

University of Missouri Extension

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Catalytic Combustors for Wood Burning Stoves and Furnaces

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A catalytic combustor is a ceramic honeycombed device coated with a noble metal, usually palladium. There are various sizes and shapes, but the most common combustor is shaped like a wheel, 5-3/4 inches in diameter and 2 inches thick.

What does the catalytic combustor do?

It causes smoke to be burned and does not allow it to go up the stack unused.

How does the catalytic combustor work?

Gases given off by the wood will burn if the fire is 1,000 degrees Fahrenheit or higher. However, if the fire is turned down and the gases inside the firebox are less than 1,000 degrees Fahrenheit, the gases will not burn. When the gases pass through the catalytic combustor, the noble metal acts as a catalyst and causes the gases to burn at temperatures as low as 500 degrees Fahrenheit.

How does this affect the operation of the wood stove or furnace?

It affects the operation of the stove or furnace in three ways.

- It increases the overall efficiency of the burning unit by 10 percent.
- It reduces creosote production 20 to 90 percent.
- It decreases air pollution up to 75 percent.

Are catalytic combustors expensive?

All approved stoves are reasonably similar in price. The approved stoves with combustors may be slightly higher.

What are the limits or shortcomings of catalytic combustors?

There are a number of limits.

- The combustors have to be replaced periodically. If they are used properly they will last 10,000 to 12,000 operating hours.
- The combustors can be contaminated (poisoned) by burning foreign materials. This contamination reduces their operating capabilities.

What can you burn, and what can't you burn?

When you are using the catalytic combustor, you should burn only natural wood. Among items you should not burn are:

- Trash
- Coal
- Paper logs
- Treated wood
- Painted wood
- Lighter fluid

Can I buy a catalytic combustor to put in the stove I own now?

A number of so-called add-on combustors used to be available. This market has practically disappeared although a few may still be available.

Do all manufacturers of wood stoves and furnaces incorporate catalytic combustors into their products?

No, not all approved stoves have combustors. However, at this writing (October 1989), it is reported to be greater than 50 percent.

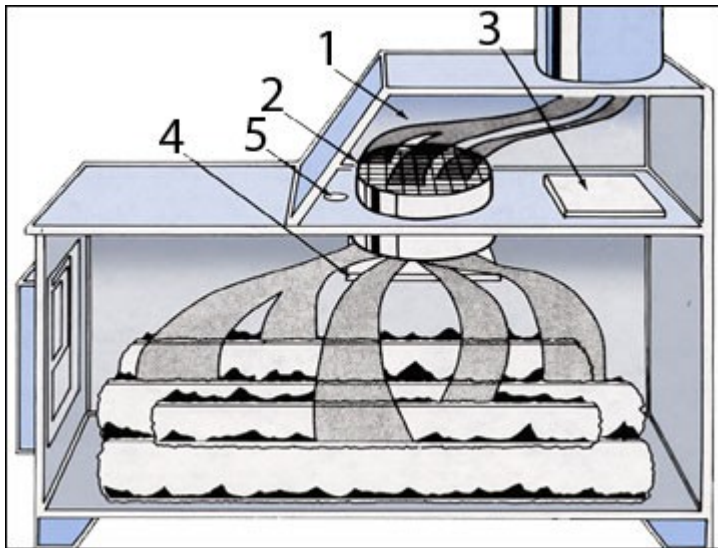


Figure 1

A cutaway sketch of a wood stove with a catalytic combustor.

How does a stove with a built-in catalytic combustor differ from a conventional wood stove?

Figure 1 shows a cutaway sketch of a wood stove with a catalytic combustor.

1. The upper box is the heat exchange chamber. The lower large box is the fire box.
2. The circular honey combed disk mounted in the baffle plate is the catalytic combustor. Hot gases and smoke from the wood fire are forced through the catalytic combustor, at which time the combustible gases are ignited by the combustor.
3. Bypass damper
4. Flame guard
5. Safety bypass opening

Related MU Extension publications

- G1730, Wood Stoves and Their Installation
<http://extension.missouri.edu/p/G1730>
- G1731, Wood Stove Maintenance and Operation
<http://extension.missouri.edu/p/G1731>
- G1732, Chimneys for Wood Stoves
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