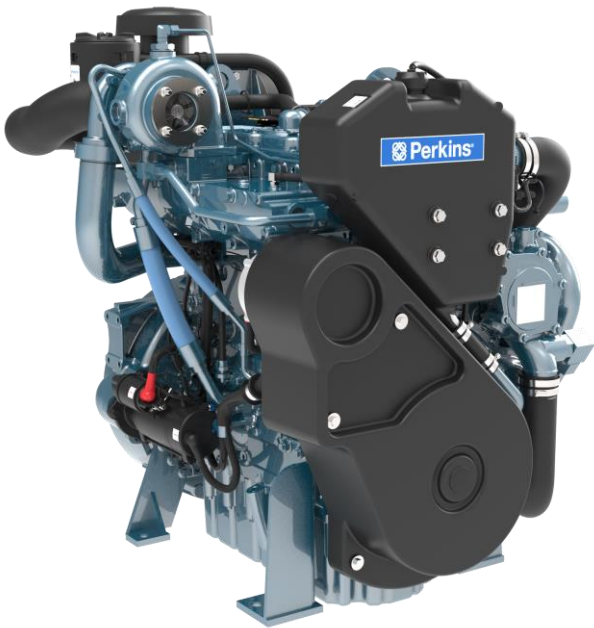




# Customer Information Pack



## E44 Marine Auxiliary Engine

# Perkins E44

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- Technical / Installation Data
- Performance Data
- Fuel Consumption
- Jacket Water Pump Data
- Auxiliary Water Pump Data
- Fan Curves
- Fuel Systems
- Cooling Systems
- Reference Material

# Marine Power

## Perkins E44 Auxiliary



### Basic Technical Data

Number of Cylinders	4
Cylinder Arrangement	Vertical in-line
Cycle	4 stroke
Induction System	Turbo after cooled or Turbo only
Combustion System	Direct injection
Bore	105 mm
Stroke	127 mm
Compression Ratio	16.5:1
Cubic Capacity	4.4 litres
Direction of Rotation	Anti-clockwise view from flywheel
Firing Order	1, 3, 4, 2
Total Weight (Wet)	681 kg (HEX/K.C) – 1089kg (RAD)
Overall Dimensions	Height = 1038 mm Length = 856 mm Width = 814 mm
Radiator	Height = 1497mm Length = 2158mm Width = 988mm

### Performance

#### Typical Average Sound Pressure Level at 1 Metre

##### HEX/K.C.

1500 rev/min = 84.5 dBA ( Complete with a Typical Alternator)

1800 rev/min = 86.3 dBA ( Complete with a Typical Alternator)

##### RAD

1500 rev/min = 106.5 dBA ( Complete with a Typical Alternator)

1800 rev/min = 108.1 dBA ( Complete with a Typical Alternator)

##### Note

All data based on operation under ISO/TR14396, ISO 3046/1 standard reference conditions

#### Test Conditions

Air temperature 25°C (77°F) barometric pressure 100 kPa (29.5 in Hg), relative humidity 30%, all ratings certified within ± 5%

If the engine is to operate in ambient conditions other than the test conditions then suitable adjustments must be made for any change in inlet air temperature, barometric pressure or humidity.

#### Diesel Fuel

ISO-F-DMX/ISO-F-DMA/ISO 8217:1986 (E) Class F, EN590, D975, JIS class 1,2,3

#### Alternative fuel

EN15940 BTL,GTL,HVO (R100%),

EN16709 Biodiesel (B20%)

#### Lubricating Oil

A multigrade lubricating oil must be used which conforms to specification API-CJ4

#### Start/Load Delay

90% of prime power can be applied 10 seconds after the starter motor is energized. The remaining 10% can be applied 30 seconds after start if the ambient temperature is not less than 15°C. If the ambient temperature is less than 15°C, an immersion heater is recommended

### General Installation Data - Typical Installation Conditions

#### E44 1500 RPM HEX & K.C.

Item	Units	Type of Operation and Application					
		Prime Power bkW			110%		
		71.1	86.8	108.6	78.2	95.5	119
Engine Speed	rev/min	1500					
Net Engine Power	BHP	95.3	116	146	105	128	160
Brake Mean Effective Pressure	bar	12.96	15.78	19.71	14.20	17.37	21.71
Piston Speed	m/s	6.3	6.3	6.3	6.3	6.3	6.3
Engine Coolant Flow (FW) Max	litre/min	155	155	155	155	155	155
Raw Water Flow Max	litre/min	138.5	138.5	138.5	138.5	138.5	138.5
Combustion Air Flow	m <sup>3</sup> /min	4.6	5.6	6.2	4.8	5.7	6.6
Exhaust Gas Flow	m <sup>3</sup> /min	12.4	13.2	14.9	13.1	13.7	15.9
Exhaust Gas Temperature	°C	596.5	514.2	516.6	622.1	526.0	530.7
Total Heat From Fuel	kW	220	237	281	240	255	308
Gross Heat to Power	kW	71.1	86.8	108.6	78.2	95.5	119
Net Heat to Power	kW	71.1	86.8	108.6	78.2	95.5	119
Heat to Water and Lubricating Oil	kW	89.3	78.2	88.9	101.4	83.0	97.2
Heat to Exhaust	kW	69.8	74.9	86.7	72.8	79.7	94.9
Heat from Radiation	kW	8.1	7.9	8.4	8.6	8.1	8.8
Heat from Aftercooler	kW	N/A	8.3	11.1	N/A	10	12.8

# Marine Power



## Perkins E44 Auxiliary

### E44 1800 RPM HEX & K.C.

Item	Units	Type of Operation and Application							
		Prime Power bkW				110%			
		71.1	81.5	108.6	129	78.2	89.7	119	142
Engine Speed	rev/min	1800							
Net Engine Power	BHP	95.3	109	146	173	105	120	160	190
Brake Mean Effective Pressure	bar	10.75	12.34	16.47	19.58	11.85	13.58	18.13	21.51
Piston Speed	m/s	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6
Engine Coolant Flow (FW) Max	litre/min	190	190	190	190	190	190	190	190
Raw Water Flow Max	litre/min	165	165	165	165	165	165	165	165
Combustion Air Flow	m <sup>3</sup> /min	5.9	6.5	7.6	8.7	6.1	6.7	8.0	9.1
Exhaust Gas Flow	m <sup>3</sup> /min	13.7	14.1	16.5	18.9	14.3	14.6	17.3	19.9
Exhaust Gas Temperature	°C	496.5	429.3	451	442.7	512.9	437.2	464.2	457.2
Total Heat From Fuel	kW	213	220	283	330	231	236	309	361
Gross Heat to Power	kW	71.1	81.5	108.6	129	78.2	89.7	119	142
Net Heat to Power	kW	71.1	81.5	108.6	129	78.2	89.7	119	142
Heat to Water and Lubricating Oil	kW	84.2	69.3	87.8	98.2	85.7	73	95.9	107.3
Heat to Exhaust	kW	67.7	69.3	84.7	100	77.7	73.8	92.1	109
Heat to Radiation	kW	8.0	7.7	8.4	9.1	8.4	7.9	8.8	9.6
Heat from Aftercooler	kW	N/A	9.9	15.9	19.5	N/A	10.7	17.6	21.9

### E44 1500 RPM RAD

Item	Units	Type of Operation and Application					
		Prime Power bkW			110%		
		63	79	96	70	87	106
Engine Speed	rev/min	1500					
Net Engine Power	BHP	84.4	105.9	128.7	93.8	116	142
Brake Mean Effective Pressure	bar	12.96	15.78	19.71	14.20	17.37	21.71
Piston Speed	m/s	6.3	6.3	6.3	6.3	6.3	6.3
Engine Coolant Flow (FW) Max	litre/min	155	155	155	155	155	155
Combustion Air Flow	m <sup>3</sup> /min	4.6	5.6	6.2	4.8	5.7	6.6
Exhaust Gas Flow	m <sup>3</sup> /min	12.4	13.2	14.9	13.1	13.7	15.9
Exhaust Gas Temperature	°C	596.5	514.2	516.6	622.1	526.0	530.7
Total Heat From Fuel	kW	220	237	281	240	255	308
Gross Heat to Power	kW	71.1	86.8	108.6	78.2	95.5	119
Net Heat to Power	kW	71.1	86.8	108.6	78.2	95.5	119
Heat to Water and Lubricating Oil	kW	89.3	78.2	88.9	101.4	83.0	97.2
Heat to Exhaust	kW	69.8	54.2	61.5	72.8	58.0	67.5
Heat from Radiation	kW	8.1	13.6	12	8.6	14.9	16
Heat from Aftercooler	kW	N/A	8.8	11.1	N/A	9.7	12.8

E44 1800 RPM RAD

Item	Units	Type of Operation and Application							
		Prime Power bkW				110%			
		61	72	99	115	67	80	110	127
Engine Speed	rev/min	1800							
Net Engine Power	BHP	81	96	132	154	89	107	147	170
Brake Mean Effective Pressure	bar	10.75	12.34	16.47	19.58	11.85	13.58	18.13	21.51
Piston Speed	m/s	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6
Engine Coolant Flow (FW) Max	litre/min	190	190	190	190	190	190	190	190
Raw Water Flow Max	litre/min	165	165	165	165	165	165	165	165
Combustion Air Flow	m³/min	5.9	6.5	7.6	8.7	6.1	6.7	8.0	9.1
Exhaust Gas Flow	m³/min	13.7	14.1	16.5	18.9	14.3	14.6	17.3	19.9
Exhaust Gas Temperature	°C	496.5	429.3	451	442.7	512.9	437.2	464.2	457.2
Total Heat From Fuel	kW	213	220	283	330	231	236	309	361
Gross Heat to Power	kW	71.1	81.5	108.6	129	78.2	89.7	119	142
Net Heat to Power	kW	71.1	81.5	108.6	129	78.2	89.7	119	142
Heat to Water and Lubricating Oil	kW	84.2	69.3	87.8	98.2	85.7	73	95.9	107.3
Heat to Exhaust	kW	67.7	69.3	84.7	100	77.7	73.8	92.1	109
Heat to Radiation	kW	8.0	7.7	8.4	9.1	8.4	7.9	8.8	9.6
Heat from Aftercooler	kW	N/A	9.9	15.9	19.5	N/A	10.7	17.6	21.9

# Marine Power

## Perkins E44 Auxiliary



### Cooling System

Minimum seacock diameter (full flow)	39mm
Maximum lift of seawater pump	2m
Maximum seawater inlet temperature	38 °C
Pressure cap setting	50kPa
Maximum Engine intake Temperature	50 °C

### Coolant

Extended Life Coolant 50% Mix (Heat Exchanger)	
Extended Life Coolant 20% Mix (Keel Cooled, normal conditions)	
Maximum raw water pump inlet pressure 50/60 Hz	15Kpa

### Radiator Capacity

Total system coolant capacity	21 litres
Drain down capacity	21.5 litres
Maximum temperature to engine	70 °C

### Thermostat

Operating range	83-94 °C
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### Electrical System

#### Battery Charging System:

Type:	Insulated return
Alternator:	100 amp- 12 volt
	55 amp- 24 volt
Starter	4.2 kW 12 volt
	4.0 kW 24 volt

#### Cold start recommendations

Minimum cranking speed	100 rpm
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#### Batteries for Temperatures down to - 5 Deg.C (23 Deg. F)

12 Volt	24 Volt
One battery - 520 Amps BS3911 or 800 Amps SAE J537 (CCA)	Two 12 Volt batteries in series - each 315 Amps BS3911 or 535 Amps SAE J537 (CCA)

#### Batteries for Temperatures down to - 15 Deg.C (5 Deg. F)

Two 12 Volt batteries in parallel, each 520 Amps BS3911 or 800 Amps SAE J537 (CCA)	Two 12 Volt batteries in parallel, each 520 Amps BS3911 or 800 Amps SAE J537 (CCA)
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### Exhaust system

Max allowable back pressure	15 kPa
Exhaust connection	68 bore 6x9 holes on 88.9mm PCD

### Induction system

#### Maximum air intake restriction

Clean filter	2.5 kPa
Dirty filter	5 kPa
Air filter type	2-stage cyclonic/paper element

### Lubrication system

#### Lubricating oil capacity

Total system	10.5 litres
Minimum	9 litres

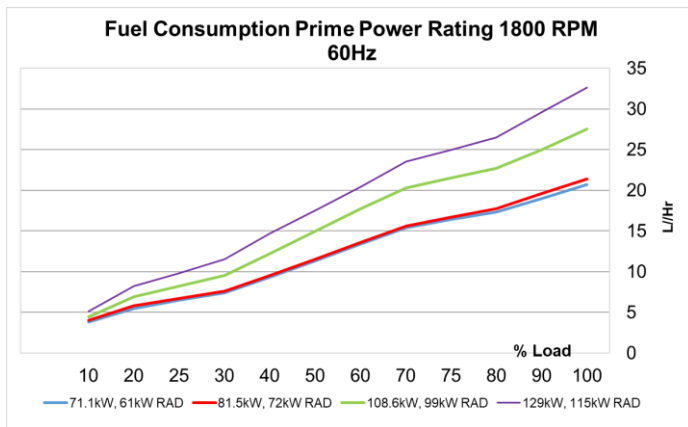
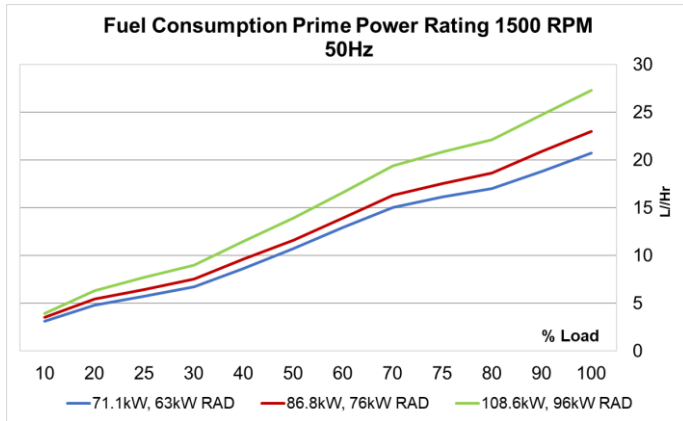
Maximum engine operating angle intermittent	30°C
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# Marine Power

## Perkins E44 Auxiliary



### Fuel consumption

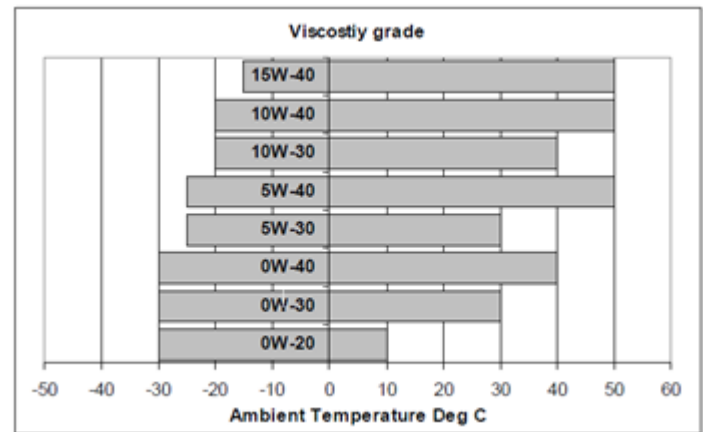


### Lubricating oil pressure

Relief valve opens	415-470 kPa
At maximum rated speed	500+/-100 kPa
Normal oil temperature	110°C
Max continuous oil temperature	125°C
Oil consumption at full load as a % of fuel consumption	0.01 %

### Recommended SAE viscosity

Multigrade oil must be used which conforms to API-CJ4.  
See illustration below:



### Fuel Lift Pump

Flow/hour 4 Ltr/min(240 Ltrs/Hr)

Maximum suction head	2m
Maximum supply line restriction	30 kPa
Maximum return line restriction	20 kPa

### Governor Type

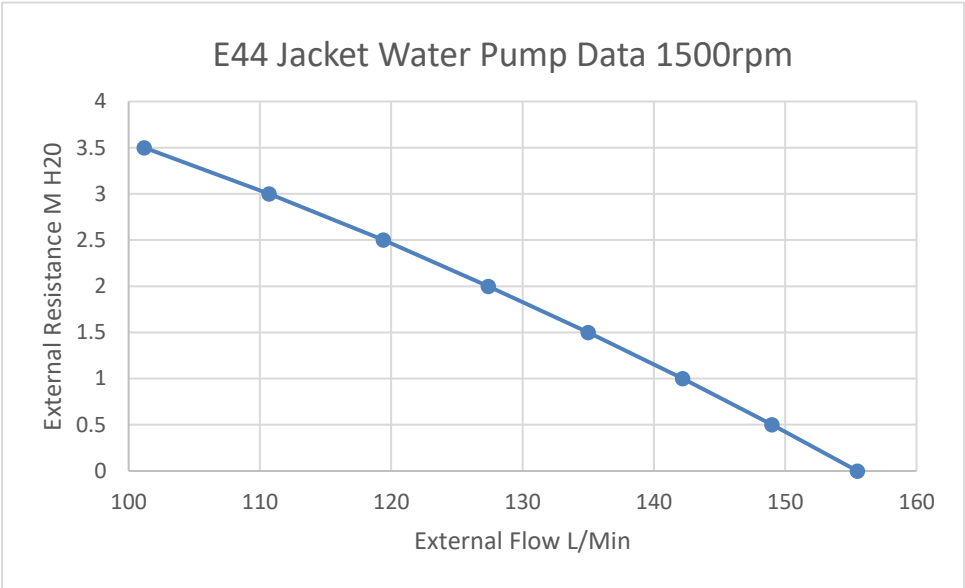
Speed control to ECM ISO 8528, G2

# Jacket Water Pump Data

Engine Speed RPM: 1,500

Pump Speed RPM: 3,000

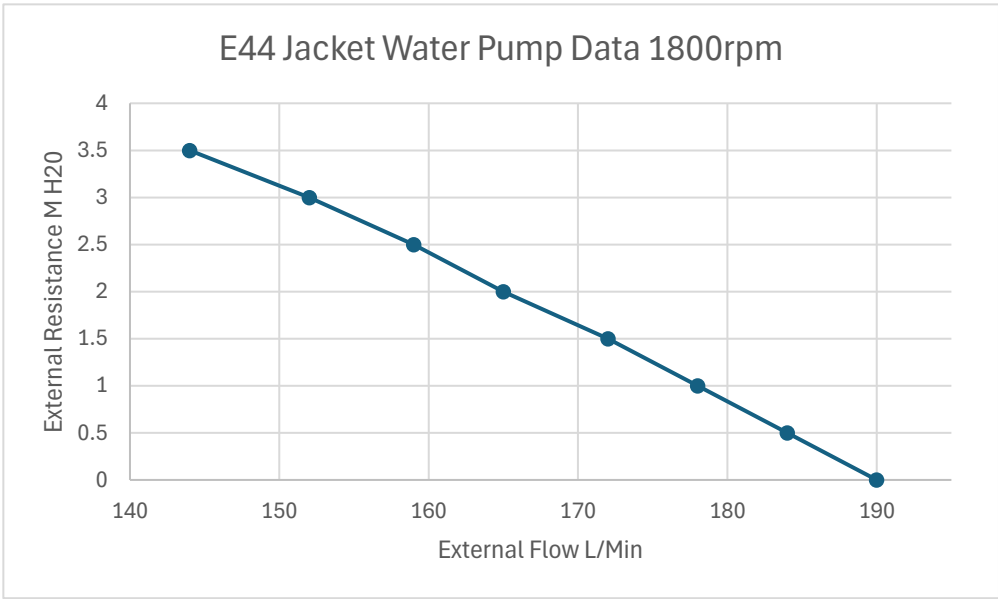
EXT RESIST M H2O	EXT FLOW L/MIN
0	155.5
0.5	149
1	142.2
1.5	135
2	127.4
2.5	119.4
3	110.7
3.5	101.2



Engine Speed RPM: 1,800

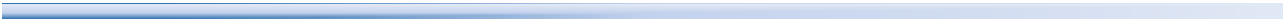
Pump Speed RPM: 3,600

EXT RESIST M H2O	EXT FLOW L/MIN
0	190
0.5	184
1	178
1.5	172
2	165
2.5	159
3	152
3.5	144





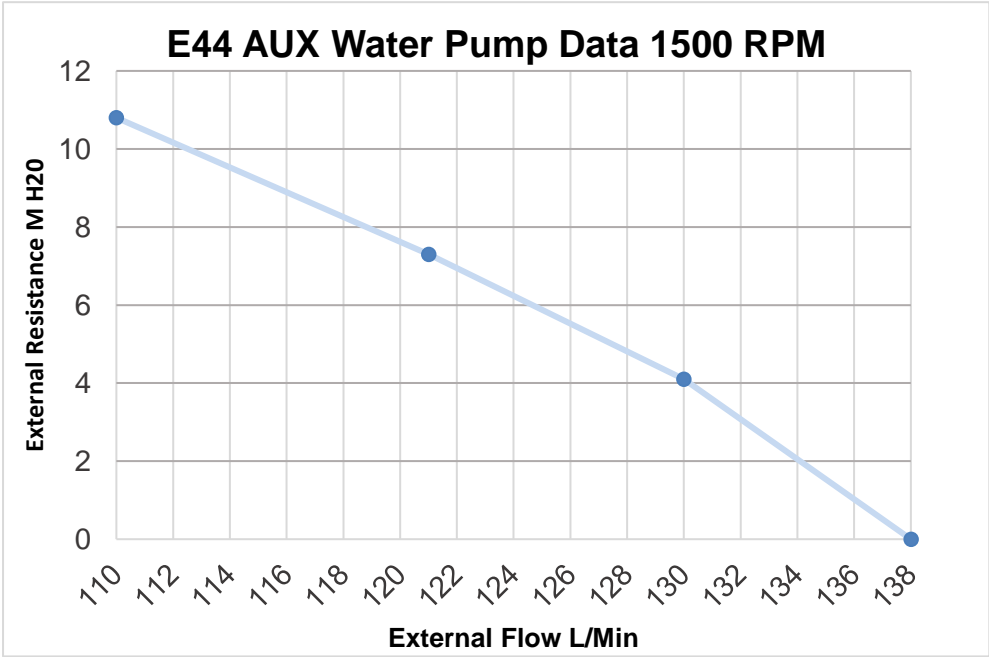
# Auxiliary Water Pump Data



Engine Speed RPM: 1,500

Pump Speed RPM: 1,125

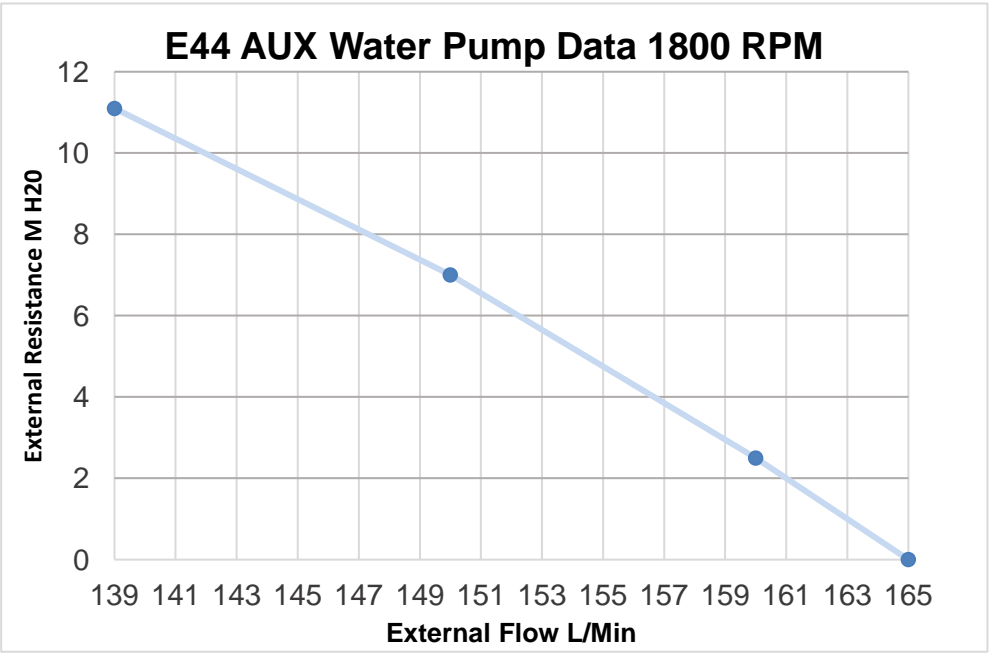
EXT RESIST M H2O	EXT FLOW L/MIN
10.8	110
7.3	121
4.1	130
0	138



Engine Speed RPM: 1,800

Pump Speed RPM: 1,350

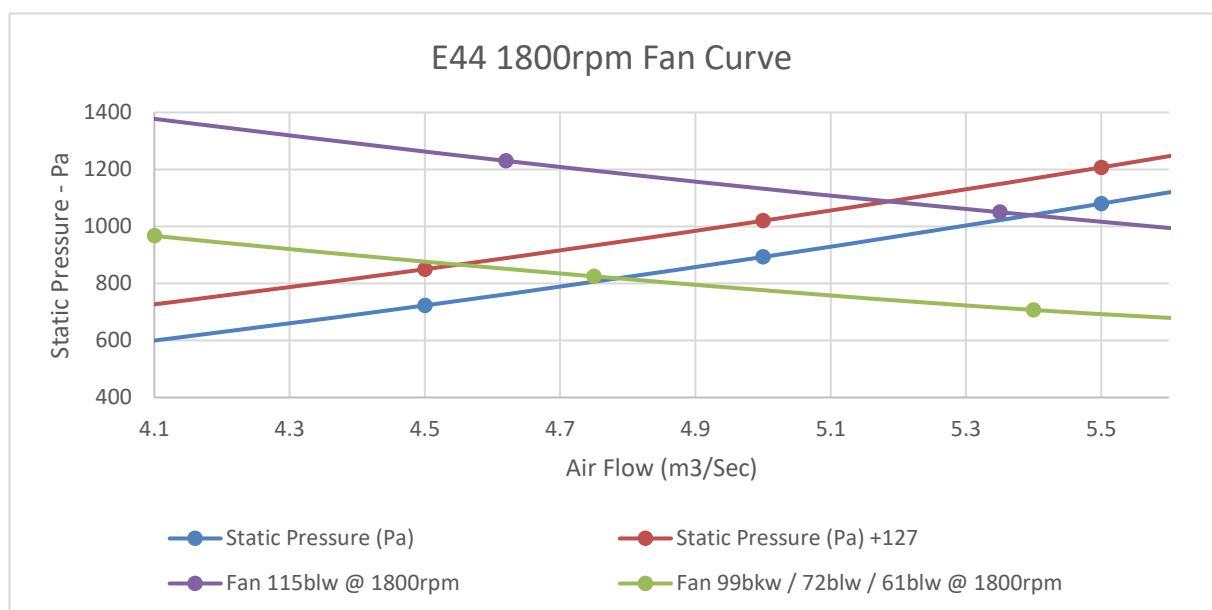
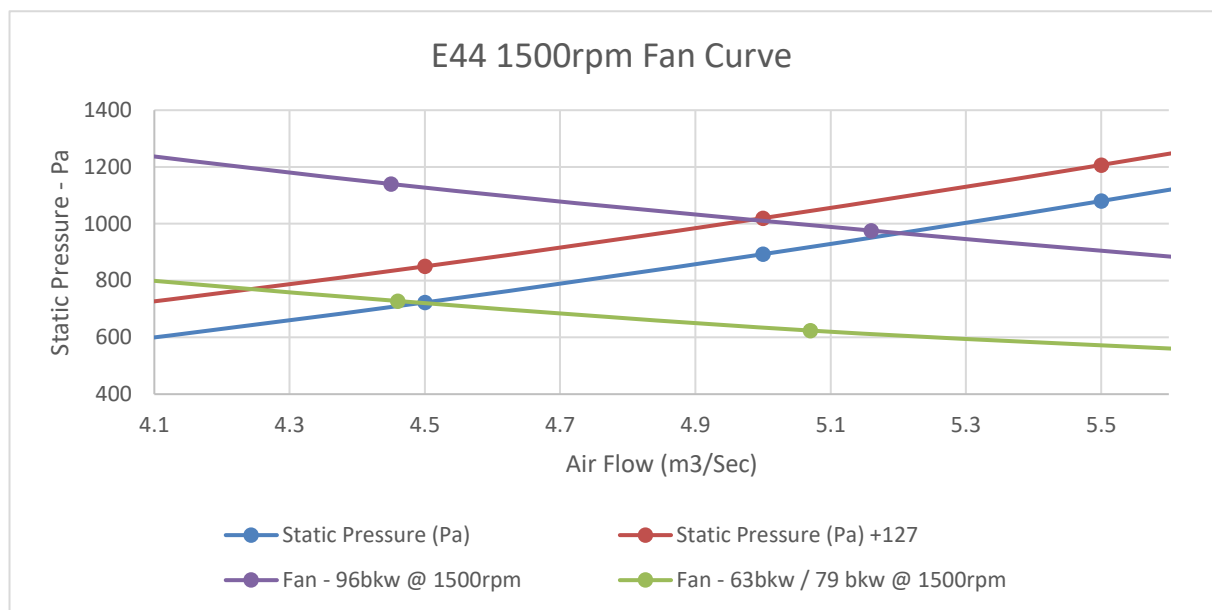
EXT RESIST M H2O	EXT FLOW L/MIN
11.1	139
7	150
2.5	160
0	165



## E44 - Radiator and Fan Air Flow Data

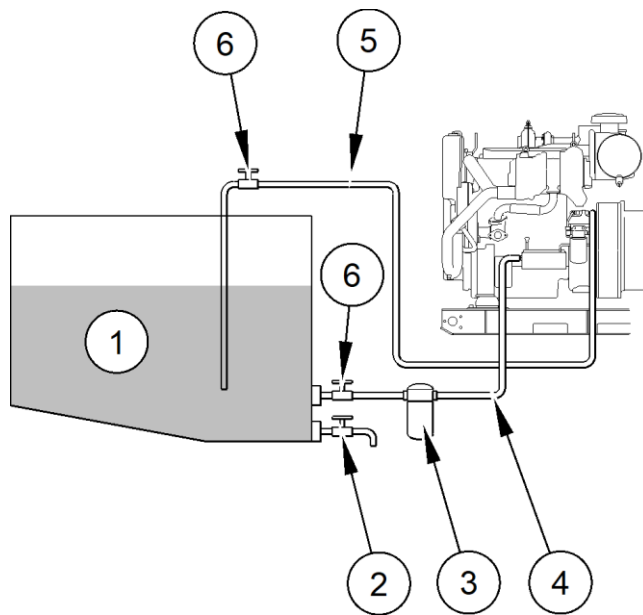
The Following charts plot the Fan air flow based on static pressure and the max allowable +127pa dust restriction. This outlines the required air flow volume of the engine room/inlet and outlet louvers to effectively cool the engine.

This does not consider any other engine room components that maybe also consuming the air flow in the engine room



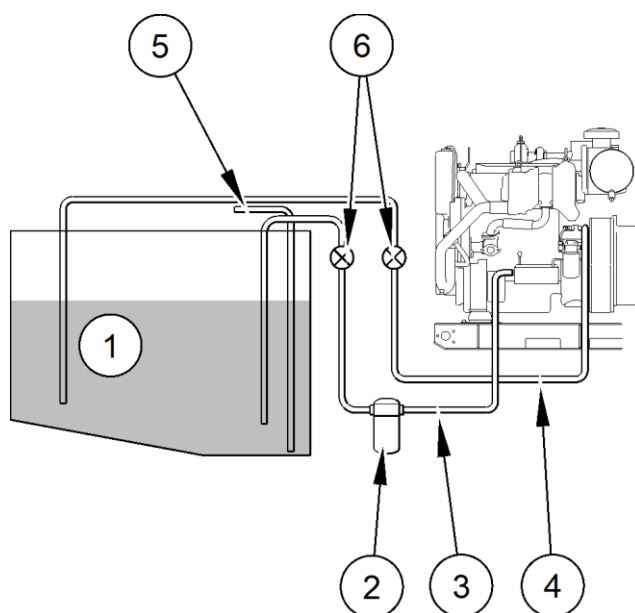
# Typical Vessel Fuel System

## Main Fuel Tank with Bottom Pickup Installation



- 1 Fuel tank
- 2 Drain point
- 3 Water separator/pre filter
- 4 Main fuel feed
- 5 Fuel return
- 6 Stop cock

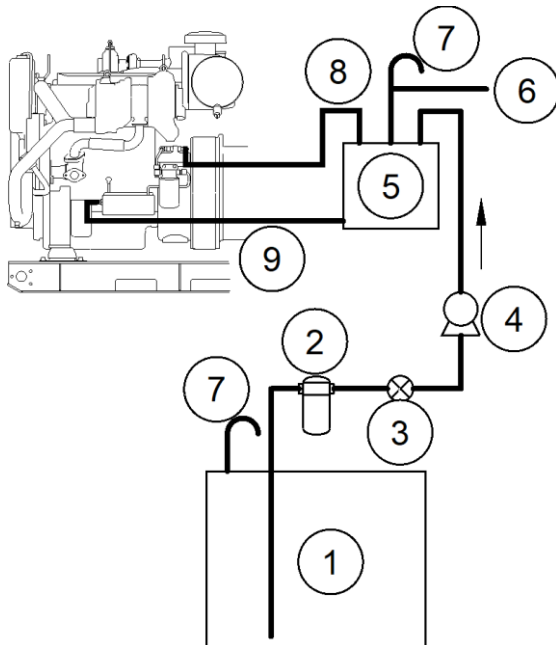
## Main Fuel Tank with Standpipe Installation



- 1 Fuel tank
- 2 Water separator/pre filter
- 3 Main fuel feed
- 4 Fuel return
- 5 Drain tube
- 6 Stop cocks

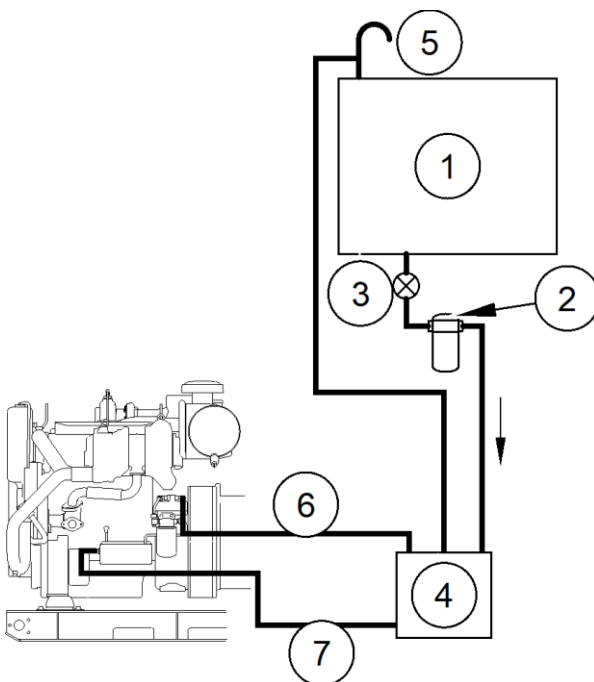
# Typical Vessel Fuel System

## Fuel Day Tank with Transfer Pump Installation



- 1 Main fuel tank
- 2 Water separator/pre-filter return
- 3 Valve.
- 4 Pump.
- 5 Day tank.
- 6 Overflow
- 7 Vent
- 8 Fuel
- 9 Fuel feed

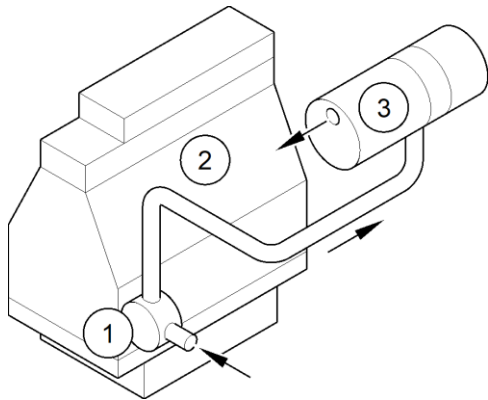
## Gravity Fed Day Tank Installation



- 1 Main fuel tank.
- 2 Water separator/pre-filter (recommended option).
- 3 Valve.
- 4 Day tank.
- 5 Vent.
- 6 Fuel return.
- 7 Fuel feed

# Engine Cooling System

## Raw Water

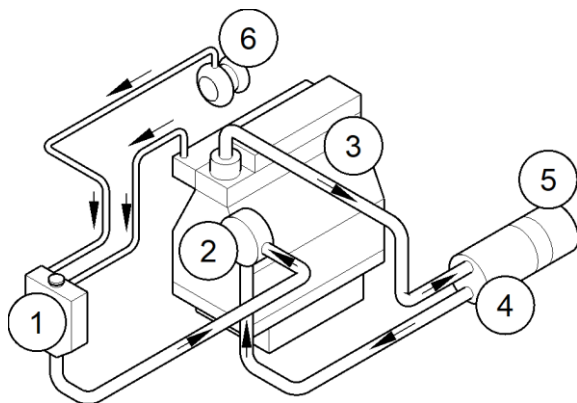


1 Auxiliary water pump

2 Engine.

3 Heat exchanger.

## Fresh Water



1 Header tank.

2 Fresh water pump.

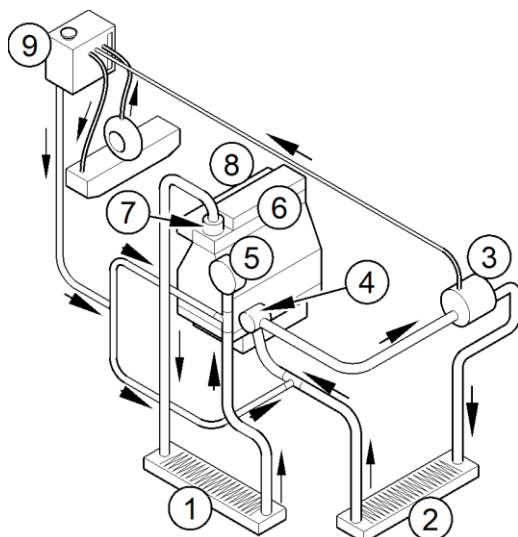
3 Engine

4 Heat exchanger.

5 Aftercooler.

6 Turbocharger.

## Keel Cooling



1 Jacket grid cooler

2 Aftercooler grid cooler

3 Aftercooler.

4 Auxiliary water pump

5 Fresh water pump

6 Engine

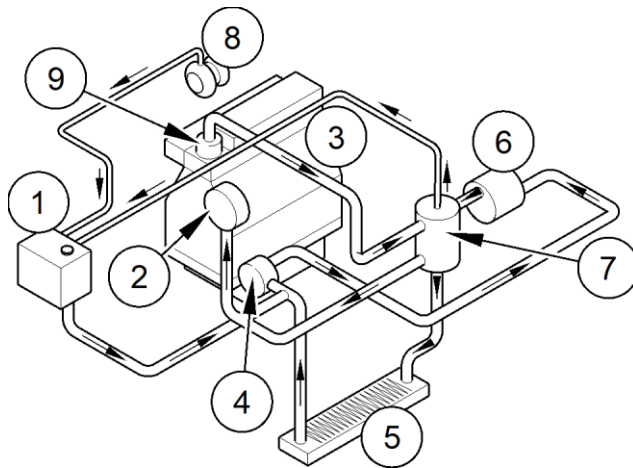
7 Thermostat.

8 Exhaust manifold.

9 Remote tank

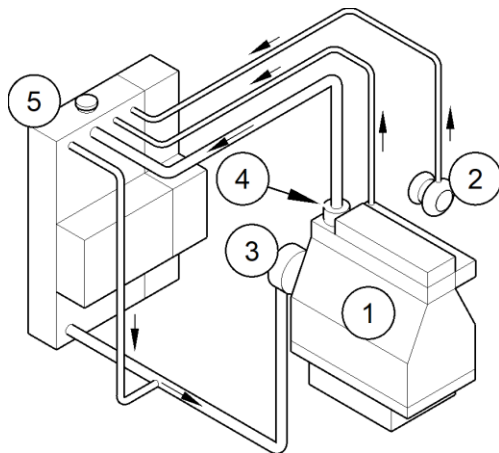
# Engine Cooling System

## Single Grid, Keel Cooling



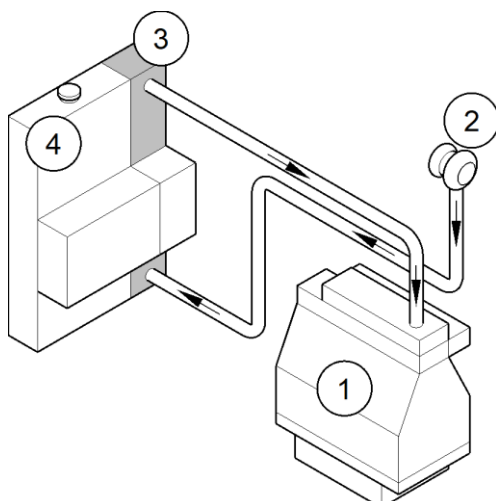
- |                         |                |
|-------------------------|----------------|
| 1 Remote tank           | 6 Aftercooler  |
| 2 Fresh water pump tank | 7 Mixing       |
| 3 Engine                | 8 Turbocharger |
| 4 Auxiliary water pump  | 9 Thermostat   |
| 5 Grid cooler           |                |

## Radiator



- |                    |
|--------------------|
| 1 Engine.          |
| 2 Turbocharger     |
| 3 Fresh water pump |
| 4 Thermostat       |
| 5 Radiator         |

## Air Flow, Radiator

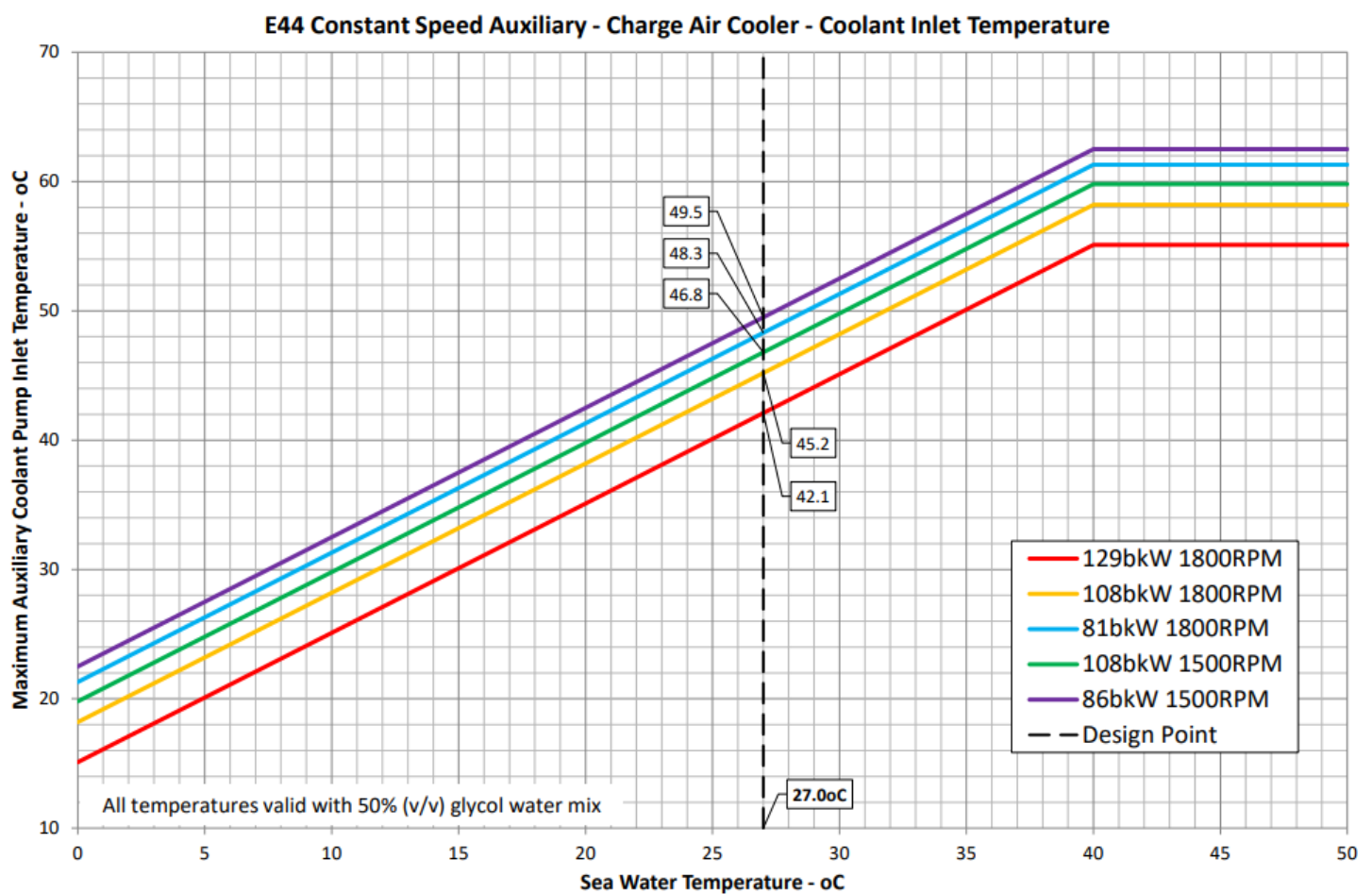


- |                     |
|---------------------|
| 1 Engine.           |
| 2 Turbocharger      |
| 3 Charge air cooler |
| 4 Radiator          |

# Engine Cooling System

## Single Grid Keel Cooling

A combined cooling system provides both jacket water and charge air cooling from a single external cooling circuit. This eliminates the need for two external keel or grid coolers. The external cooling circuit is driven by the auxiliary coolant pump.



# Reference Material

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All information in this document is  
substantially correct at time of printing  
and may be altered subsequently.  
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