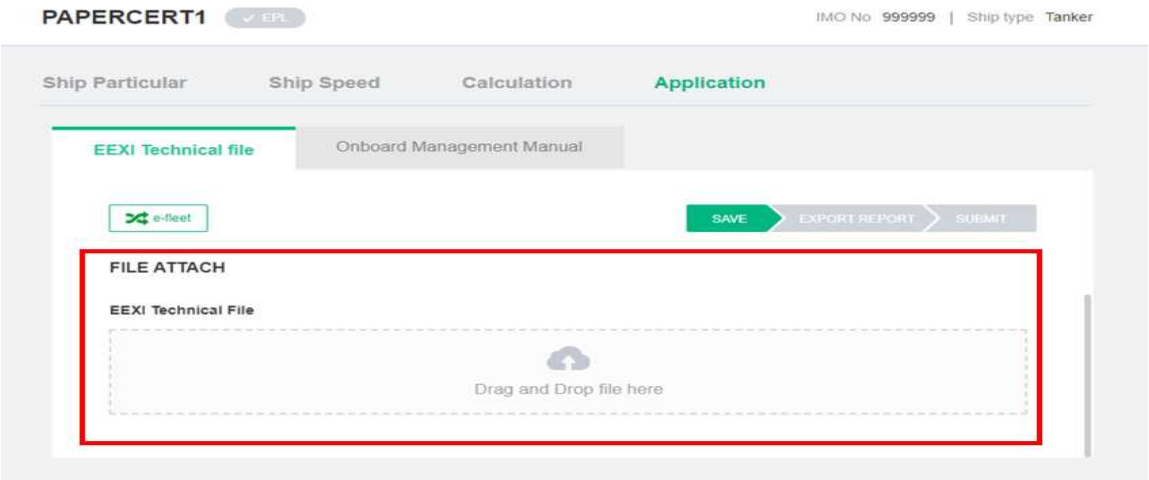
7. Make drawings & Submit for approval

You can submit an application for the EEXI Technical File and Onboard Management Manual on the this tab, and filling out, saving, and submitting the application letter for drawing approval is performed separately for each tab.

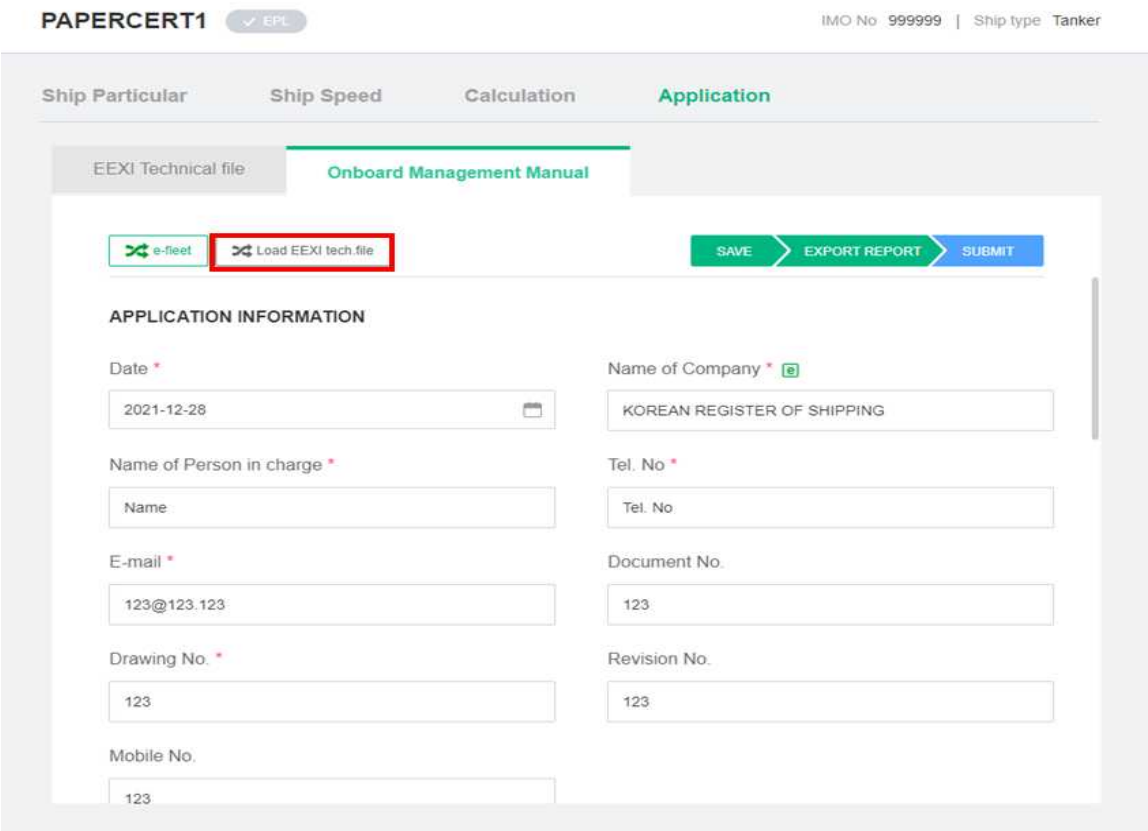
1) Click the tab where you want to fill out the application form and enter the required data.



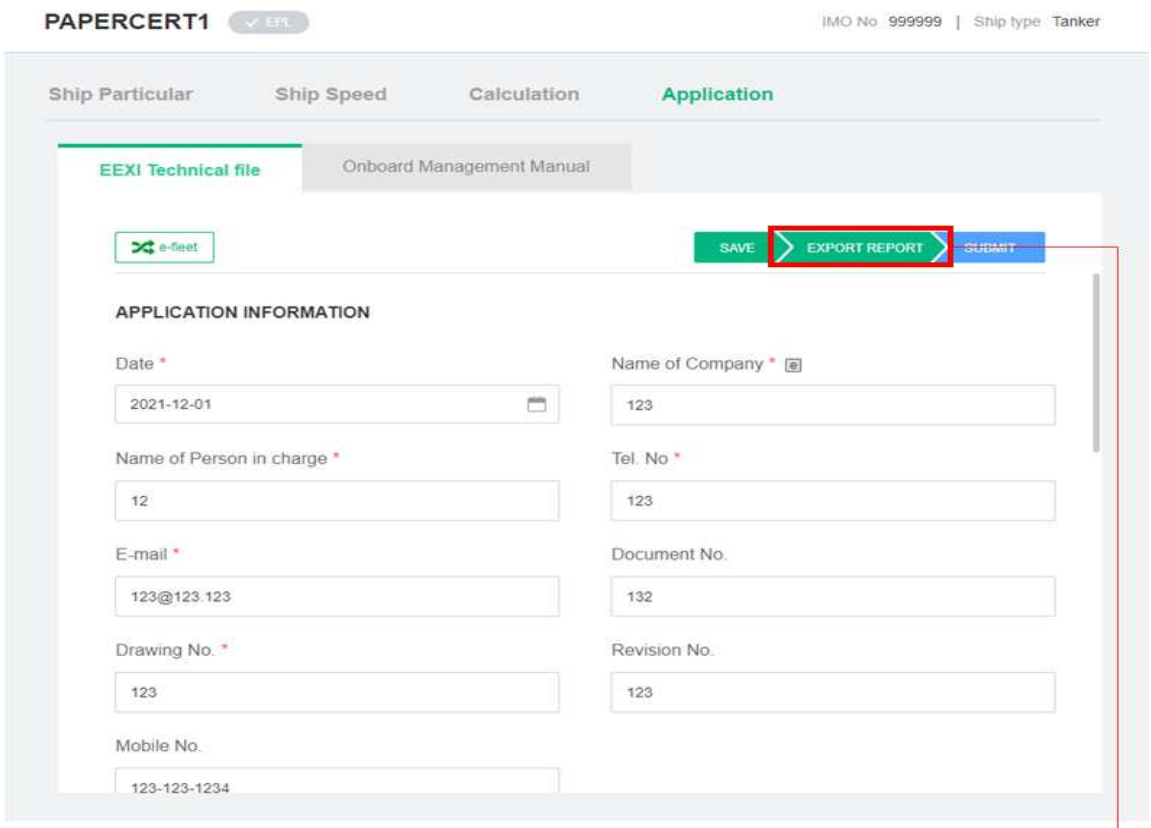
2) Attach the necessary files to submit the application. (Only PDF files can be attached)



3) When writing the Onboard Management Manual, if the application information is the same as the data written in the EEXI Technical File, you can synchronize the data by clicking the 'LOAD EEXI tech.file' button.



4) When you click the Save button, the Export report button is activated, and when you click the button, a drawing is created based on the created data.



Report Preview

ISWG-GHG 8/WP.1
Annex 2, page 8

APPENDIX

SAMPLE OF EEXI TECHNICAL FILE

1 Data

1.1 General information

Shipowner	XXX Shipping Line
Shipbuilder	XXX Shipbuilding Company
Hull no.	12345
IMO no.	94112XX
Ship type	Bulk carrier

1.2 Principal particulars

Length overall	250.0 m
Length between perpendiculars	240.0 m
Breadth, moulded	40.0 m
Depth, moulded	20.0 m
Summer load line draught, moulded	14.0 m
Deadweight at summer load line draught	150,000 tons

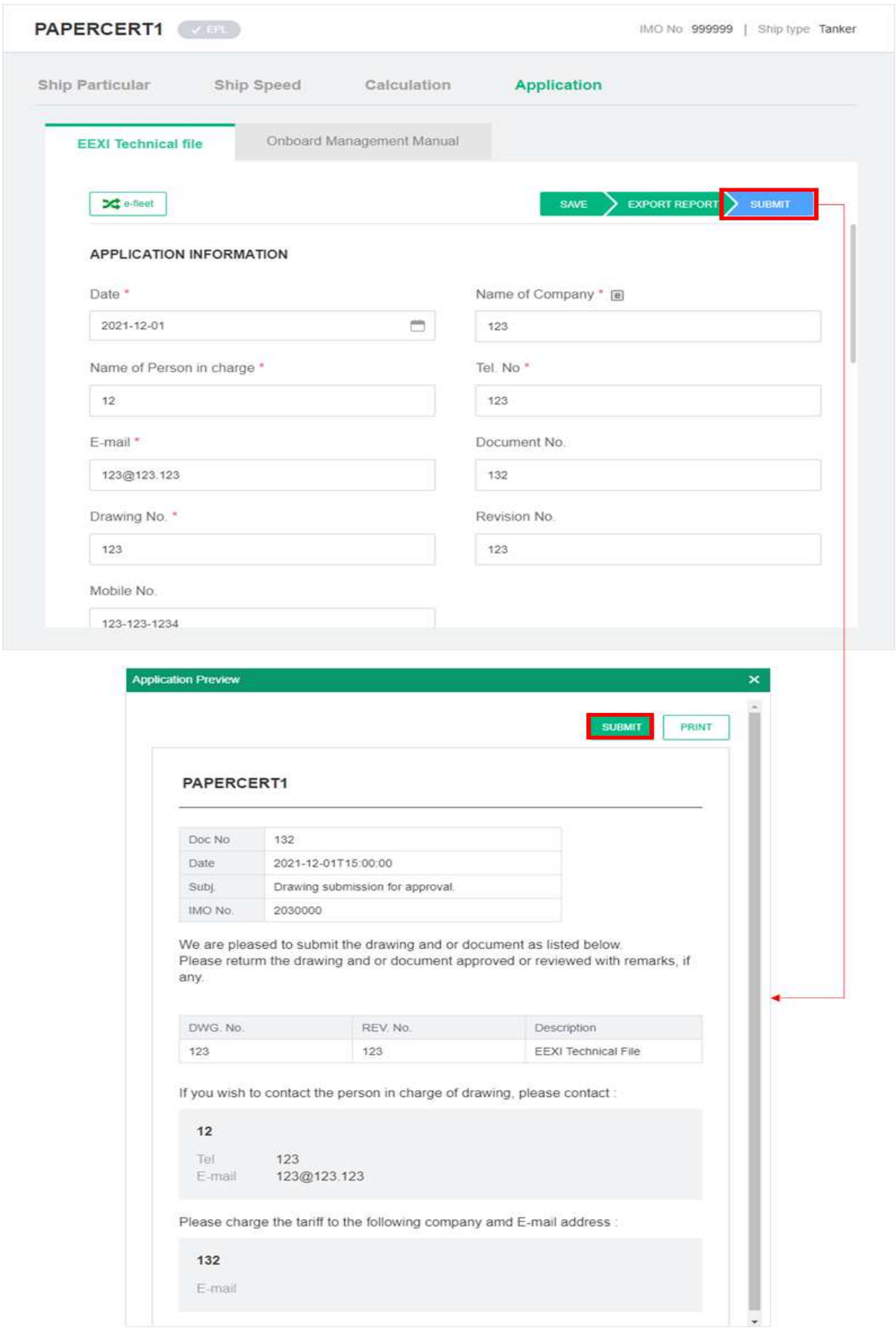
1.3 Main engine

Manufacturer	XXX Industries
Type	6J70A
Maximum continuous rating (MCR_{ME})	15,000 kW x 80 rpm
Limited maximum continuous rating with the Engine Power Limitation installed ($MCR_{ME,lim}$)	9,940 kW x 70 rpm
SFC at 75% of MCR_{ME} or 83% of $MCR_{ME,lim}$	166.5 g/kWh
Number of sets	1
Fuel type	Diesel Oil

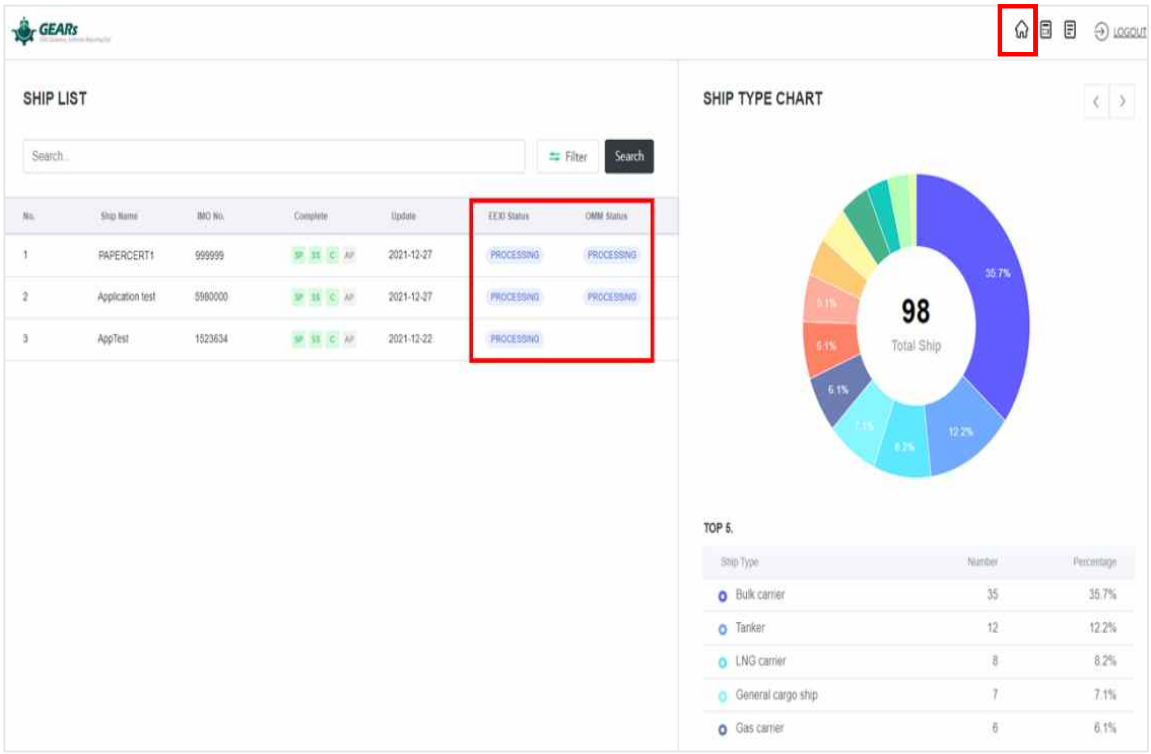
1.4 Auxiliary engine

Manufacturer	XXX Industries
Type	5J-200
Maximum continuous rating (MCR_{AE})	600 kW x 900 rpm

5) When drawing creation is complete, you can submit an application by clicking the SUBMIT button. The drawing and application are submitted together when you click the SUBMIT button.

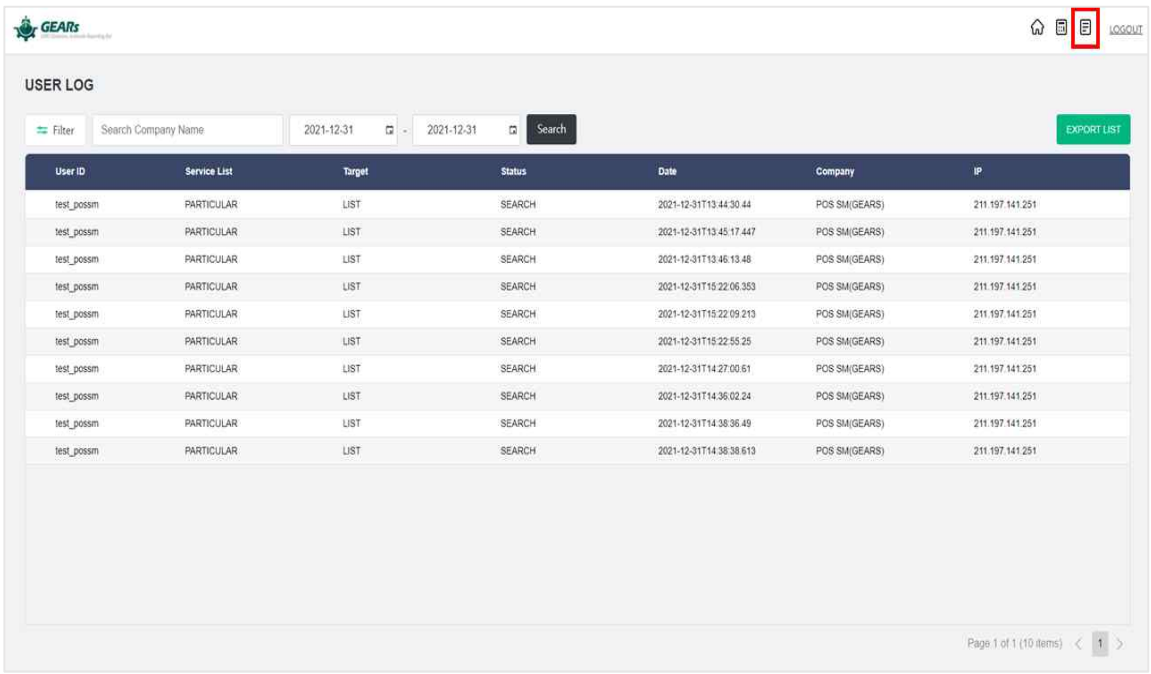

PAPERCERT1
EPL
IMO No 999999 | Ship type Tanker
Ship Particular
Ship Speed
Calculation
Application
EEXI Technical file
Onboard Management Manual
e-fleet
SAVE
EXPORT REPORT
SUBMIT
APPLICATION INFORMATION
Date *
2021-12-01
Name of Company *
123
Name of Person in charge *
12
Tel. No *
123
E-mail *
123@123.123
Document No.
132
Drawing No. *
123
Revision No.
123
Mobile No.
123-123-1234
Application Preview
SUBMIT
PRINT
PAPERCERT1
Doc No 132
Date 2021-12-01T15:00:00
Subj. Drawing submission for approval.
IMO No. 2030000
We are pleased to submit the drawing and or document as listed below.
Please return the drawing and or document approved or reviewed with remarks, if any.
DWG. No. REV. No. Description
123 123 EEXI Technical File
If you wish to contact the person in charge of drawing, please contact :
12
Tel 123
E-mail 123@123.123
Please charge the tariff to the following company amd E-mail address :
132
E-mail

6) The progress of drawing approval can be checked by being linked to the main page.



8. EEXI User Log

On the log tab, you can check the user's history of using the EEXI program, and the history is divided into SEARCH, INSERT, SAVE, and DELETE.



<End>