STOVES IN BOATS

A quick guide to some of the basics about fitting and using solid fuel stoves on boats.

The numbers in (brackets) are sections in the official **British Standard BS 8511:2010** ***Code of practice for the installation of solid fuel heating and cooking appliances in small craft*** where much more detailed information can be found.

A good stove will follow the rules here and:

- Be installed by a competent person. (5.2)
- Be recommended by the manufacturer for use in water craft.
- Be the right size for the space to be heated.
- Have securely latching doors which can't jolt open.
- Use very dry wood or smokeless fuels. Avoid bituminous coal (called 'housecoal' or 'Polish coal')
- Have chimney and flueways cleaned once a month.
- Have door seals, windows and liners kept sound.
- If your stove has a lower ash door which can be opened separately from the main door – take *very great care*, leaving it open can make the fire burn far too fiercely. This is one of the commonest cause of serious boat fires.

- **Insulate the flue pipe to make the smoke rise**
- **Make sure there's enough fresh air coming in.**
- **Keep anything flammable well, well away.**

An open-sided **TERMINAL** (8.4)

HEIGHT At least 600mm above the roof when moored – removable if need be. (8.4)

INSULATED FLUEPIPE Insulated pipe outside *and* inside the cabin, for safety and to keep the smoke HOT so it rises. Uninsulated pipe cools the smoke down and drastically spoils stove performance. (8.2)

THROUGH THE ROOF The flue pipe should be supported by the roof, not the stove, have no join inside the roofspace and be well protected from combustibles (8.4)

The whole flue able to be **CLEANED** from end to end (8.5)

A SOUND CHIMNEY Even tiny, tiny leaks in the chimney can let air in, which cools the smoke, stops it rising, and risks poisonous CO gas leaking out.

FIT AN ALARM Carbon Monoxide in smoke is poisonous, and fire can start unnoticed. Fit CO *and* smoke alarms. (C6)

Insulated pipe usually needs to be **3/4 of its diameter** away from unprotected combustibles

IDEALLY STRAIGHT, but *never* more than 2 x 45° bends and NO horizontal lengths! (8)

A FRESH AIR SUPPLY Stoves need fresh air to burn As well as the air needed for people to breathe and to feed engines, cookers etc, *add* 550mm² for each 1kW of stove output. This means that the total air inlet needed into a boat is rarely less than 4000mm² (equal to about 65mm square) preferably divided between at least two vents, one high and one low – which may mean ductwork is needed (9)

If there has to be a short length of *un*insulated pipe to connect to the insulated chimney, then **at least 3x its diameter** away from unprotected combustibles.

STOVE SITED where it won't cause obstruction, particularly to escape routes or near steps. (5.1)

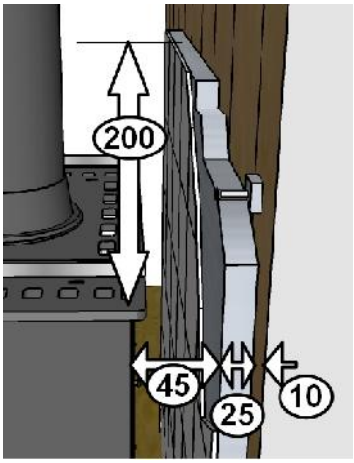
WELL AWAY FROM COMBUSTIBLES... ...*anything* made of wood, GRP, fuel, gas containers, oil, candles, curtains, cushions, clothing, books, oil lamps, fold-away furnishings or anything which could create a fire hazard – all as far away as the stove maker says is safe, usually about **600mm away** or behind a Protection Panel. (5.1)

Stoves to the latest safety standards show an 'EN' number and how close combustibles can safely be.

(5.3) Stove, hearth and chimney all **FIXED FIRMLY IN PLACE**

THE HEARTH needs to project at least 225mm in front and 150mm to each side of the stove OR have a high lip. Made of sturdy, non-flammable material, to fully protect combustibles underneath, such as wood or GRP. (6)

FLUE PIPES fit socket end up, and are sealed with fire cement (8.3)



HEAT PROTECTION PANELS

Stoves and uninsulated flue pipes can easily get hot enough to set fire to paint, wood or other combustibles a considerable distance away. A single fireproof panel fastened directly on a combustible wall is no use – heat can pass straight through it and set fire to whatever is on the other side.

One way of making a good protection panel is to have: a **10mm air gap** (which can be supported on offcuts of fireboard or tiles screwed though at the corners), then 25mm thick **calcium silicate** fireboard (which can be tiled) then at least a 45mm gap to the stove body, all extending at least 200mm above the stove. (7) Topped by a 15mm cement-board panel, this construction can be used as the hearth underneath a stove with legs.

The 3 things you need to know about stoves...

1 THE CHIMNEY EFFECT

Understand the Chimney Effect and you understand most of what's needed to be known about stoves.

Fuel only burns because fresh air reaches it.

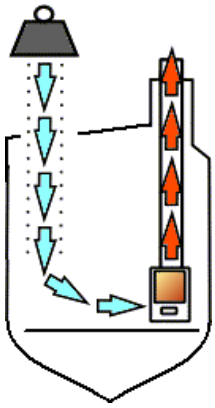
Smoke does NOT naturally rise – what happens is that smoke and waste gas, being hot, expand and become less dense. Being less dense, they are less pulled down by gravity so that cooler outside air falls down and pushes them up out of the way. The incoming air causes combustion.

A chimney needs to be very hot inside to keep the gases rising, which means that it needs to be insulated.

There must be free access for outside air to come in and push the waste gases up the chimney.

Chimney suction, or draught, is measured in Pascals. Most stoves are designed to work at 12Pa (typical of an insulated chimney 4.5m high). An insulated boat chimney = 6Pa, which is just about OK on a suitable stove.

Uninsulated chimney = c2Pa = slow lighting, inability to burn economical hard fuels, inability to burn at low rates, risk of fume emission.



2 HOT. VERY HOT

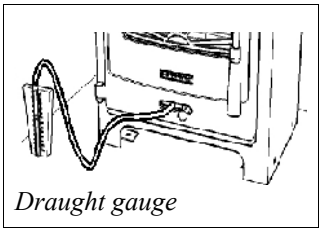
Stoves normally burn at about 650°C inside – they can get up to 1100°C, which is the melting point of cast iron.

It is perfectly possible for a hot stove to ignite unprotected materials like wood several feet away.

3 CARBON MONOXIDE IS POISONOUS

ALL solid fuel appliances produce potentially fatal concentrations of carbon monoxide into the chimney, even when they are working correctly, and even if burning smokeless fuels.

If the chimney is not hot enough, the CO and other gases won't go safely up the chimney.



Draught gauge

Once lit and hot the stove should very readily control up and down by manipulating the controls. Measure the flue draught through the air vent on the door – it should be at least 6Pa (0.025 inches of water)

SOME SUPPLIERS

Stove draught meter
Model 460 Air Meter: Dwyer Instruments: http://www.dwyer-inst.com/Products/Product.cfm?Group_ID=173

Combined Smoke/CO alarms:
Kidde Safety (Europe) Ltd, Mathisen Way, Colnbrook, Slough, Buckinghamshire SL3 0HB
01753 685148 www.kiddesafetyeurope.co.uk

Boat Chimney System:
Chilli Penguin Stoves, The Fire & Stove Shop, Merthyr Road, Tongwynlais, Cardiff CF15 7LF Tel: 02920811478
Morso UK, Unit 7, io Centre, Valley Drive, Swift Valley, Rugby CV21 1TW Warks Tel.: 01788 554410
BFM Europe Limited, Trentham Lakes, Stoke on Trent, Staffordshire ST4 4TJ Tel: 01782 339000-0

Calcium Silicate Fireboard:
Skamol Super Isol – Gas Fire Innovations, Bristol Tel 07768 338706 gasfireman@blueyonder.co.uk