

Engine Announcement X52-S & X62-S, Diesel and DF

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Engines: X52-S2.0, X62-S2.0, X52DF-S1.0, X62DF-S1.0

Contents

1	Information.....	1
2	Diesel Engines – Main Parameters.....	2
2.1	X52-S2.0.....	2
2.2	X62-S2.0.....	3
2.3	Diesel Engines Comparison.....	4
3	Dual-Fuel Engines - Main Parameters	5
3.1	X52DF-S1.0	5
3.2	X62DF-S1.0	6
3.3	Dual-Fuel Engines Comparison	7
4	Operational features.....	8
	Appendix.....	9

Summary

This Technical Information Note announces the launch of 4 new additions to the WinGD portfolio. These engines, the X52-S2.0, X62-S2.0, X52DF-S1.0 and X62DF-S1.0, are the introductory engines of WinGD’s new shorter piston stroke range.

1 Information

WinGD, the marine industry’s leading low-speed gas engine developer, further extend the Generation X series portfolio with the addition of two diesel engines, the X52-S2.0 and X62-S2.0, and two dual-fuel engines, the X52DF-S1.0 and X62DF-S1.0 (as defined by the new naming convention described in TIN016 – *Introduction of Engine Designation*). The main application of these types of engine is on vessels with lower draft, smaller propeller diameters and lower main deck height. For example:

- Container Feeder Vessels
- Multipurpose Vessels
- Car and Truck Carriers
- RORO Vessels
- CONRO Vessels

The GTD (General Technical Data) program provides official engine performance data for all WinGD portfolio engines. Data for the diesel engines (X52-S2.0, X62-S2.0) will be available with the next GTD update released in December 2019 (version 2.9.0), while data for the dual-fuel engines (X52DF-S1.0 and X62DF-S1.0) will be available with the GTD in the middle of 2020.

The main parameters for these new diesel and dual-fuel engines are shown in sections 2 and 3 respectively, with additional engine data found in Appendix.

2 Diesel Engines – Main Parameters

2.1 X52-S2.0

The X52-S2.0 engine has a cylinder bore diameter of 520 mm and a piston stroke of 2,045 mm, with a maximum continuous power of 1,910 kW/cylinder at 120 rpm (R1 rating). This is shown below in Figure 1, where the engine cylinder layout field for power and speed is defined by the ratings R1 to R4.

The engine will be available from five to eight cylinders, covering an overall power range from 5,425 kW to 1,5280 kW at 95 to 120 rpm.

X52-S2.0	R1	R2	R3	R4
rpm	120	120	95	95
kW/cyl	1910	1370	1515	1085

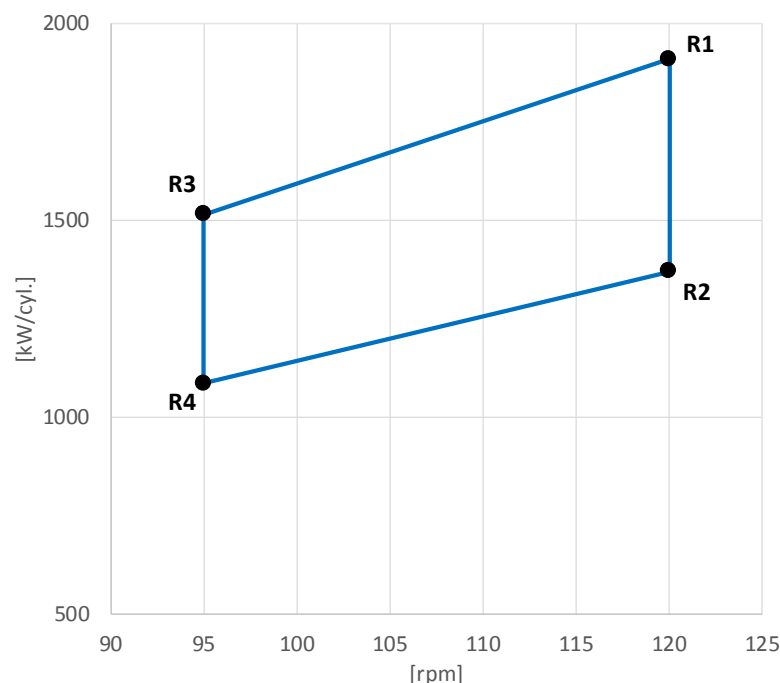


Figure 1: Engine cylinder layout for X52-S2.0

Table 1: Engine parameters for X52-S2.0

Cylinder bore	520	[mm]
Piston stroke	2,045	[mm]
Power per cylinder at R1 (MCR)	1,910	[kW]
Maximum engine rating speed (R1-R2)	120	[min ⁻¹]
Minimum engine rating speed (R3-R4)	95	[min ⁻¹]
Mean effective pressure at R1-R3	22	[bar]
Mean piston speed @ R1	8.2	[m/s]
Number of cylinders	5 to 8	
Brake Specific Fuel Consumption @ R1	162	[g/kWh]

2.2 X62-S2.0

The X62-S2.0 engine has a cylinder bore diameter of 620 mm and a piston stroke of 2,245 mm, with a maximum continuous power of 2,685 kW/cylinder at 108 rpm (R1 rating). This is shown below in Figure 2, where the engine cylinder layout field for power and speed is defined by the ratings R1 to R4.

The engine will be available from five to eight cylinders, covering an overall power range of 7,600 kW to 21,480 kW at 85 to 108 rpm.

X62-S2.0	R1	R2	R3	R4
rpm	108	108	85	85
kW/cyl	2685	1930	2110	1520

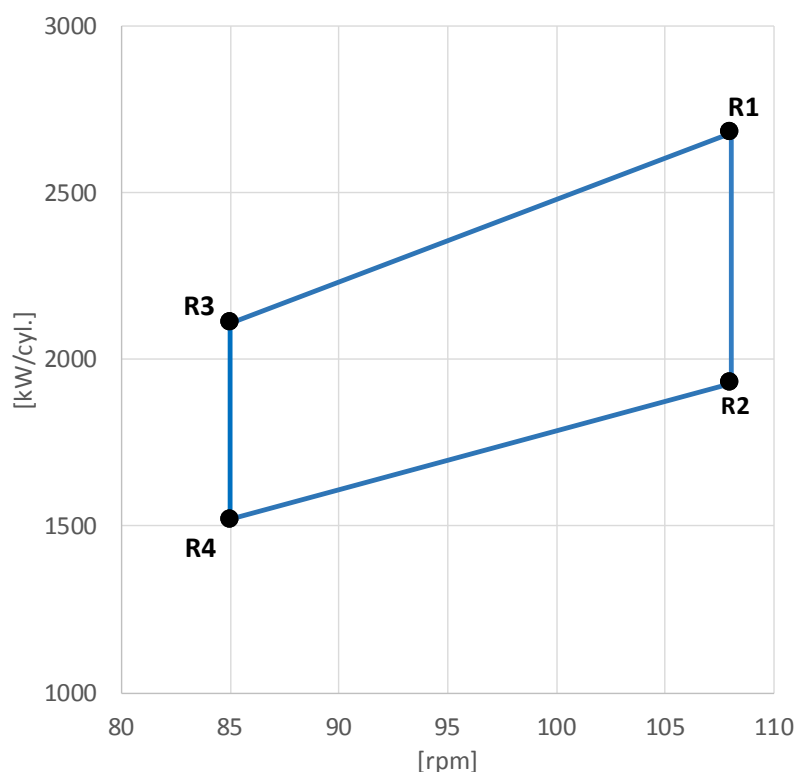


Figure 2: Engine cylinder layout for X62-S2.0

Table 2: Engine parameters for X62-S2.0

Cylinder bore	620	[mm]
Piston stroke	2,245	[mm]
Power per cylinder at R1 (MCR)	2,685	[kW]
Maximum engine rating speed (R1-R2)	108	[min ⁻¹]
Minimum engine rating speed (R3-R4)	85	[min ⁻¹]
Mean effective pressure at R1-R3	22	[bar]
Mean piston speed @ R1	8.1	[m/s]
Number of cylinders	5 to 8	
Brake Specific Fuel Consumption @ R1	161	[g/kWh]

2.3 Diesel Engines Comparison

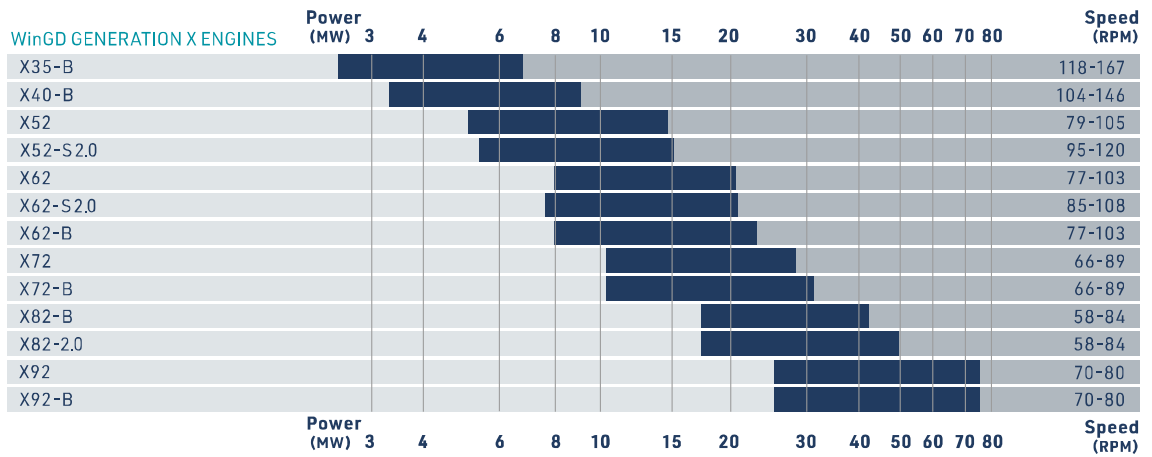


Figure 3: Diesel engines comparison

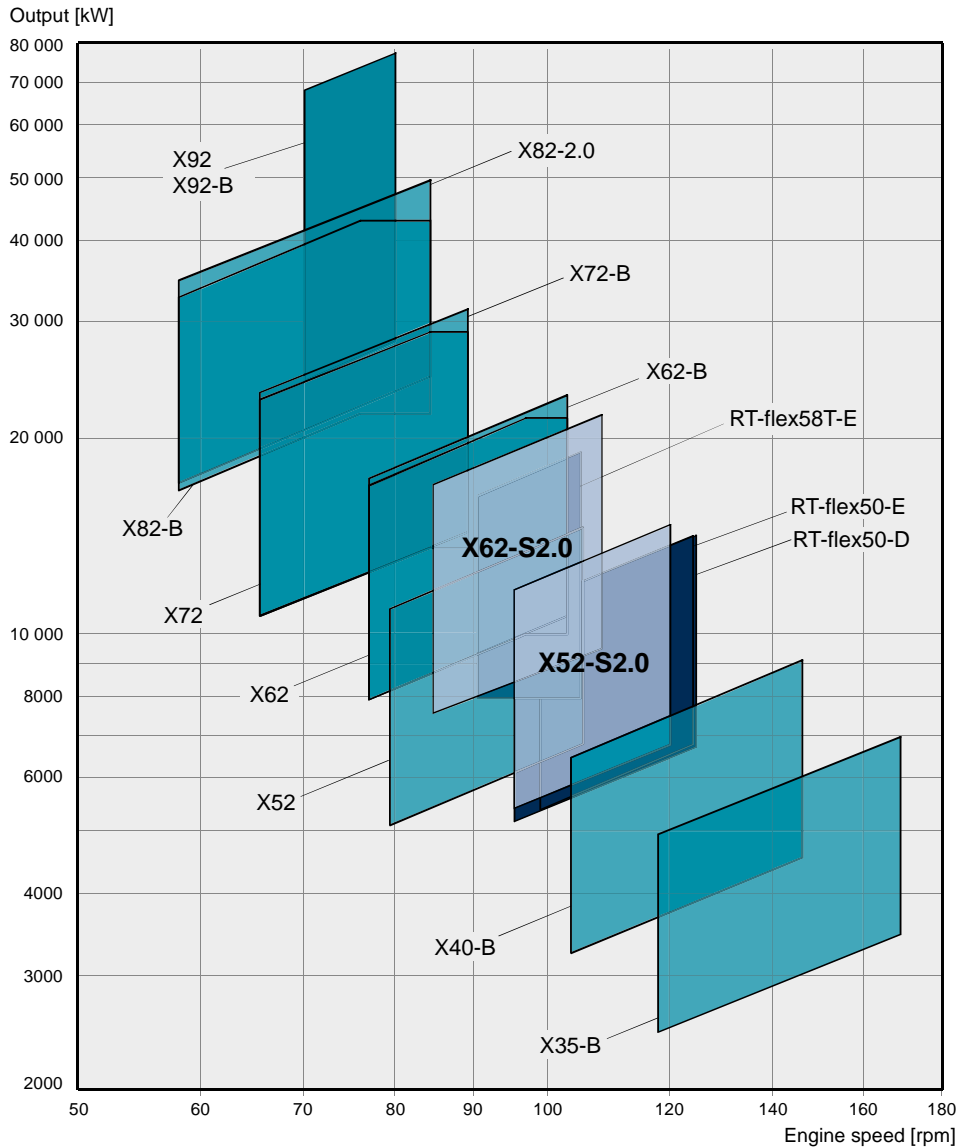


Figure 4: Power / Speed rating fields comparison with all WinGD diesel engines

3 Dual-Fuel Engines - Main Parameters

3.1 X52DF-S1.0

The X52DF-S1.0 engine has a cylinder bore diameter of 520 mm and a piston stroke of 2,045 mm, with a maximum continuous power of 1,500 kW/cylinder at 120 rpm (R1 rating). This is shown below in Figure 5, where the engine cylinder layout field for power and speed is defined by the ratings R1 to R4.

The engine will be available from five to eight cylinders, covering an overall power range of 4,950 kW to 12,000 kW at 95 to 120 rpm.

X52DF-S1.0	R1	R2	R3	R4
rpm	120	120	95	95
kW/cyl	1500	1250	1190	990

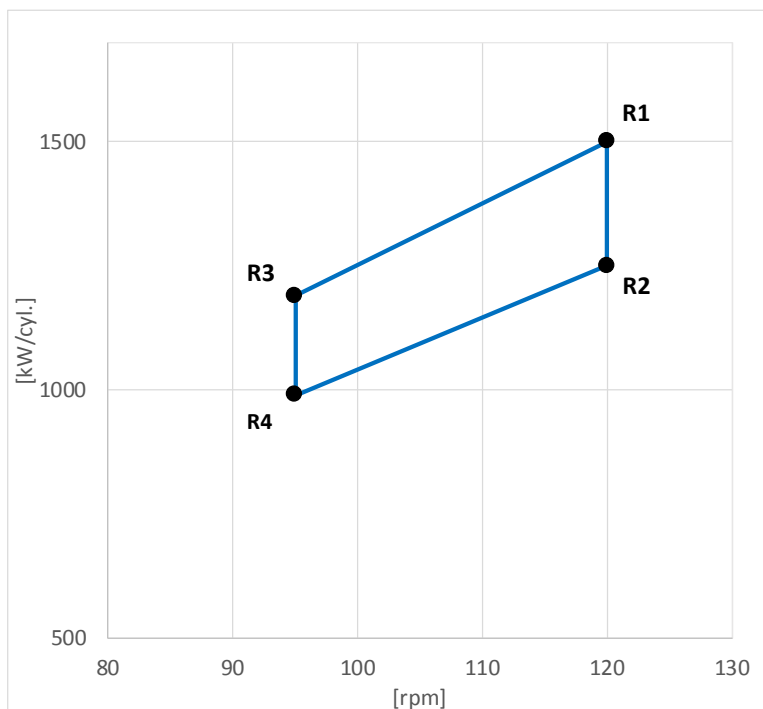


Figure 5: Engine cylinder layout for X52DF-S1.0

Table 3: Engine parameters for X52DF-S1.0

Cylinder bore	520	[mm]
Piston stroke	2,045	[mm]
Power per cylinder at R1 (MCR)	1,500	[kW]
Maximum engine rating speed (R1-R2)	120	[min ⁻¹]
Minimum engine rating speed (R3-R4)	95	[min ⁻¹]
Mean effective pressure at R1-R3	17.3	[bar]
Mean piston speed at R1	8.2	[m/s]
Number of cylinders	5 to 8	

3.2 X62DF-S1.0

The X62DF-S1.0 engine has a cylinder bore diameter of 620 mm and a piston stroke of 2,245 mm, with a maximum continuous power of 2,110 kW/cylinder at 108 rpm (R1 rating). This is shown below in Figure 6, where the engine cylinder layout field for power and speed is defined by the ratings R1 to R4.

The engine will be available from five to eight cylinders, covering an overall power range of 6,925 kW to 16,880 kW at 85 to 108 rpm.

X62DF-S1.0	R1	R2	R3	R4
rpm	108	108	85	85
kW/cyl	2110	1755	1660	1385

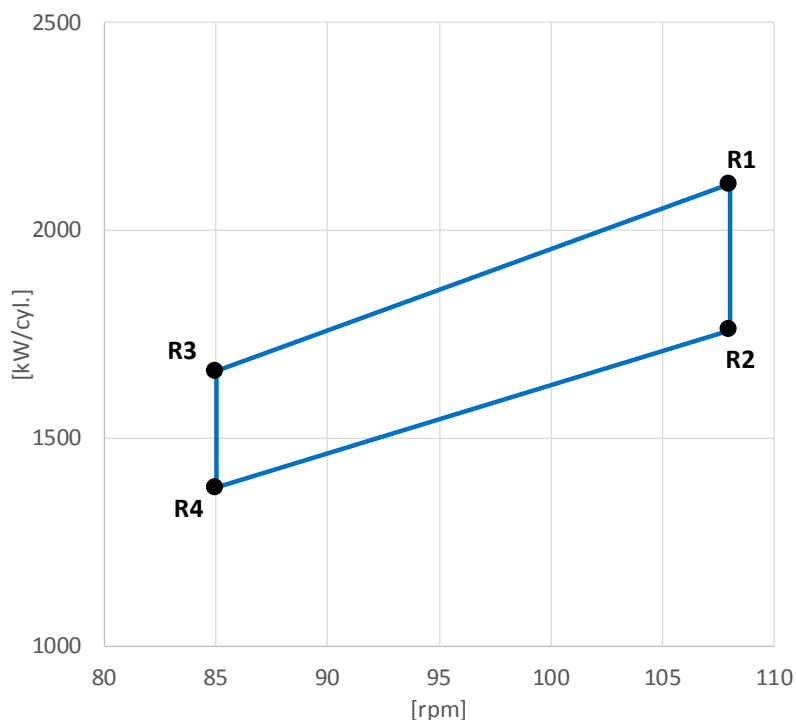


Figure 6: Engine cylinder layout for X62DF-S1.0

Table 4: Engine parameters for X62DF-S1.0

Cylinder bore	620	[mm]
Piston stroke	2,245	[mm]
Power per cylinder at R1 (MCR)	2,110	[kW]
Maximum engine rating speed (R1-R2)	108	[min ⁻¹]
Minimum engine rating speed (R3-R4)	85	[min ⁻¹]
Mean effective pressure at R1-R3	17.3	[bar]
Mean piston speed at R1	8.1	[m/s]
Number of cylinders	5 to 8	

3.3 Dual-Fuel Engines Comparison

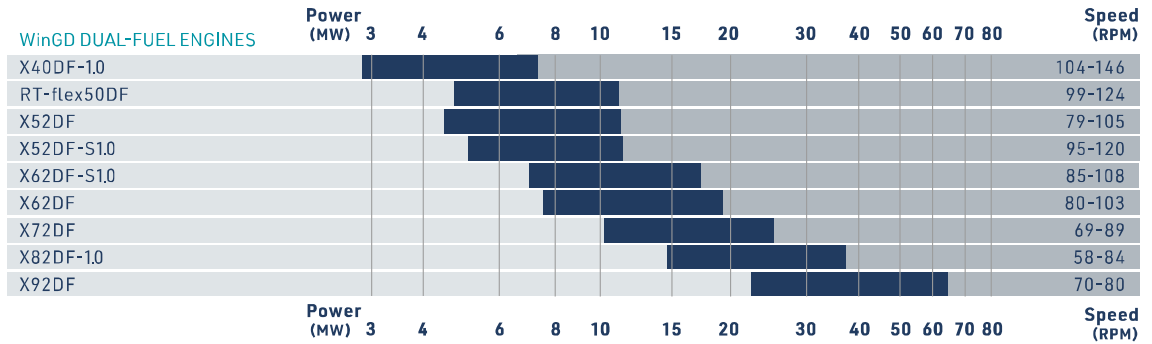


Figure 7: Dual-fuel engines comparison

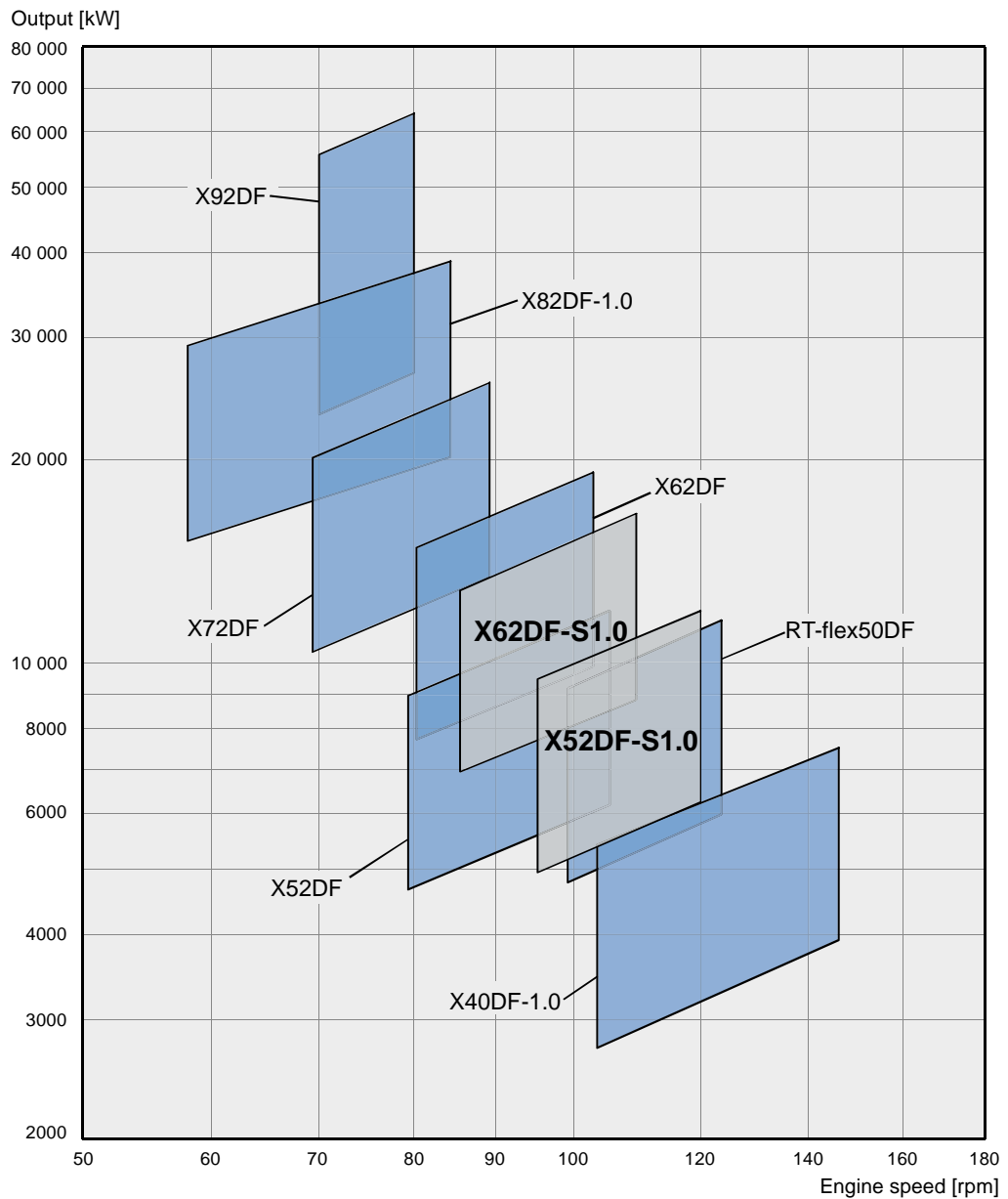


Figure 8: Power / Speed rating fields comparison with all WinGD dual-fuel engines

4 Operational features

- The selected stroke-to-bore ratio results in a compact engine with low manufacturing and assembly costs. Service-friendly design will reduce downtime and cut operating costs.
- To be fully compliant with IMO Tier III NO_x emissions requirements, the diesel engines will be equipped with iSCR (integrated Selective Catalytic Reduction) as standard. For reference see TIN014 – *Tier III NO_x Compliance: Introduction of SCR On Engine (iSCR)*.
- No structural components of the new diesel engines require modification for conversion to LNG fuel. “DF-ready” is the ideal solution for LNG-ready ships.
- WinGD’s well proven electronically-controlled common-rail technology results in low fuel consumption across the entire operating range, especially at low and part loads.

5 Scheduling

The first engine shop test is targeted in Q4 2021.

Appendix

Rating Field Comparison

	R1	R1+	R2	R2+	R3	R4
X52-S2.0						
rpm	120		120		95	95
kW/cyl.	1910		1370		1515	1085

X52DF-S1.0						
rpm	120		120		95	95
kW/cyl.	1500		1250		1190	990

X52						
rpm	105		105		79	79
kW/cyl.	1810		1360		1360	1020

X52DF						
rpm	105		105		79	79
kW/cyl.	1490		1240		1120	930

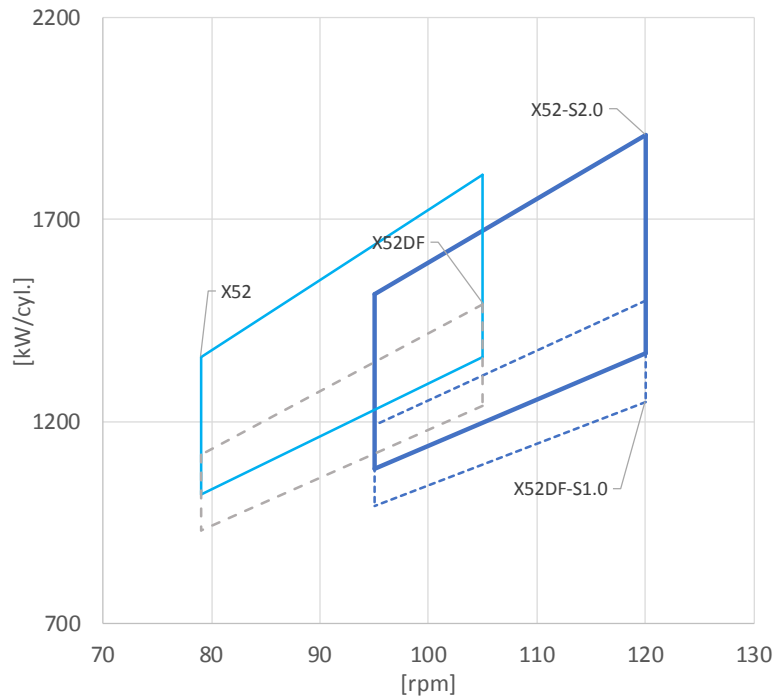


Figure 9: Rating field comparison of X52 family

	R1	R1+	R2	R2+	R3	R4
X62-S2.0						
rpm	108		108		85	85
kW/cyl.	2685		1930		2110	1520

X62DF-S1.0						
rpm	108		108		85	85
kW/cyl.	2110		1755		1660	1385

X62						
rpm	97	103	97	103	77	77
kW/cyl.	2660	2660	2000	2000	2110	1590

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

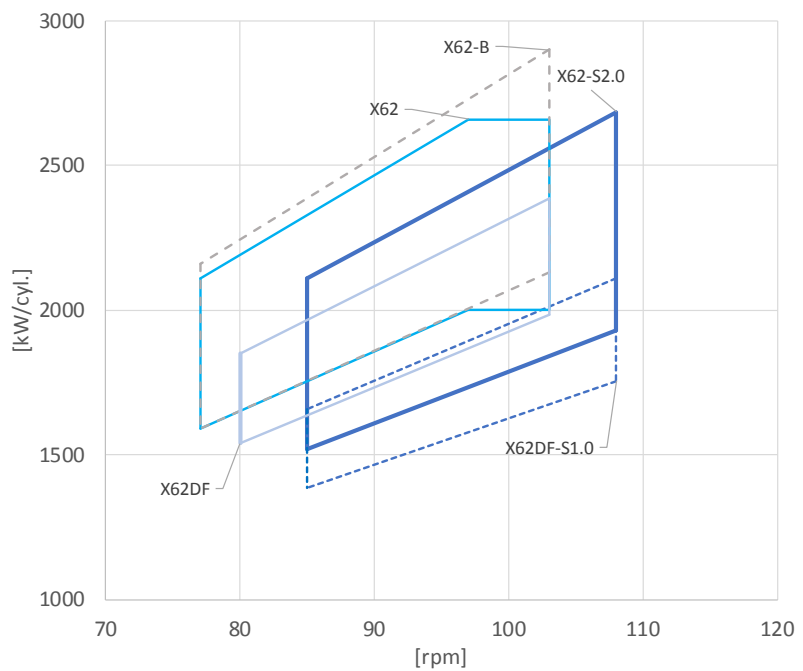


Figure 10: Rating field comparison of X62 family

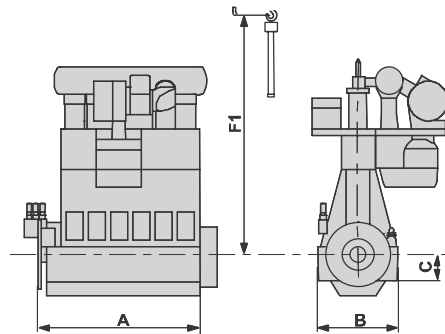
X52-S2.0 - Engine Data

X52-S2.0

Cylinder bore	520 mm
Piston stroke	2045 mm
Speed	95-120 rpm
Mean effective pressure at R1	22 bar
Stroke / bore	3.93

Dimensions (mm)

Cyl.	Length A	B	C	F1
		3 200	1 190	9 405
5	5 440			
6	6 300			
7	7 160			
8	8 020			



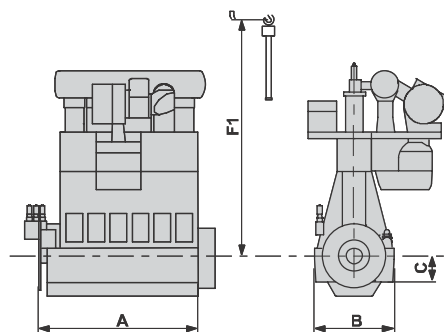
X62-S2.0 - Engine Data

X62-S2.0

Cylinder bore	620 mm
Piston stroke	2245 mm
Speed	85-108 rpm
Mean effective pressure at R1	22 bar
Stroke / bore	3.62

Dimensions (mm)

Cyl.	Length A	B	C	F1
		3 720	1 300	10 330
5	6 500			
6	7 500			
7	8 500			
8	9 500			



All dimensions may change during development

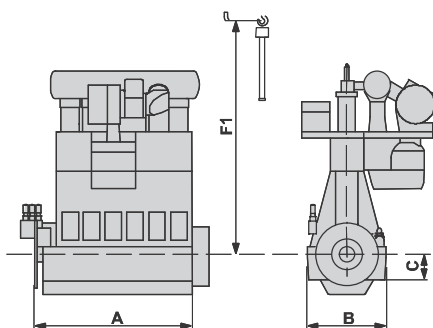
X52DF-S1.0 - Engine Data

X52DF-S1.0

Cylinder bore	520 mm
Piston stroke	2045 mm
Speed	95-120 rpm
Mean effective pressure at R1	17.3 bar
Stroke / bore	3.93

Dimensions (mm)

Cyl.	Length A	B	C	F1
		3 200	1 190	9 405
5	5 440			
6	6 300			
7	7 160			
8	8 020			



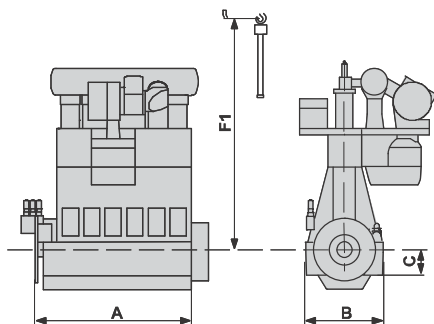
X62DF-S1.0 - Engine Data

X62DF-S1.0

Cylinder bore	620 mm
Piston stroke	2245 mm
Speed	85-108 rpm
Mean effective pressure at R1	17.3 bar
Stroke / bore	3.62

Dimensions (mm)

Cyl.	Length A	B	C	F1
		3 720	1 300	10 330
5	6 500			
6	7 500			
7	8 500			
8	9 500			



All dimensions may change during development