Masonry Heat Accumulating Fireplaces

The Modern Masonry Heater

21st Century Wood burning

Prehistoric desires in todays residential world

We are the only earthly creature to use fire. We have a long history with fire 200,000 to 500,000 years.

Humans and Fire

Used for cooking, light and heat.

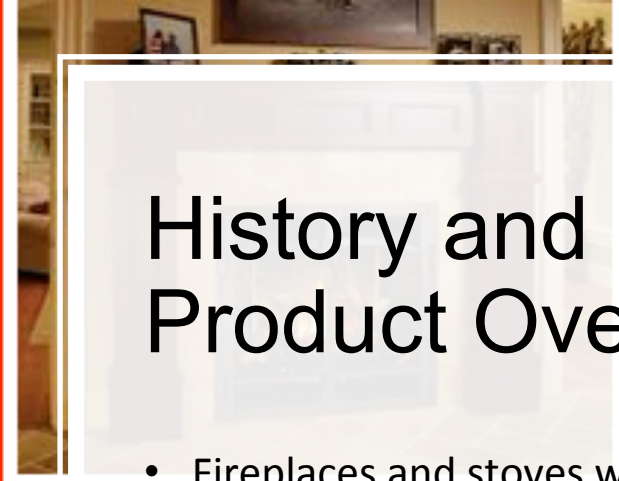
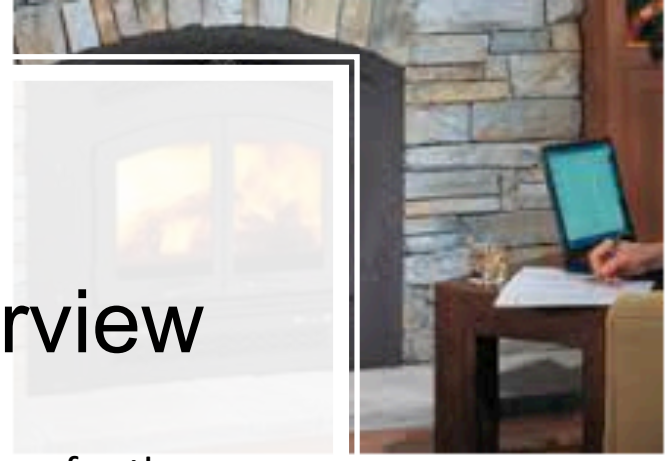
Metallurgy and portal into chemistry.

Wood as Fuel.

- Understanding Fire
- What is it? The chemistry of fire

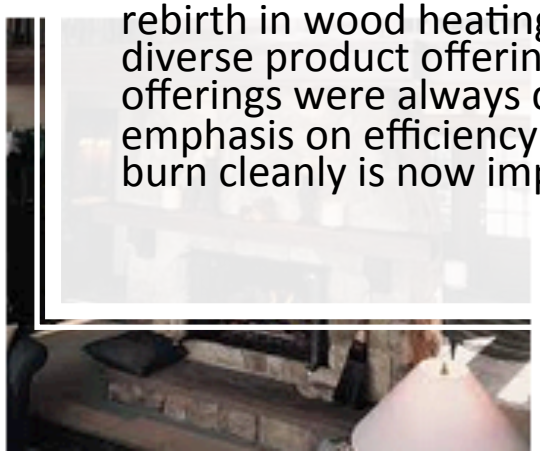
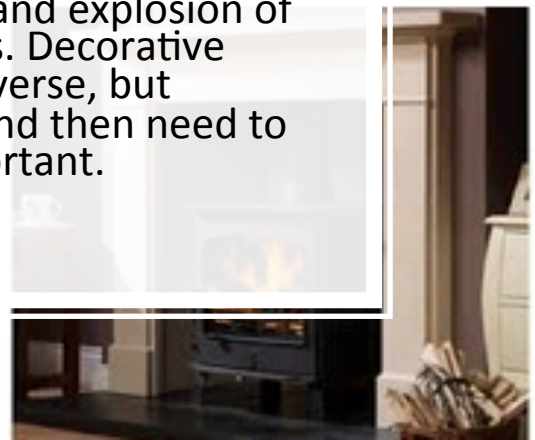
History and Product Overview

- Fireplaces and stoves were for the heating, cooking, lighting. Function driven until central heating and the modern era.
- Open fireplaces came back into style in 1920's for looks. Site built masonry until ZC in 50's onward. In the 1970s was getting heat from them a concern.
- Heat loss from fireplaces during that era was a concern; it was a hole in the house!
- Oil crisis in the 70's brought about a rebirth in wood heating and explosion of diverse product offerings. Decorative offerings were always diverse, but emphasis on efficiency and then need to burn cleanly is now important.





Wood burning and the Indoor and Outdoor Air Quality

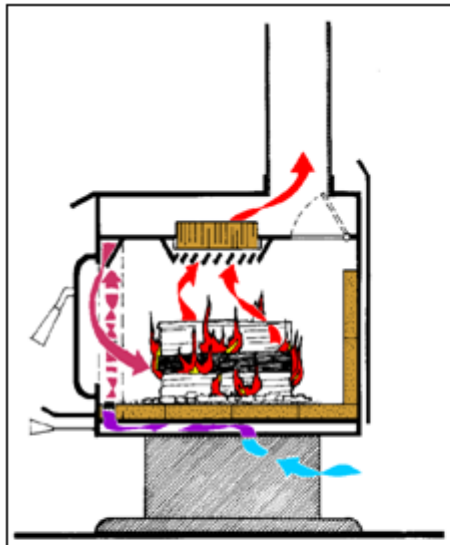
- After the advent and widespread adoption of central heat 1920 onward smoke spillage into the house was the major concern in fireplace design.
- When we burn we also produce heat it has to go somewhere- into the house or up the chimney.
- How much air do we need?
- Heat became important again in the 1970's
- Very quickly smoke in the outdoor environment became a concern.
- EPA regulates wood burning appliances.

EPA Compliant Wood Burning Methods and Appliances

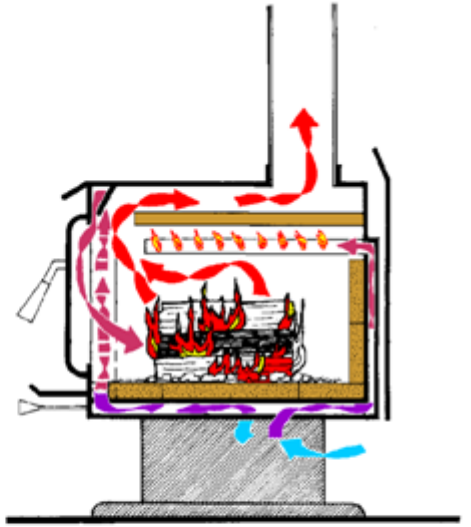
Back to what makes combustion work.

Here are the most common modern techniques to make it work better; results in much Cleaner and more efficient burning.

They are used in stoves as illustrated here and in fireplace most commonly they require glass doors.



Cross section of a catalytic stove, showing combustion air/exhaust flow patterns, the catalytic element and the bypass damper.



Cross section of a non-catalytic stove, showing combustion air/exhaust flow patterns, large baffle and high level combustion air supply.

How Masonry Heaters work

Traditional and 21st century advances

Always burned well because they had the heat air needed for clean burning.

New advances preheat the air and introduce it up high not from below the grate.

How Masonry Heaters Heat and Manage the Heat

Heat is absorbed stored and radiated.

Air for combustion is not restricted.

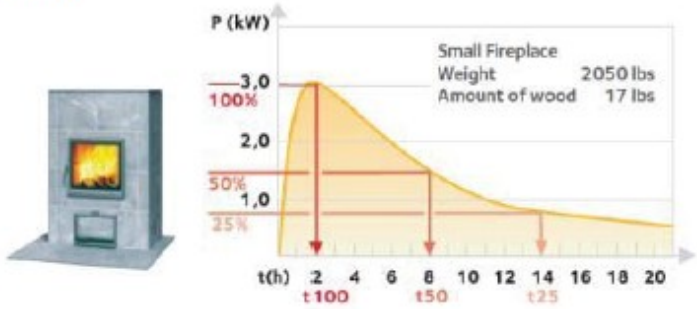
Relatively short burn time and relatively vigorous fire and the mass to accumulate and store the heat.

Quite moderate steady heat output.

Long lasting, steady heat release

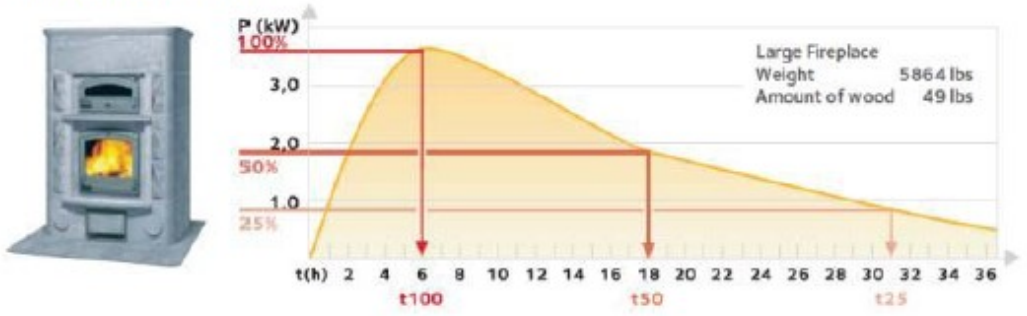
A soapstone stove with a smaller mass retains less heat and cools more quickly than a large one. A larger fireplace stores more energy, which is released slowly into the room, keeping it warm for a long time. However, a Tulikivi fireplace always soundly beats a wood stove, for example, which only gives off heat for a relatively short period.

In the first example, a small Tulikivi fireplace achieves its peak instantaneous heat release (3 kW) approx. 2 hours after heating is started. This fireplace continues to release 50% of its heat output 8 hours after heating is started and 25% of its heat output 14 hours after heating is started.



t_{100} = 2 h, t_{50} = 8 h, t_{25} = 14 h.

In the second example, a large Tulikivi fireplace reaches its peak instantaneous heat release (3.6 kW) approx. 6 hours after heating is started. It then releases 50% of its instantaneous heat output 18 hours after heating is started and 25% of its instantaneous heat output 31 hours after heating is started.



t_{100} = 6 h, t_{50} = 18 h, t_{25} = 31 h.

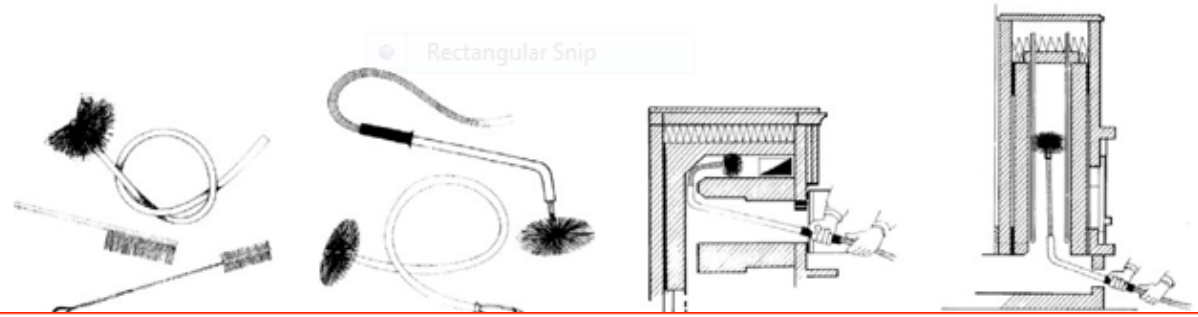
Design, Function, Maintenance

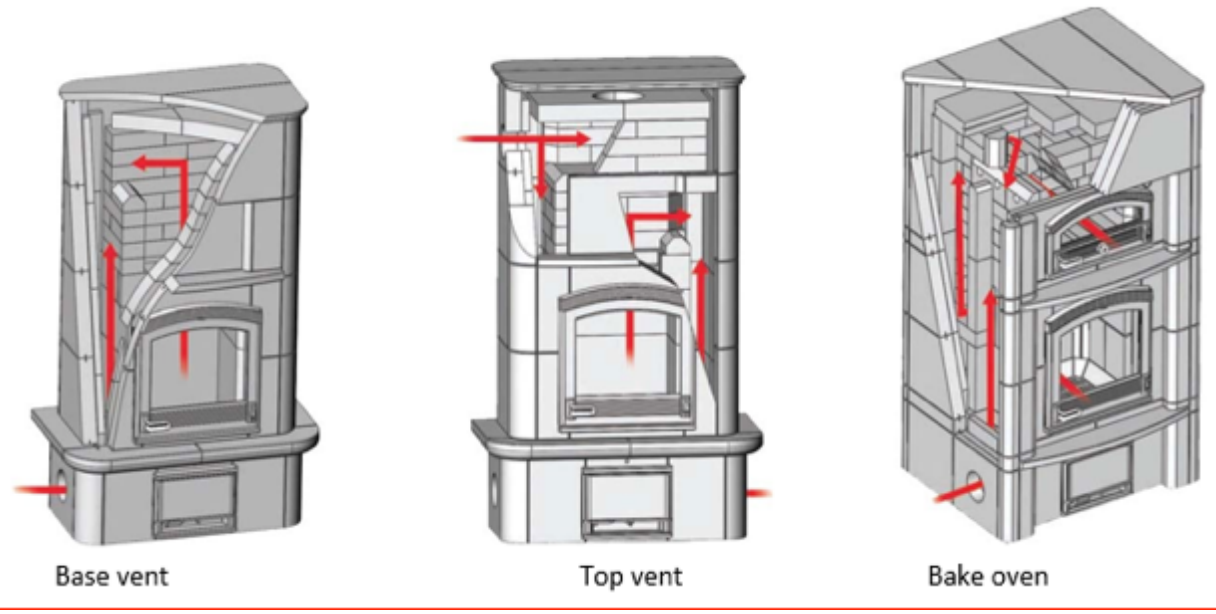
All modern mechanical products add complexity to the house.

Professional help for selection, regular maintenance and repair.

Tools:

Use flexible Nylon/Perlon brushes, avoid metal brushes as they might scratch the stone.





- Wood fired Masonry Heaters

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  Woodland Stoves and Fireplaces 612-338-6606
  www.woodlandstoves.com

  Tulikivi Soapstone Fireplaces www.Tulikivi.com/usa-can

  For more Information see:

  Alliance for Green Heat www.forgreenheat.org

  Burn Wise www.epa.gov/burnwise

  Hearth, Patio & Barbecue Association www.hpba.org

  Masonry Heater Association of North America www.mha-net.org

  Woodheat.Org www.woodheat.org

  Chimney Safety Institute of America www.CSIA.org