

General Engine Data			
Type	V-Type, 4 cycle, water cooled, 12 Cylinder		
Aspiration	Turbocharged & Intercooled		
Cylinder Type	Replaceable dry liner		
Bore x Stroke	<i>mm (inch)</i>	128 x 142 (5.04 x 5.59)	
Displacement	<i>liter (inch³)</i>	21.927 (1338)	
Compression Ratio	15 : 1		
Valves per Cylinder	- Intake	1	
	- Exhaust	1	
Valves lashes at cold	- Intake	<i>mm (inch)</i>	0.3 (0.0118)
	- Exhaust	<i>mm (inch)</i>	0.4 (0.0157)
Valve Timing	- Intake	Opening: 24° BTDC	Close: 36° ABDC
	- Exhaust	Opening: 63° BBDC	Close: 27° ATDC
Combustion Type	Direct Injection		
Firing Order	1-12-5-8-3-10-6-7-2-11-4-9		
Injection Timing	18° BTDC		
Rotation	Counter Clockwise, viewed from flywheel		
Dimension (L x W x H)	<i>mm</i>	1,909 x 1,289 x 1,838 (L= Comstruction length)	
Dry Weight	<i>Approx. kg (lb)</i>	1.775 (3.913)	

Approved Ratings		1470 rpm	1760 rpm	2100 rpm
DF22TiH-F Output	<i>kW (hp)</i>	486 (661)	573 (779)	559 (760)

Although our FM ratings are shown at specific speeds, De Maas FFE engines can be applied at any intermediate speed. To determine the intermediate speed power; make a linear interpolation from the applicable De Maas power curves.

Fuel System			
Injection Pump	Bosch in-line "P" type		
Governor	RSV type (all speed control)		
Feed Pump	Mechanical type		
Injection Nozzle	Multi hole type		
Opening Pressure	<i>kPa (psi)</i>	27949 (4053.7)	
Fuel Filter	Full flow, cartridge type		
Used Fuel	Diesel fuel type 2-D Only		
Fuel consumption	See table no. 3.100.06FCEN.XX		
Minimum Supply line Size	<i>mm (inch)</i>	12 (0.47)	
Minimum Return line Size	<i>mm (inch)</i>	12 (0.47)	

Electrical System			
24 Volts (Nominal)			
Starter motor	<i>kW</i>	1 x 7	
Recommended Battery Capacity	<i>Ah</i>	200	
Quantity per battery bank	2		
Cold Cranking Amperes	<i>@18°C (0°F)</i>	1000	
Charging Alternator Output	<i>Amps</i>	45	

Air Induction System			
Air Cleaner Type	Drip proof		
Engine Air Flow -	<i>m³/min.</i>	47.0 @ 2100 rpm	
Air Inlet Restriction	<i>kPa</i>	3.4	

Cooling system		
Heat Exchanger Minimum Raw Water Flow		1 litre / Minute per kW installed
Engine Water Pump		Centrifugal type driven by belt
Water Pump Capacity	<i>liter/min. (gal./min.)</i>	454 (120) @ 2100 rpm
Heat Exchanger Maximum Cooling H ₂ O		
Inlet Pressure	<i>kPa (psi)</i>	1,000 (145.1)
Flow	<i>liter/min. (gal./min.)</i>	559 (123.0)
Maximum Temperature	<i>°C (°F)</i>	37.8 (100)
Thermostat, Start to Open	<i>°C (°F)</i>	71 (160)
Fully Opened	<i>°C (°F)</i>	85 (185)
Coolant Capacity	<i>liter (gal.)</i>	35 (9.4)
Coolant Pressure Cap	<i>kPa (psi)</i>	95 (13.8)
Maximum Raw Water Supply pipe		
Connection to Heat Exchanger	<i>inch</i>	1½" BSP
Maximum Raw Water Discharge pipe		
Connection from Heat Exchanger	<i>inch</i>	2" BSP Vertical up!
Max. Engine Coolant Temperature	<i>°C (°F)</i>	96 (204.8)
Pressure loss Engine Cooling circuit	<i>kPa (psi)</i>	80 (116)

Lubrication System		
Lubrication Method		Fully Forced pressure feed type
Oil Pump		Gear type driven by crankshaft
Oil Filter		Full Flow, Cartridge type
Oil pressure Range, normal	<i>kPa (psi)</i>	100 (14.5) at idle 300-600 (43.5-87.0) at maximum speed
Max. Oil Sump Temperature	<i>°C (°F)</i>	108 (226)
Oil Sump Capacity High	<i>liter (gal.)</i>	40 (10.6)
Low	<i>liter (gal.)</i>	33 (8.7)
Total Engine Oil Capacity	<i>liter (gal.)</i>	40 (10.6)
Minimum Oil Pressure	<i>kPa (psi)</i>	75 (10.9)

Exhaust System		
Exhaust Gas Flow	<i>m³/min.</i>	132 @ 2100 rpm
Exhaust Gas Temperature	<i>°C (°F)</i>	600 (1112) @ 2100 rpm
Max. Allowable Back Pressure	<i>kPa</i>	5.4
Minimum Exhaust Pipe Diameter	<i>mm(inch)*</i>	2x 273.0 (2x 10")

* Based on Nominal System. Flow analysis must be done to assure adherence to system limitations!

(Minimum exhaust pipe diameter is based on 15 feet of pipe, one elbow, and a silencer. Pressure drop no greater than one half the max. allowable back pressure)

Heater System		
Wattage (Nominal)	<i>W</i>	3000
Voltage – AC	<i>V</i>	230

Engine Performance Data		
All data is based on the engine operating with fuel system, lubricating oil pump, air cleaner, and alternator; not included are compressor, fan, optional equipment, and driven components. Data is based on operation at SAE standard J1394 conditions of 300ft (91.4m) altitude, 29.61 in.(752mm) Hg dry barometer, and 77°F (25°C) intake air temperature, using No.2 diesel or a fuel corresponding to ASTM-D2.		
Altitude above which output should be Limited	<i>m (ft.)</i>	91.4 (300)
Correction Factor per 305m.(1000ft.) above Altitude Limit		3 %
Temperature above which output should be Limited	<i>°C (°F)</i>	25 (77)
Correction Factor per 11°C (10°F) above Temperature Limit		2% (1%)