Let's Talk

Fireplaces

AUSTRALIA

Department of Territories

Fireplaces

Open fireplaces, slow combustion stoves and potbelly stoves may well be attractive appliances for home heating — but they are also significant sources of air pollution.

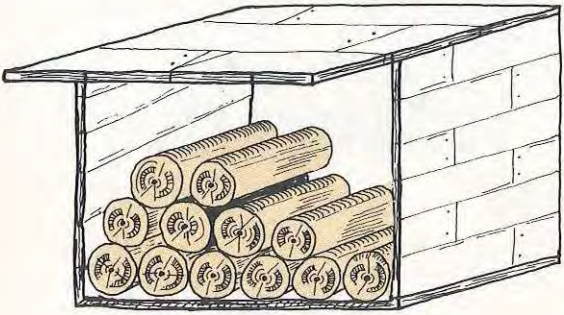
They emit smoke, soot odours and a range of carcinogenic (cancer causing) compounds and they can often be a real nuisance to neighbours.

The potential air pollution problems associated with solid fuel home heaters are basically twofold:

- they contribute to air pollution such as the brown haze experienced in Canberra; and
- they can cause problems of odours and toxic emissions.

Even the most advanced technology models available emit pollutants to some extent, especially if they are not properly operated.

It is therefore important to look at ways of reducing the emissions as much as possible.



Keep wood dry

Successful combustion

An understanding of the combustion process is helpful in reducing air pollution from solid fuel home heating appliances.

Successful combustion requires the following conditions:

- sufficient heat or temperature;
- sufficient air flow;
- sufficient turbulence or mixing of air and hot combustion gases to form the flame; and
- sufficient time to allow virtually complete combustion.

When wood, coal or other similar solid fuels are completely burned the main final products are carbon dioxide and water vapour, which are emitted to the air, and an ash residue.

However, if there is a lack of any or all of the above factors, incomplete combustion will occur.

This produces toxic substances such as carbon monoxide, benzene, creosotes, aldehydes and polynuclear aromatic hydrocarbons (PAHs), which have been linked with cancer.

On some models of slow combustion fires the air intake can be adjusted so that the fire will burn on 'low fire' overnight. This 'starving' of the air supply prevents proper combustion and increases the production of soot, smoke, carbon monoxide and volatile organic compounds.

The same effect occurs if a fire is overloaded or if the fuel is damp.

For combustion to occur the fuel must first be heated up to the ignition point and any moisture dried out. Each time a well-burning fire receives a load of fresh fuel, this pre-combusion heating forms a 'drain' on the heat available from the already burning material, leaving less heat available for effective combustion.

Chimney and flue height and position

Another important aspect of solid fuel fires is the height and position of the chimney or flue.

The minimum height for chimneys is 300 mm higher than any other part of the roof structure, and for flues a height of not less than 460 mm above the adjoining roof level.

The position of a flue or chimney should ideally be located so as to:

- avoid the possibility of a fire to any nearby combustible material; and
- avoid smoke or fumes penetrating any nearby windows, fresh air inlets, mechanical ventilation inlets or exhausts or the like.

Useful hints

To avoid expensive repairs to your appliance, and to help reduce the incidence of air pollution in the ACT, the following hints are recommended:

1. Ensure that the plans are approved, and a permit for the installation of the appliance has been obtained from the Building Section of the Department of Territories, and when the installation has been completed, that it is checked by a building inspector.
2. Ensure that the appliance is properly installed according to the manufacturer's instructions and follow the directions for the most efficient use of your fire.

3. Buy appliances with advanced features such as secondary combustion or catalytic conversion.
4. Appliances with a draught control in the fire box should be considered over those with a damper in the flue.
5. Only burn well-seasoned (very dry) wood. Make sure the wood you use has not been treated with creosote or copper-chrome-arsenate (the green colour of playground logs) — **ALL EMIT POISONOUS FUMES!**
6. When adding fuel, adjust the draught control to the maximum setting.
7. Burn **HOT**, with a generous draught.
8. Add smaller amounts of fuel more often for better heating and less pollution.
9. Burn only when necessary and avoid prolonged use of the 'low fire' setting as this causes smouldering.

For further information write to:
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