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Engine Update: The X52-S & X62-S, Diesel and Dual-Fuel versions

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1 Introduction

At the end of 2019, new WinGD short-stroke engines had been officially announced to the market. Today, WinGD is pleased to share the drawing road map of the four engine variants, including the GTD and documentation schedule. In addition, to enhance WinGD's competitive position in the market, it has been decided to reduce the minimum engine speed and power output on both engine types (diesel and Dual-Fuel versions). In addition, the WinGD X-DF2.0 technology with iCER will also be introduced as announced in TIN 018, released June 2020.

2 Extended rating fields: Engine speed reduction on R3/R4

On the WinGD X52-S2.0 and X52DF-S1.0/2.0, the minimum engine speed has been reduced from 95 to 85 rpm without technical changes to the initial design.

On the WinGD X62-S2.0 and X62DF-S1.0/2.0 the minimum engine speed has been reduced from 85 to 82 rpm. Same as for the X52-S2.0, no technical changes to the initial design are necessary.

On all the above-mentioned engine variants, the fuel consumption will be slightly reduced with the next GTD release.

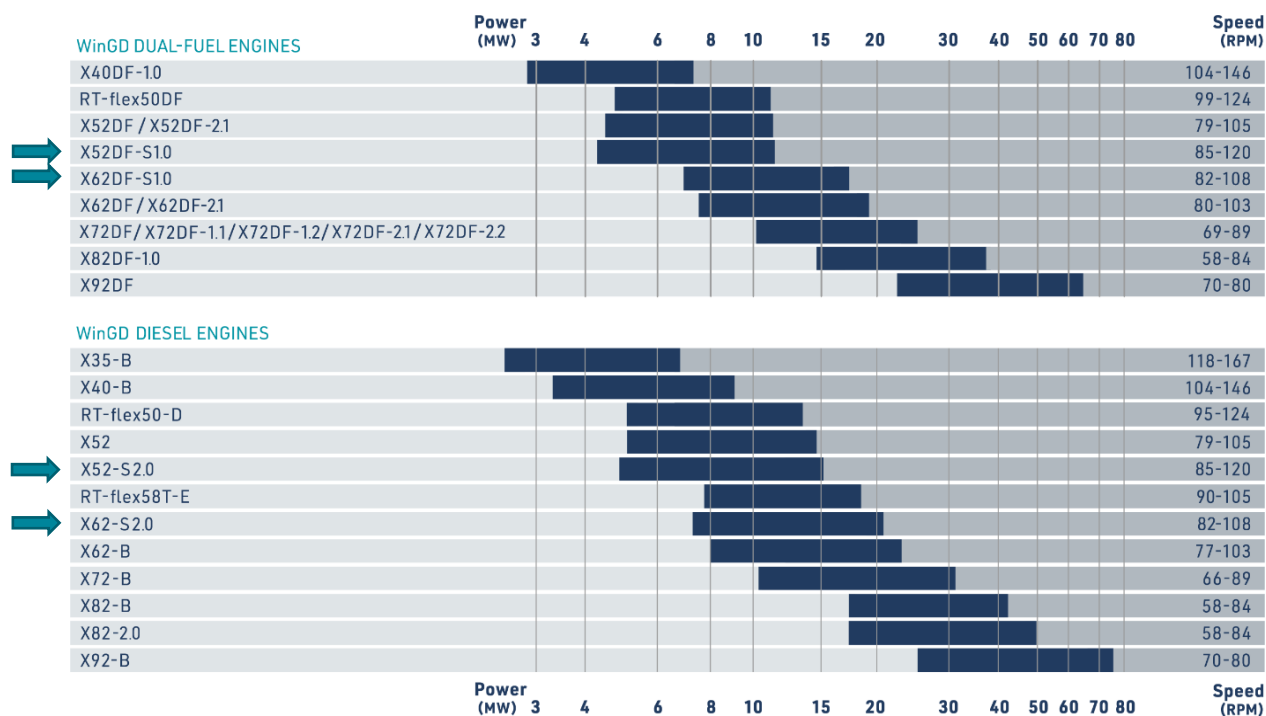


Figure 2-1: Power range for WinGD low-speed engines

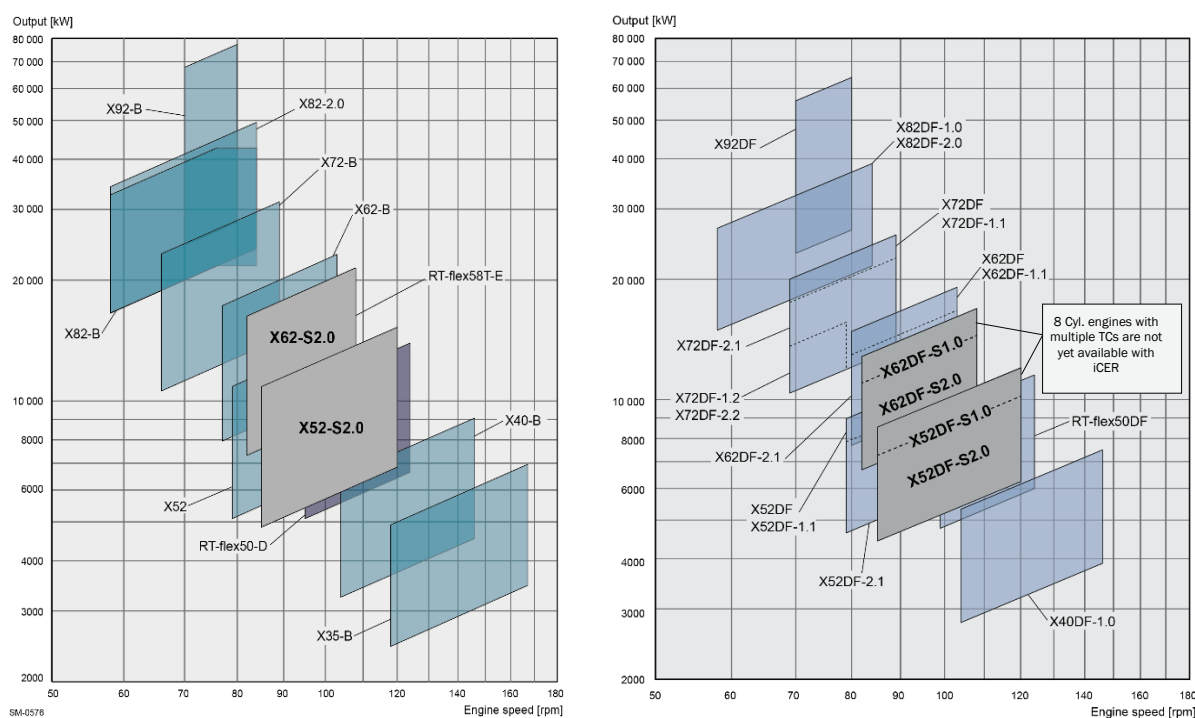


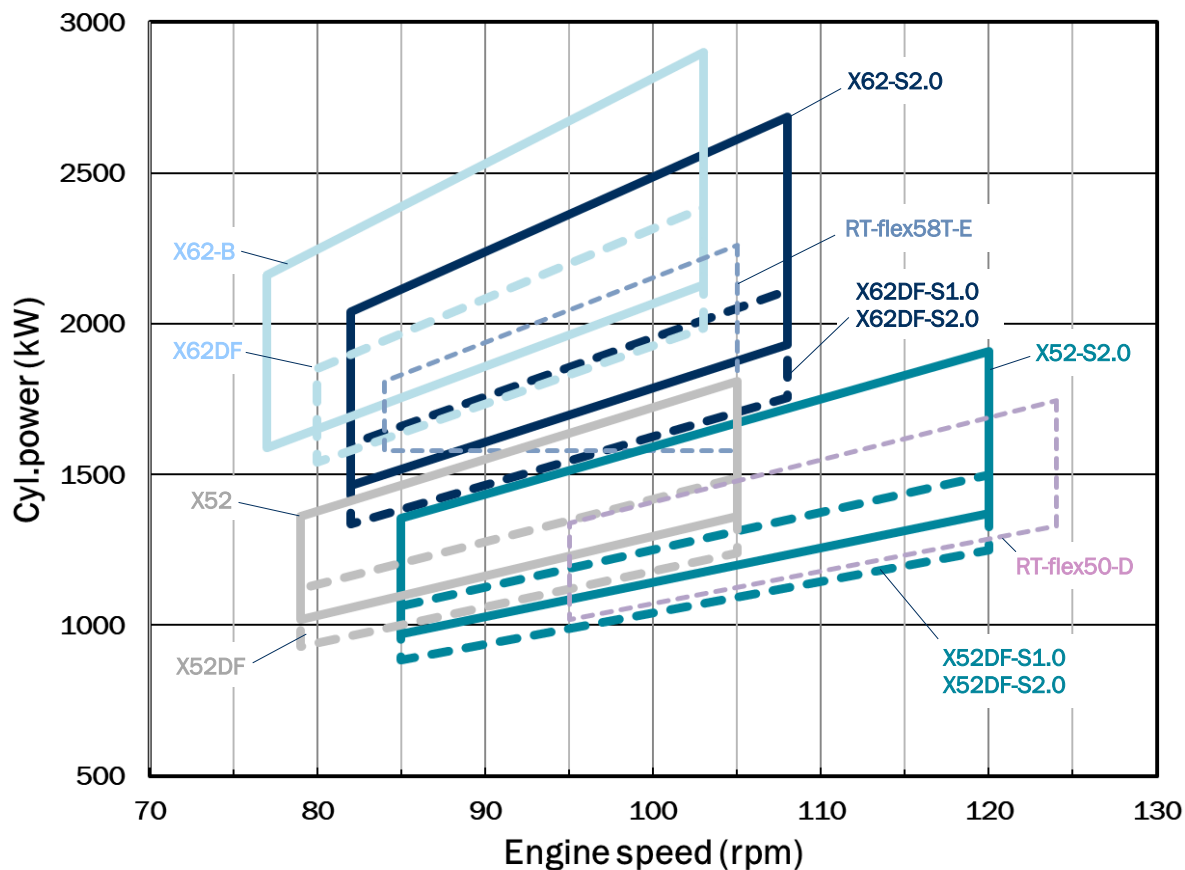
Figure 2-2: Rating fields for the WinGD diesel and X-DF engines

Note: For detailed engine parameters, please see chapter 3 for further information.

3 Main engine parameters with extended rating fields

3.1 Rating fields of portfolio engines in the 50- and 60-bore range

The below graphs show the rating field comparison between the existing engines in the 50- and 60-bore range to the new short-stroke engines.



	R1	R2	R3	R4
X62-S2.0				
rpm	108	108	82	82
kW/cyl.	2685	1930	2040	1465
X62DF-S				
rpm	108	108	82	82
kW/cyl.	2110	1755	1600	1335
RT-flex58T-E				
rpm	105	105	90	90
kW/cyl.	2350	1580	2015	1580
X62-B				
rpm	103	103	77	77
kW/cyl.	2900	2130	2160	1590
X62DF				
rpm	103	103	80	80
kW/cyl.	2385	1985	1850	1540

	R1	R2	R3	R4
X52-S2.0				
rpm	120	120	85	85
kW/cyl.	1910	1370	1355	970
X52DF-S				
rpm	120	120	85	85
kW/cyl.	1500	1250	1065	885
RT-flex50-D				
rpm	124	124	95	95
kW/cyl.	1745	1330	1340	1020
X52				
rpm	105	105	79	79
kW/cyl.	1810	1360	1360	1020
X52DF				
rpm	105	105	79	79
kW/cyl.	1490	1240	1120	930

Figure 3-1: Rating fields of portfolio engines in the 50- and 60-bore range

3.2 Main parameters of the new X52-S2.0/X52DF-S1.0 and X62-S2.0/X62DF-S1.0 short-stroke engines

Table 3-1: Comparison of the new short-stroke engine executions

Engine Type	X52-S2.0	X52DF-S1.0	X62-S2.0	X62DF-S1.0	
Cylinder bore	520	520	620	620	[mm]
Piston stroke	2045	2045	2245	2245	[mm]
Power/cylinder, R1 MCR	1910	1500	2685	2110	[kW]
Engine speed, R1	120	120	108	108	[1/min]
Engine speed, R3	85	85	82	82	[1/min]
Mean eff. pressure @ R1/R3	22	17.3	22	17.3	[bar]
Mean piston speed @ R1	8.2	8.2	8.1	8.1	[m/s]
Number of cylinders	5 to 8	5 to 8	5 to 8	5 to 8	
Brake Specific Fuel Consumption @ R1	162.0	184.3	161.0	182.2	[g/kWh]
Brake Specific Gas Consumption @ R1		142.7		142.4	[g/kWh]

4 Engine availability

The following list includes the expected availability of the different engine types:

- X62-S2.0 2022-Q3
- X52-S2.0 2022-Q4
- X62DF-S1.0 2023-Q2
- X52DF-S1.0 2023-Q3

The Marine Installation Manual (MIM) and the General Technical Data (GTD) are expected to be available as follows:

- MIM
 - October 2021: The X52-S2.0/X52DF-S1.0 and X62-S2.0/X62DF-S1.0
 - October 2021: The X52DF-S2.0 and X62DF-S2.0 (iCER)
- GTD
 - October 2021

5 Integrated selective catalytic reduction option (iSCR)

The new short-stroke diesel engines will also be offered with the iSCR option.

Below Figure 5-1 shows the latest design which is very compact and will only slightly affect the engine width on the upper platform level. The charging unit of the standard and iSCR engines will have the same underslung design. The LP-SCR is provided as an option. However, the off-engine HP-SCR interface is not provided.

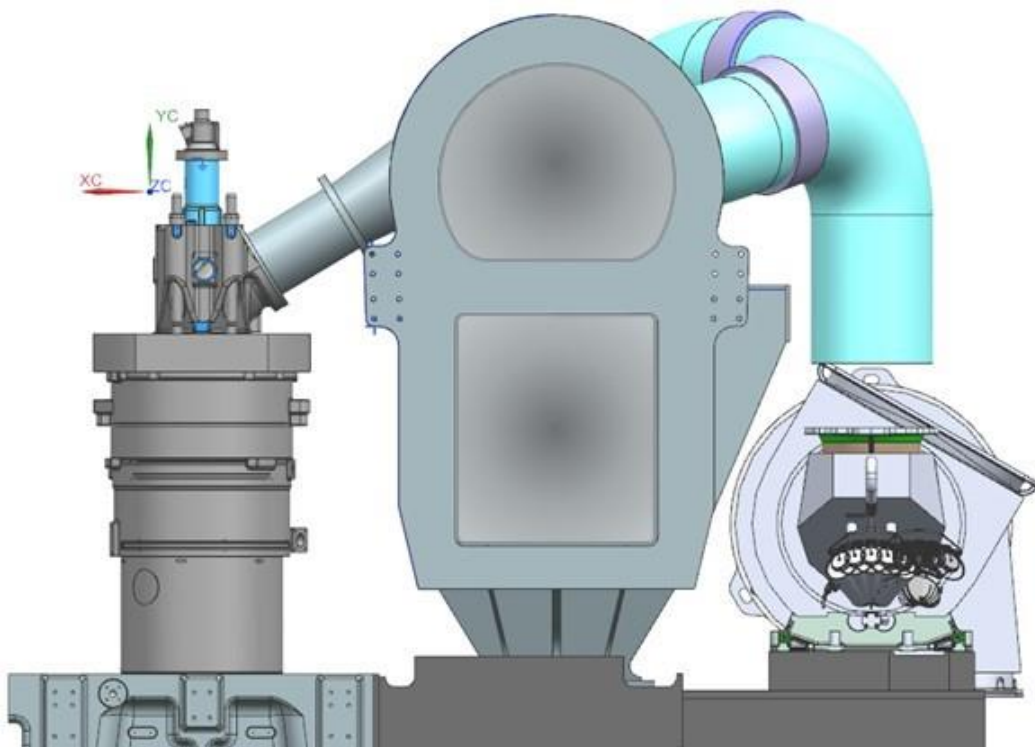


Figure 5-1: Example of an iSCR shown from the driving end side

The iSCR application has major benefits for shipyards and designers:

- Compact Tier III solution which ensures easy integration in the engine room layout
- Less installation work as it is fitted on the engine
- Combined testing of the engine and the iSCR
- Integrated in the engine control system
- Favourable higher process temperatures for the iSCR

Note:

1. iSCR is designed for MGO with a maximum content of 0.10% sulphur m/m operation in NECA
2. In Tier II bypass mode, a maximum of 0.50% sulphur m/m content is allowed
3. Please see also TIN 014, released November 2019

6 Interface with the WinGD X-DF2.0 technology (iCER system)

The new WinGD X-DF short-stroke engines will also be offered with the Intelligent Control by Exhaust Recycling (iCER) option. Figure 6-1 shows the latest design of the iCER gas version. With special pipe interfaces on the standard WinGD X-DF engine, the iCER equipment can be added to the installation.



Figure 6-1: Example of an iCER system arrangement

The iCER system substitutes a part of the oxygen with cooled exhaust gas. This positively influences the combustion process and provides the following benefits to the operator:



Reduction of energy consumption in gas mode by 3%



Reduction of fuel consumption in diesel mode by up to 5 g/kWh



Reduction of methane slip of up to 50%

Note: Please see also TIN 018, released June 2020

7 Acronyms

% m/m	Percent mass per mass
BSFC	Brake Specific Fuel Consumption
BSGC	Brake Specific Gas Consumption
GTD	General Technical Data (Engine performance data)
HFO	Heavy Fuel Oil
HP-SCR	High-Pressure Selective Catalytic Reduction
iCER	Intelligent Control by Exhaust Recycling
iGPR	Integrated Gas Pressure Regulation (unit)
iSCR	Integrated Selective Catalytic Reduction
LP-SCR	Low-Pressure Selective Catalytic Reduction
MCR	Maximum Continuous Rating
MDO	Marine Diesel Oil
MGO	Marine Gas Oil
MIM	Marine Installation Manual
MM	Maintenance Manual
NECA	Nitrous Oxide Emission Control Area
OM	Operation Manual
SCR	Selective Catalytic Reduction
SECA	Sulphur Emission Control Area
SPC	Spare Parts Catalogue
TC	Turbocharger