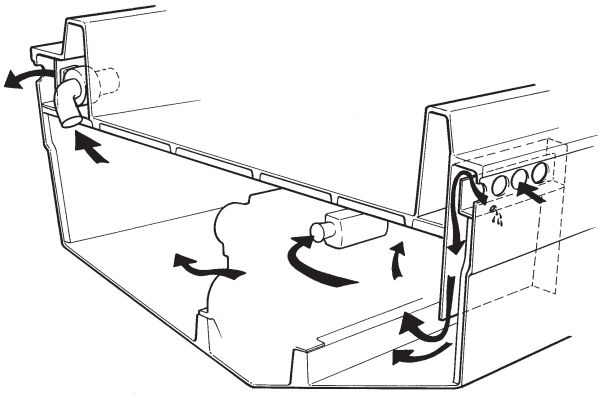
Engine room ventilation



Two main conditions must be met:

1. The engine must receive enough air (oxygen) for combustion of the fuel.
2. The engine room must be ventilated, so that the temperature can be kept down to an acceptable level.

Ventilation is also important to keep the engine's electrical equipment and fuel system at a low temperature, and to ensure general cooling of the engine.

NOTE! All valid safety regulations and legal requirements for each country must be followed. Each classification society has its own regulations that must be followed when required.

The temperature of the inlet air at the air filters must not be higher than +25°C (77°F) for full power output. During sea trials the air temperature in the air filter should not exceed **20°C (36° F)** above ambient temperature.

The temperature of the engine itself is rather high in some places. Certain separate electric components, such as charging regulators and relays, should therefore be fitted on bulkheads or elsewhere where the temperature is relatively low.

The **maximum temperature** for areas where electric components are fitted is **70°C (158°F).** The starter motor and alternator however, have their given locations.

NOTE! The total intake area can be calculated by using the formula:

Total intake area = Engine air consumption + Engine room ventilation

Area in cm²

Engine air consumption

The engine consumes a certain amount of air in the combustion process. This requires a minimum internal area in the air supply ducting.

The area can be calculated by using the formula:

A = 1.9 × engine power output

A = Area in cm²
Engine output in kW

The value applies for non-restricted intake and up to 1 m (3.3 ft) duct length with only one 90 degree bend. The bending radius should be at least twice the diameter.

If longer ducts or more bends are used, the area should be corrected by multiplying by a coefficient from ***Table 1*** below.

Number	**Duct length, m (ft)**				
of bends	1 (3.3)	2 (6.6)	3 (9.8)	4 (13.1)	5 (16.4)
1	1	1.04	1.09	1.13	1.20
2	1.39	1.41	1.43	1.45	1.49
3	–	1.70	1.72	1.74	1.78

Table 1.

Engine room ventilation

A great deal of the radiant heat must be transported out of the engine room to keep the engine room temperature down to the permitted values, in other words the heat must be ventilated away .

The same dimension must be chosen for the inlet and outlet ducts to achieve low flow speeds and low noise levels.

The area of the inlet/outlet air supply is calculated using the formula:

Inlet air = 1.65 × engine power output

Outlet air = 1.65 × engine power output

Areas in cm^2
Engine power output in kW.

These values must be corrected according to ***Table 1*** with regard to bends and duct length.

The ambient air temperature (outdoor air temperature) is assumed to be +30°C (86°F). Correction factors as per ***Table 2*** shall be used where applicable.

Ambient air temperature °C (°F)	Correction factor
+20 (68)	0.7
+30 (86)	1.0
+40 (104)	1.4

Table 2.

Fan selection

The fan must be dimensioned according to air flow volumes as follows:

Air flow = 0.07 × engine power output

Air flow volume in m^3 /min
Engine power output in kW.

The total pressure increase across the fan should be 10 mm (0.39") water column (100 pa).

These two values, flow and total pressure increase, are sufficient for the selection of a fan. If the fan is fitted directly to the bulkhead, i. e. without a connection pipe, the value of the total pressure increase can be reduced to 7 mm (0.28") water column (70 pa). This means that a somewhat smaller fan can be used.