KR

KR Fuel Oil Change Over Program
Version 2.0

User's Manual

2014

Korean Register of Shipping

Index

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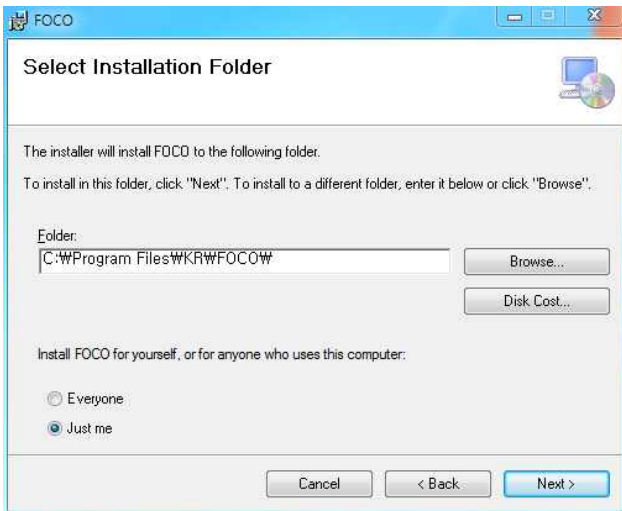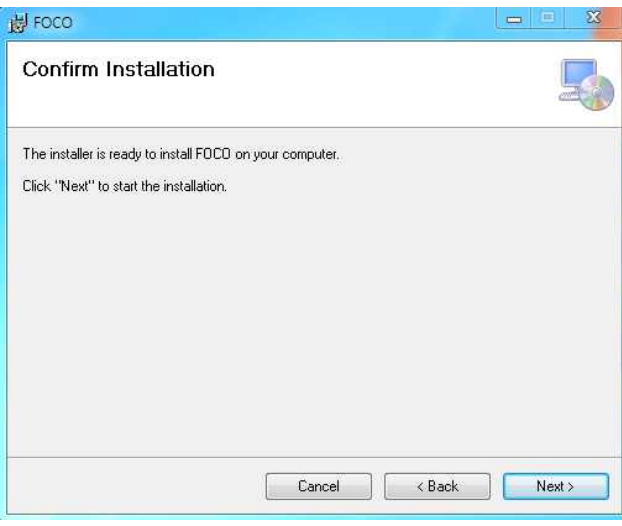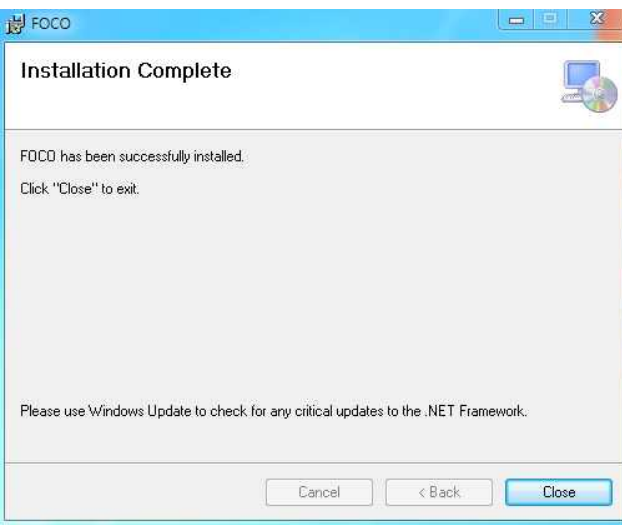
1. Installation

1. Things to check before installation

 - This program is for Windows system only.
 - This program requires approximately 18.0 MB of hard disk space. Check your hard disk space before installation.
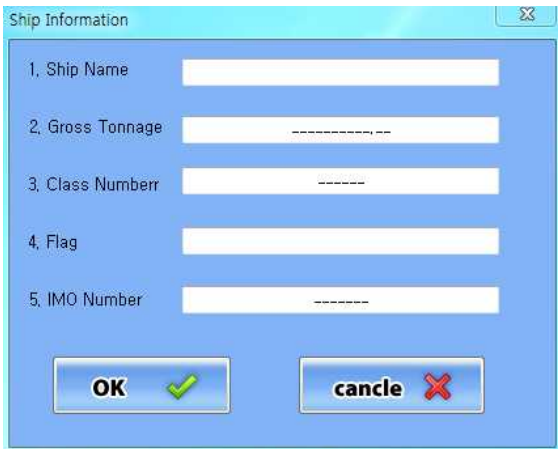 - MS-Word program should be pre-installed.

 2. Installation

Installation	Instruction
	▶ Click "setup.exe". When the following screen appears, click "Next".

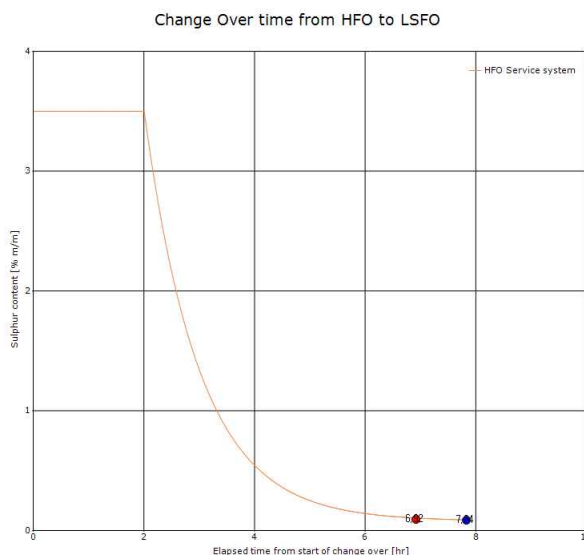| Installation	Instruction
FOCO — Select Installation Folder The installer will install FOCO to the following folder. To install in this folder, click "Next". To install to a different folder, enter it below or click "Browse". Folder: C:\Program Files\KR\FOCO\ [Browse...] [Disk Cost...] Install FOCO for yourself, or for anyone who uses this computer: ○ Everyone ● Just me [Cancel] [< Back] [Next >]	▶ Click "Browse" to select the installation directory, then click "Next".
FOCO — Confirm Installation The installer is ready to install FOCO on your computer. Click "Next" to start the installation. [Cancel] [< Back] [Next >]	▶ Click "Next" to start the installation.
FOCO — Installation Complete FOCO has been successfully installed. Click "Close" to exit. Please use Windows Update to check for any critical updates to the .NET Framework. [Cancel] [< Back] [Close]	▶ Click "Close" when the installation is completed.

2. KR-FOCO Program User Guide

The KR fuel change over calculator can be used in both cases where the dedicated LSFO Service Tank is fitted or not. The change over time is calculated assuming that the two oils be mixed in ideal condition. In its application onboard, it is recommended that appropriate margin to the time be given depending on each machinery's characteristics.
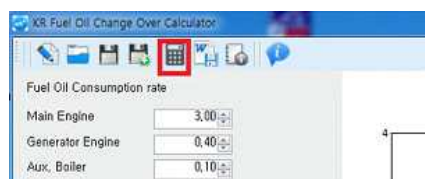
Instruction		
1		▶ Click the "KR-FOCO".
2		Input Data other than "ship name" are optional. ▶ Ship Name: Enter the name of ship. ▶ Gross Tonnage : Enter the ship's Gross Tonnage. ▶ Class No. : Enter the ship's classification number. ▶ Flag : Enter the ship's flag. ▶ IMO No. : Enter the ship's IMO number.

Fuel Oil Consumption rate
Main Engine — 2.00 (Ton / hr)
Generator Engine — 0.00 (Ton / hr)
Aux. Boiler — 0.00 (Ton / hr)
Return Flow from Service
System to Service Tank — 0.00 (Ton / hr)
HFO Tank
HFO Settling Tank — 0.00 (Ton)
HFO Service Tank — 0.00 (Ton)
HFO Service System
Including Piping System — 2.00 (Ton)
Sulphur Content — 3.50 (% m/m)
Temp. in Service Tank — 100.00 (C)
Price — 0.00 ($)
Time to stop HFO heater
and change over fuel — 120.00 (Min.)
LSFO Tank
Sulphur Content — 0.08 (% m/m)
Temp. in Service Tank — 40.00 (C)
Price — 0.00 ($)
Required Sulphur Content Limit
Sulphur content — 0.10 (% m/m)
Results
Change over Time — 6.92 (hr)
Additional Cost during Change Over — 0.00 ($)
Max. Temperature Decrease — 0.01 (C/min.)
Max. allowable fuel consumption
+ Return flow to fulfill 2 ℃/Min. — 4.00 (Ton/hr)

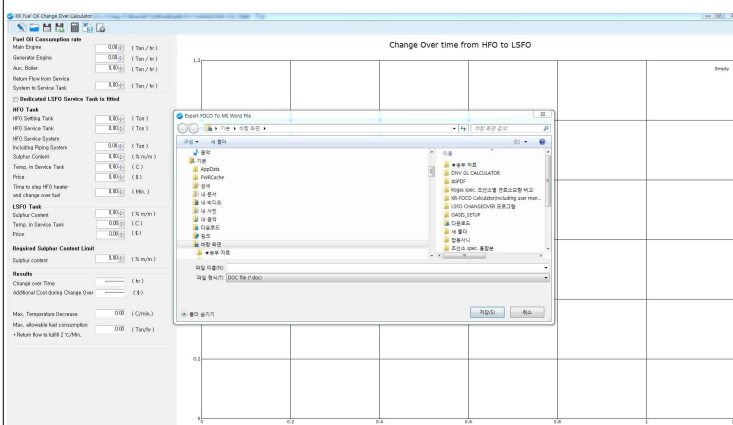Change Over time from HFO to LSFO

1. Enter the fuel oil consumption rate for main engine, generator engine, aux. boiler.
2. Enter return flow rate. The amount of the return flow mean flow from Service system to HSFO tanks or drain tanks.
3. Select if the LSFO Service Tank is fitted or not.
4. Enter the amount of HFO in Settling Tank, Service Tank, and Service System which will be filled and mixed with LSFO.
5. Enter the Sulphur Content(%) and Price for HFO
   Enter the Temp. in Service Tank for HFO and Time to stop HFO heater
6. Enter the Sulphur Content(%) less than 0.1% and Price for LSFO
   Enter the Temp. in Service Tank for LSFO
7. Enter the required Sulphur Content Limit
8. Click ▦ "Run Calculation".

9. Check the result of the calculation
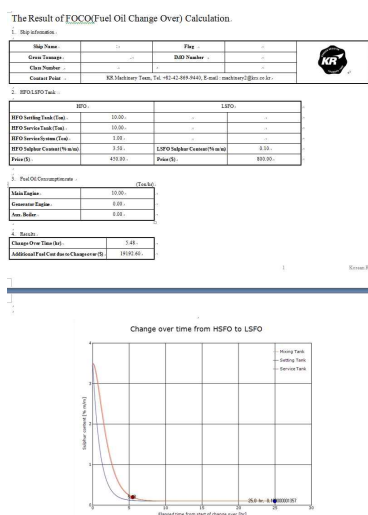   Max. Changeover Time is 48Hrs

Instruction

4		▶ Click [icon] "Export to word" to print the result calculation. ▶ Save the files
5		▶ Calculation result (Ms-Word format)

The icon's function is described as follow

[Open]	a. Click the icon. b. When the [Open KR FOCO file] dialog box appears, select the folder you wish to choose from [Directory]. c. Select the file(*.xml) you wish to choose from the file list box. d. Click [Open]. The selected file will appear on the screen.
[Save]	a. Click the icon. b. When the [Save KR FOCO file] dialog box appears, choose a drive from [Directory]. c. In the file list window, select a folder in which the file is to be saved. d. Enter the file name in the [File Name] dialog box. e. Click [Save].
[Save as]	a. Click the icon. b. When the [Save as FOCO file] appears, enter a new name in the [File name] dialog box. c. Click [Save].

The followings consideration is to be taken into account.

1) The fuel changeover operation should be clearly defined for each vessel by means of comprehensive procedure in consultation with engine/machinery manufacturer

2) Engine manufacturer's guidelines relate to the minimum viscosity of a fuel and the avoidance of thermal shock which would be harmful to fuel injection equipment. In general, a maximum of 2°C per minute temperature variation is recommended. Also, Close attention should be paid to lube oil analysis and consideration is given to the possible use of lower Total Base Number(TBN) of system and cylinder oils.

3) Where vessels need to change between different fuel types i.e HFO, MGO, the following differences in fuel characteristics should be considered
   - Viscosity
   - Density
   - Flash point
   - Lubrication properties