| Options                      | Fuel type          | executions | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x |
|------------------------------|--------------------|------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|                              | HFO & MDO & MGO    |            |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|                              | MDO & MGO only     | x           | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x |
|                              | MGO only with < 0.1 % sulphur | x           | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x |
|                              | Foundation arrangement | STANDARD | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x |
|                              |                    | NARROW     | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x |
|                              | Fuel pump lubrication | INTERNAL | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x |
|                              |                    | EXTERNAL   | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x |
|                              | Turbocharger lubrication | INTERNAL | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x |
|                              |                    | EXTERNAL   | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x |

**Net Weight**

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**Quality PER ENGINE**

- Number: 008
- Material Code: RA007071
- Description: Lubricating Oil Drain Tank Filling guideline
- Weight: 0.001 kg

**Material break-down**

- Material: XXXXX
- Standard Reference: 00000000
- Unit weight: 0.001 kg
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### Reference

- **WINGD** - Manufacturer's logo
- **W157270F** - Model number
- **LUBRICATING OIL SYSTEM** - Description
- **SCHMIEDESYSTEM** - Description in German
SPECIFICATION WHICH MUST BE MET

**INLET - High BN cylinder lubricating oil**
- Cylinder lubricating oil temperature: 60°C - 80°C
- Trace heating to be applied on the cylinder L0 feed line on system side.
- Cylinder lubricating oil static pressure: min. 0.4 bar

**INLET - Low BN cylinder lubricating oil**
- Cylinder lubricating oil temperature: 40°C - 65°C
- Trace heating to be applied on the cylinder L0 feed line on system side.
- Cylinder lubricating oil static pressure: min. 0.4 bar

**OUTLET - Oil drain servo system, oil return from engine free end**
- Just needed in case a two-piece rail unit is installed.
- Free flow to lubricating oil drain tank.

**OUTLET - Oil drain servo system, oil return from engine free end**
- Just needed in case a two-piece rail unit is installed.
- Free flow to lubricating oil drain tank.

**OUTLET - Oil drain supply unit**
- Free flow to lubricating oil drain tank.

**OUTLET - Oil drain servo system, oil return from engine free end**
- Just needed in case a two-piece rail unit is installed.
- Free flow to lubricating oil drain tank.

**OUTLET - Oil drain supply unit**
- Free flow to lubricating oil drain tank.

**OUTLET - Cylinder lubricating oil**
- Lubricating oil temperature:
  - Controller set-point: 45°C (controller type: P0)
  - Tolerance steady state condition: 45 ± 2°C
  - Tolerance transient condition: 45 ± 4°C
- Lubricating oil pressure: 4 - 5 bar
  - An active pressure control device is needed, which could be either a bypass via pressure control valve or frequency controlled pumps, working with a closed loop control circle.
  - Lubricating oil valve flow: according to ST0
  - Lubricating oil cleanliness:
    - Full flow filtered by 35 micron filter (absolute, sphere passing mesh)
    - Bypass cleaning of lubricating oil in drain tank by self-cleaning centrifugal separator.

**OUTLET - Lubricating oil turbocharger**
- Must be connected to other oil return lines.
- Pipe outlet above the oil level in the L0 drain tank or drain pipe with venting holes above max. oil level to be installed.
- Connected to the lubricating oil drain tank, opposite to the main lubricating oil pump, i.e.
  - On tanks forward end if main lubricating oil pump suction is on tanks aft end.
  - On tanks aft end if main lubricating oil pump suction is on tanks forward end.
  - On tanks forward or aft end if main lubricating oil pump suction is in middle of tank.

**INLET - Crosshead lubricating oil**
- Lubricating oil temperature:
  - Controller set-point: 45°C (controller type: P0)
  - Tolerance steady state condition: 45 ± 2°C
  - Tolerance transient condition: 45 ± 4°C
- Lubricating oil pressure: 10 - 13 bar
  - An active pressure control device is needed, which could be either a bypass via pressure control valve or frequency controlled pumps, working with a closed loop control circle.
  - Lubricating oil valve flow: according to ST0
  - Lubricating oil cleanliness:
    - Full flow filtered by 35 micron filter (absolute, sphere passing mesh)
    - Bypass cleaning of lubricating oil in drain tank by self-cleaning centrifugal separator.
SYSTEM PROPOSAL - LO treatment system

### System Components
- 001: Scrubbing oil tank
- 002: Oil cooler
- 003: Moisture separating oil pump
- 004: Moisture separating oil filter
- 005: Condensing oil heater with relief valve
- 006: Oil cleaner
- 007: Oil purifier
- 008: Oil heater
- 009: Oil cooler
- 010: Oil drain valve
- 011: Oil separator

### Specifications
- **Clean LO tank volume:** [value] (equal or bigger than LO drain from volume)
- **Dirty LO tank volume:** [value] (equal or bigger than LO drain from volume)
- **LO separator min. cap.:** [value] L/H
- **Reserve oil tank volume:** [value] Depending on ships requirements

### Notes:
- Air vents and drain valves where necessary.
- Air vent and drain pipes must be fully functional of oil circulation pipes of the LO drain of which the engine must be operational (SOx Class relief)
- Pipework elements to be designed according to shipyard practice and component suppliers' recommendations.
SPECIFICATION which must be met

OUTLET - Oil drain servo system, oil return from engine driving end
- Free flow to lubricating oil drain tank
- Drain to lubricating oil drain tank
- Drain pipe must within the permissible range as specified on the LO drain tank drawing.
- Final position to be informed by the shipyard to the engine manufacturer.

OUTLET - Lubricating oil
- Lubricating oil temperature:
  - Controller set-point: 45 °C (controller type: PI)
  - Steady state condition: 45±2 °C
  - Transient condition: 45±4 °C
- Lubricating oil pressure: 7 - 8 bar
  - An active pressure control device is needed, which could be either a bypass via pressure control valve or frequency controlled pumps, working with a closed loop control circuit.
- Lubricating oil volume flow according to G10
- Lubricating oil cleanliness:
  - Full flow filtered by 35 micron filter (absolute, sphere passing mesh)
  - Bypass cleaning of lubricating oil in drain tank by self-cleaning centrifugal separator.

OUTLET - Lubricating oil turbinecharger
- Must be connected to other oil return lines.
- Pipe outlet above the oil level in the LO drain tank or a drain pipe with venting holes above the crank oil level to be installed.
- Connected to the lubricating oil drain tank, opposite to the main lubricating oil pump, i.e.
  - on tanks forward end if main lubricating oil pump suction is on tanks aft end,
  - on tanks aft end if main lubricating oil pump suction is on tanks forward end,
  - on tanks forward or aft end if main lubricating oil pump suction is in midle of tank.

OUTLET - Crossfeed Lubricating oil
- Lubricating oil temperature:
  - Controller set-point: 45 °C (controller type: PI)
  - Steady state condition: 45±2 °C
  - Transient condition: 45±4 °C
- Lubricating oil pressure: 7 - 8 bar
  - An active pressure control device is needed, which could be either a bypass via pressure control valve or frequency controlled pumps, working with a closed loop control circuit.
- Lubricating oil volume flow according to G10
- Lubricating oil cleanliness:
  - Full flow filtered by 35 micron filter (absolute, sphere passing mesh)
  - Bypass cleaning of lubricating oil in drain tank by self-cleaning centrifugal separator.

INLET - Cylinder lubricating oil
- Cylinder lubricating oil temperature: 40-50 °C
- Trace heating to be applied on the cylinder LO feed line on system side
- Cylinder lubricating oil static pressure: min 0.0 bar

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LUBRICATING OIL SYSTEM without CAF
Schmierelsystem
Self-Regulating Heating Cable 10QTVR2-CT

Order drawing

C 10QTVR2-CT

Heating cable construction

Tinned-copper outer jacket
Modified polyethylene outer jacket (CRI)
Modified polyethylene inner jacket
Self-regulating conductive inner layer
Nickel-plated copper bus wire

Specification:
Description: 10QTVR2-CT
Order No.: 391991-000
Area Classification: Non-hazardous and hazardous locations
Traced surface type: Metal and plastic
Chemical Resistance:
- Exposure to aqueous inorganic chemicals: Use -CR (modified polyethylene outer jacket)
- Exposure to organic chemicals or corrosives: Use -CT (fluoropolymer outer jacket)

Supply Voltage: 200-277 VAC
Temperature Rating:
- Maximum maintain or continuous exposure temperature (power on) 225°F (110°C)
- Maximum intermittent exposure temperature, 1000 hours (power on) 225°F (110°C)
- Minimum installation temperature –76°F (–60°C)

Minimum Bending Radius: 13 mm at 20°C
35 mm at –60°C

Height: 4.5 mm
Width: 11.8 mm
Weight: 0.126 kg/m

MAXIMUM CIRCUIT LENGTH BASED ON TYPE ‘C’ CIRCUIT BREAKERS ACCORDING TO EN60898

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Supplier: www.pentairthermal.com
Diagram must be arranged in accordance with the physical structure and with the specified dimensions. Any gaps in the text or marks in the diagram must be shown in the margin. The diagram must be clearly marked with the scale and any annotations. The diagram is subject to the technical specifications provided in the manual.
Ra 12.5 (✓) SHARP EDGES REMOVED

H DEPENDS ON CHOCK THICKNESS

H = A - 45mm

FOR THE RELATION OF A SEE DRAWING DAAD033697
Ra 12.5/ (✓) SHARP EDGES REMOVED

A-A

24 x Ø22

Ø760

Ø458

10

(15°)

Product: W-2S

PLATE

OIL DRAIN VERTICAL

Blech

Oelablauf vertikal

Units: mm

IDE: A

Basic Material: W-FU-235-JR

Net Weight: 20.2

SURFACE PROTECTION SEE GROUP G344

TOLERANCING PRINCIPLE: ISO8015

GENERAL TOLERANCES ACCORDING TO: ISO2768-

Drawing ID: DA037262

Page: 1/1

Material: PAAD119291

Design Draw: 9722

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ROUGH CLEANED
WELD QUALITY CLASS Q3

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Product: OIL STRAINER FOR OIL DRAIN IN BEDPLATE
Geesieb zum Ölablauf in der Grundplatte

SURFACE PROTECTION SEE GROUP 0344
TOLERANCING PRINCIPLE: ISO8015
GENERAL TOLERANCES ACCORDING TO ISO2768-M
RING
ON FRAME FOR OIL STRAINER

RING
ZUM ROMAN DES ÖLSIEBES
STRAIGHT LENGTH 244.5

HOLDER
ON FRAME FOR OIL STRAINES
Halter
zum Rahmen des Ölsiebes

WÄRTSILÄ

W-2S

Basic Material: W-FU-235-JR
Not Weight: 0.44
FLAT BAR
ON FRAME FOR OIL STRAINE
Flachstahl
zum Rahmen des Oelsiebes

WÄRTSILÄ
W-2S

PAAD107408
DAAD033853
A-A

ø760

ø478

24 x 22

12 x 21

ø724

ø519

RUBBER GASKET
VERTICAL OIL DRAIN
Gummidichtung
Ölauflauf vertikal

WÄRTSILA

SURFACE PROTECTION SEE GROUP 0344
TOLERANCING PRINCIPLE: ISO 286-15
GENERAL TOLERANCES: ACCORDING TO ISO 286-4 1978

Date: 13.03.2014 09:11:58
Designer: Asenov A. Sekulic

Date: 05.07.2014 10:17:41
Design Group: Chmiel: NA, 007: Wroblewski

Drawing ID: DAAD037284

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Specifications that need to be met:

Dimensioning guidelines and capacities for tank design

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<tr>
<td>Recommended total tank height (m)</td>
<td>according to installation requirements</td>
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<td>Recommended tank volume: 1025 m³</td>
<td>according to installation requirements</td>
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<td>Recommended filling level (m)</td>
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<td>Low-level alarm volume (m³)</td>
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<td>Min. retention volume (m³)</td>
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<tr>
<td>Distance between suction pipe and bottom of tank (m)</td>
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<tr>
<td>Suction Area</td>
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REMARKS:

1. Level after filling of external system. Volume and level in the tank drain tank depend on capacity of pipes, couplers, filters, etc. The oil volume in tank contains a part of the oil quantity, which drains back when the pumps are stopped.

2. The low-level alarm (h2) has to be positioned in such a way that a proper pump suction is ensured under the conditions defined by the classification societies.

Minimum inclination angles comply with the rules of classification societies.

Peel to each side: 12°
Trim: 0°
L300-3000, max. 5°
L = ship length in meter
S = 60/L 

Pitching: ± 5°

Additionally, this level has to be above or equal to the minimum retention volume (Vr) for WRC operation.

3. Distance (d) between suction pipe inlet of the main LO pumps and the drain tank bottom has to be in accordance with the requirements of the pump manufacturer. As guideline the following formula can be applied:

\[ d = \frac{\text{DN} \times 40}{d} \]

4. The stated tank volume represents the min. requirement. The final tank dimensions have to be agreed in regard to dimensional restrictions by ship and engine structure and pump suction requirement.

5. To be kept during engine operation.
SPECIFICATIONS that need to be met:

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OUTLET - Lubricating oil for fuel pump lubrication
- Free flow to fuel pump lubricating oil service tank

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INLET - Lubricating oil for fuel pump lubrication
- Lubricating oil temperature: SAE30 = 45±5°C
SAE40 = 50±5°C
- Lubricating oil pressure: 4-5 bar
- Min required lubricating oil flow rate:
  W6X92 | W7X92 | W8X92 | W9X92 | W10X92 | W11X92 | W12X92
  5 m³/h | 7 m³/h | 8 m³/h | 9 m³/h | 9 m³/h | 9 m³/h | 9 m³/h
- Lubricating oil cleanliness:
  - Full flow filtered by a 25 micron filter
    (absolute sphere passing mesh)
  - Offline cleaning of the fuel pump lubricating oil
    in the service tank by an offline fine filter
    cleaning system (removal efficiency: 98% of all
    particles >3 micron and 50% of all solid particles
    >0.8 micron in one single pass, water removal by
    absorption)
  OR by centrifugal separator

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The engine is equipped with the following components:

ECO1: FC supply pumps

Remarks:

1. All water and diesel pipes must be fully functional at all inclinations and at the speed at which the engine must be operated.

2. The pump capacity is selected in regard to the specified lubricating oil flow rate, the pump delivery head depends on the system layout (details are provided in the diagram). The system pressure drop has to be considered to achieve the specified pressure at engine inlet.

3. Installed as required (check with pipe connection plans)

4. Possible configuration:
   - Diesel filter element for depth filtration, particle removal efficiency 90% of all particles over 5 microns and 30% of all solid particles over 8 microns. It is a single-pass, water-cooled filter element. The oil is then removed by using an oil pump. Circulation rate: 250 liters per minute.

5. Maximum temperature of the oil in the tank at min. 42°C (52°C if SAE 30) respectively max. 45°C for SAE 40 (especially when the main engine is at low speed for an extended time).

6. Constant temperature at engine inlet: SAE 30: 45°C
   SAE 40: 50°C

7. Max. temperature increase over the supply unit is 5°C, i.e., in reference to the constant temperature at engine inlet the following temperatures at cooler inlet have to be considered:
   - SAE 30: 40°C
   - SAE 40: 45°C

8. The manual drain valve has to be positioned in such a way that an appropriate pump suction pipe is always ensured, i.e., under all ship's conditions of trim or heel defined by class.

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MIDS – WinGD-X92DF - Lubricating Oil System (DG9722)

TRACK CHANGES

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<td>2020-02-11</td>
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<td>Main drawing for 8, 9, 11 cyl - added</td>
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