EEXI Technical File

Ship's name:	DONG FANG FU(东方富)
IMO No.:	9162423
Company:	Fujian Orient Shipping Co., Ltd.

Concents

1 Data

1.1 General information

Shipowner	Fujian Orient Shipping Co., Ltd.
Shipbuilder	Imabari Shipbuilding Co., Ltd.
Hull no.	538
IMO no.	9162423
Ship type	Container ship

1.2 Principal particulars

Length overall	161.85 m
Length between perpendiculars	150 m
Breadth, moulded	25.6 m
Depth, moulded	12.9 m
Summer load line draught, moulded	9.07 m
Deadweight at summer load line draught	18185 tons

1.3 Main engine

Manufacturer	MITSUI ENGINERING & SHIPPING CO.,LTD
Type	7S50MC
Maximum continuous rating (MCR_{Me})	9988 kW
Limited maximum continuous rating with the Engine Power Limitation installed ($MCR_{ME,lim}$)	
SFC at 75% of MCR_{me}	190 g/kWh
Number of sets	1
Fuel type	HFO

1.4 Auxiliary engine

Manufacturer	YANMAR DIESEL ENGINE CO.,LTD
Type	M220AL-UN

Maximum continuous rating (MCR_{AE})	736 kW
SFC at 50% MCR_{AE}	215 g/kWh
Number of sets	3
Fuel type	HFO

1.5 Ship speed

Ship speed (Vref)	17.24 knots

2 Power curve

The speed-power curve is not available, the ship speed V_{ref} is approximated by $V_{ref,app}$ which is obtained from statistical mean of distribution of ship speed and engine power as below:

$$V_{ref,avg} = A \times B^{c} = 3.2395 \times 18185.0^{0.18294} = 19.487222$$

$$MCR_{avg} or MPP_{avg} = D \times E^{F} = 0.5042 \times 18185.0^{1.03046} = 12361.381616$$

$m_v$is a performance margin of a ship, which should be 5% of $V_{ref,avg}$ or one knot, whichever is lower;

$$m_v = 0.974361$$

$$V_{ref,app} = \left(V_{ref,avg} - m_v\right) \times \left[\frac{\sum P_{ME}}{0.75 \times MCR_{avg}}\right]^{\frac{1}{3}}$$

$$= (19.487222 - 0.974361) \times \left[\frac{7{,}491}{0.75 \times 12361.381616}\right]^{\frac{1}{3}}$$

$$= 17.24[knot]$$

3 Overview of propulsion system and electric power supply system

3.1 Propulsion system

3.1.1 Main engine

Refer to paragraph 1.3 of this file.

3.1.2 Propeller

Type	Fixed pitch propeller
Diameter	5460
Number of blades	5
Number of set	1

3.2 Electric power supply system

3.2.1 Auxiliary engines

Refer to paragraph 1.4 of this file.

3.2.2 Main generators

Manufacturer	NISHISIBA ELECTRIC CO.,LTD
Rated output	680
Voltage	450
Number of set	3

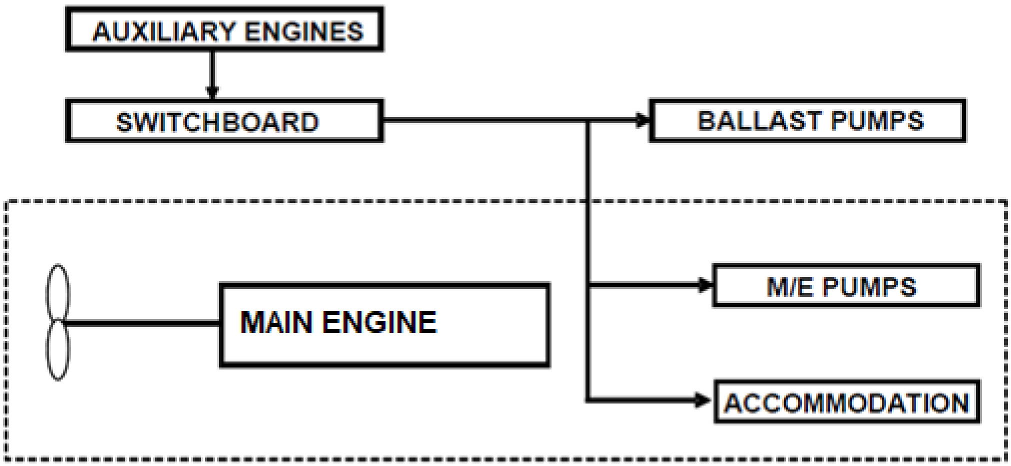

Figure 3.1: Schematic figure of propulsion and electric power supply system

4 Estimation process of speed-power curve

N/A

5 Description of energy saving equipment

5.1 Energy saving equipment the effects of which are expressed as $P_{AEeff(i)}$ or $P_{eff(i)}$ in the EEXI calculation formula

N/A

5.2 Other energy saving equipment

N/A

6 Calculated value of attained EEXI

6.1 Basic data

Type of ship	Capacity DWT	Speed V_{ref} (knots)
Container ship	12,730	17.24

6.2 Main engine

MCR_{ME} (kW)	$MCR_{ME,lim}$ (kW)	P_{ME} (kW)	Type of fuel	C_{FME}	SFC_{ME} (g/kWh)
9988		7491	HFO	3.114	190

Where:

P_{ME}=75% MCR_{ME}=7,491(kW)

6.3 Auxiliary engines

P_{AE}(kW)	Type of fuel	C_{FAE}	SFC_{AE}(g/kWh)
499	HFO	3.114	215

Where：

$$\sum_{i=1}^{nPTI} P_{PTI(i)} = 0$$

$$P_{AE} = 0.05 \times \left(\sum_{i=1}^{nME} MCR_{ME(i)} + \frac{\sum_{i=1}^{nPTI} P_{PTI(i)}}{0.75} \right)$$

$$= 0.05 \times \left(9988 + \frac{0}{0.75} \right)$$

$$= 499 \quad (kW)$$

SFC_{AE}:

No.	$MCR_{AE(i)}$(kW)	$SFC_{AE(i)}$(g/kWh)
1	736	215
2	736	215
3	736	215

$$SFC_{AE} = \frac{\sum_{i=1}^{nAE}(MCR_{AE}(i) \times SFC_{AE}(i))}{\sum_{i=1}^{nAE} MCR_{AE}(i)}$$

$$= \frac{736 \times 215 + 736 \times 215 + 736 \times 215}{736 + 736 + 736}$$

$$= 215 \qquad [g/kWh]$$

6.4 Ice class

Ice class:N/A

6.5 Innovative electrical energy efficient technology

Peff:N/A

6.6 Innovative mechanical energy efficient technology

PAEeff:N/A

6.7 f_j

$f_j\ = 1$

6.8 f_i

$f_i = 1$

6.9 f_c

fc is the cubic capacity correction factor and should be assumed to be one (1.0) if no necessity of the factor is granted.

$f_c = 1$

6.10 f_l

$f_{cranes} = 1$ If no cranes are present.

$f_{sideloader} = 1$ If no side loaders are present.

$f_{RoRo} = 1$ If no ro-ro ramp is present.

$f_l = f_{cranes} \times f_{sideloader} \times f_{RoRo} = 1$

6.11 f_w

$f_w = 1$

6.12 f_m

If ice class ship with notation"IA Super" or "IA",then f_m=1.05,else f_m= 1;

$f_m = 1$

6.13 Calculated value of attained EEXI

$$EEXI = \frac{\left(\prod_{j=1}^{M} f_j\right)\left(\sum_{i=1}^{nME} P_{ME(i)} \cdot C_{FME(i)} \cdot SFC_{ME(i)}\right) + \left(P_{AE} \cdot C_{FAE} \cdot SFC_{AE}\right)}{f_i \cdot f_c \cdot f_l \cdot Capacity \cdot f_w \cdot V_{ref} \cdot f_m}$$

$$+ \frac{\left\{\left(\prod_{j=1}^{M} f_j \cdot \sum_{i=1}^{nPTI} P_{PTI(i)} - \sum_{i=1}^{neff} f_{eff(i)} \cdot P_{AEeff(i)}\right) \cdot C_{FAE} \cdot SFC_{AE}\right\}}{f_i \cdot f_c \cdot f_l \cdot Capacity \cdot f_w \cdot V_{ref} \cdot f_m}$$

$$- \frac{\left(\sum_{i=1}^{neff} f_{eff(i)} \cdot P_{eff(i)} \cdot C_{FME} \cdot SFC_{ME}\right)}{f_i \cdot f_c \cdot f_l \cdot Capacity \cdot f_w \cdot V_{ref} \cdot f_m}$$

$$= \frac{1 \times (7491 \times 3.114 \times 190) + (499 \times 3.114 \times 215)}{1 \times 1 \times 1 \times 12730 \times 1 \times 17.24 \times 1}$$

$$+ \frac{\{(1 \times 0 - 0 \times 0 \times 3.114) \times 215\}}{1 \times 1 \times 1 \times 12730 \times 1 \times 17.24 \times 1}$$

$$- \frac{(0 \times 0 \times 3.114 \times 190)}{1 \times 1 \times 1 \times 12730 \times 1 \times 17.24 \times 1}$$

$$= \; 21.7 (g - CO_2 / ton \cdot mile)$$

Attained EEXI: 21.7 g-CO_2/ton mile

6.14 Calculated value of required EEXI

The reference line value RLV is calculated as follows:

RLV = a ×b$^{(-c)}$ = 174.22×18185.0$^{-0.201}$ = 24.2603

The required EEXI is calculated as follows:

Required EEXI =(1-y/100) × RLV

= (1-20/100) ×24.2603

=19.4 (g-CO_2/ton·mile)

Where, y=20, is the reduction factor

Required EEXI: 19.4 g-CO_2/ton mile

Attained EEXI > Required EEXI