

## Canaline Marine Engine – Keel Cooling Tanks Guidelines

All Canaline Marine Engines are keel cooled, and it's a requirement of the boatbuilder or installer to ensure that the correct size tank is fitted.

Due to the nature of narrow boats and the conditions that they operate in, by far the most popular way of cooling the diesel engine is through a keel cooling tank. These are usually just a double skin of steel boxed welded onto the side of a narrow boat.

The most important factors to consider when designing a keel cooling tank for a canal boat are:

- The surface area of the tank in contact with the cold water outside the boat.
- The ability of the tank design to ensure that all the water passing through the tank is forced to make contact with the cold surface and cannot take a "short cut" - a baffle is normally needed.
- The total volume of the system and the effect on expansion.

We recommend the tank is fitted vertically to the swim, or to the side of the boat, and not the bottom, as the base plate is often thicker, and the hotter water remains at the top of the tank, so very inefficient.

### Calculations

The surface area of the outer skin which forms one side of the tank should be sized as follows:

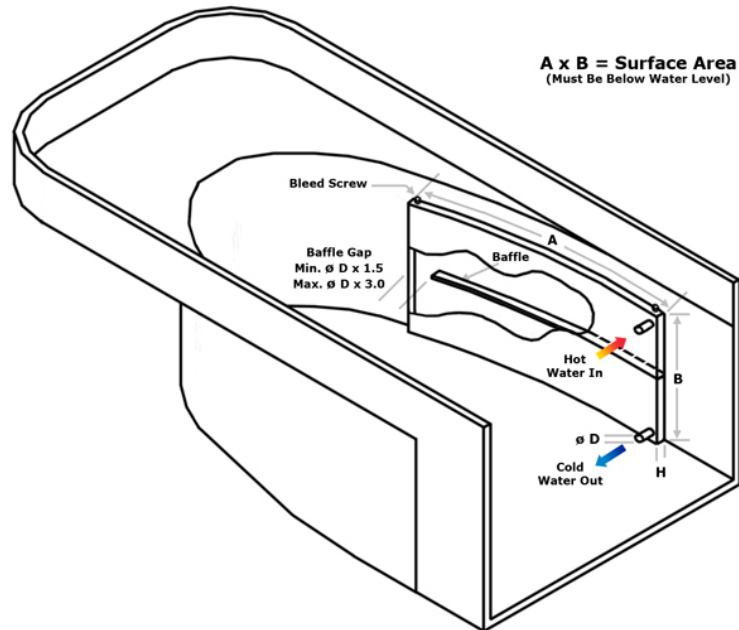
- Steel Hull : Engine bhp ÷ 4 = area in square feet
- Aluminium Hull: - Engine bhp ÷ 5 = area in square feet
  - Aluminium has a higher thermal conductivity, the cooler size may be smaller:

This gives us the following areas for the Canaline range of engines:

| Engine type  | Power Output       | Steel ft2 | Aluminium ft2 |
|--------------|--------------------|-----------|---------------|
| Canaline 38  | 38bhp @ 2600 r/min | 9.5       | 7.6           |
| Canaline 42  | 42bhp @ 3000 r/min | 10.5      | 8.4           |
| Canaline 52  | 52bhp @ 3000 r/min | 13.0      | 10.4          |
| Canaline 60  | 60bhp @ 3000 r/min | 15.0      | 12.0          |
| Canaline 70T | 65bhp @ 2500 r/min | 16.25     | 13.0          |

This area assumes that the engine is developing its maximum continuous power at full engine rpm and it is therefore what we recommend. In practice many boaters do not cruise at maximum rpm and many are over propped, so we much smaller areas have beed used, but we have calculated on the maximum.

### Typical Installation of Keel cooler in Canal Boat



We would recommend at least two baffles, rather than the one shown to allow for a better working keel cooling tank.

### Expansion

We favour slim tanks, as they give much better performance but just as important, less expansion. When water heats up its density drops thus increasing its volume, and potentially the loss of water through the overflow. So the larger the cooling system the larger the expansion. The objective must be to keep the volume of the total system as low as possible using a slim line tank.

### Generating Sets

For generating Set information, please contact Engines Plus Ltd

### Pipe Sizes – for information

- Water inlet / Outlet hose Size – 32mm
- Calorifier Inlet / Outlet hose size – 5/8" / 16mm