

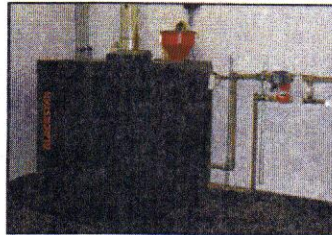


Ownership & Operation Manual - Boiler Room Considerations

The design of the boiler room and the installation of the wood pellet boiler must be in compliance with the applicable local, state, and federal rules, building and electrical codes, environmental authorities, fire regulations and labor inspectorate. For advice regarding the rules and regulations governing the design, approval, and installation of your wood pellet boiler system it is recommended that you contact a Kedel authorized full service dealer and/or seek advice and guidance from your code enforcement official.

In this section you will find the boiler room specifications. This will cover topic areas that include:

1. **Wall and Ceiling Materials**
2. **Distances Surrounding the Boiler**
3. **Flooring Material**
4. **Area and Lighting**
5. **Chimney Requirements**
6. **Ventilation**
7. **Fuel**
8. **Forbidden Chemicals and Materials**
9. **Preventing Chimney Condensation**



1. **Wall and Ceiling Materials**

As a minimum, ceiling surfaces must consist of Class 1 material. If the ceiling happens to be the underside of the roof, the ceiling material must be non-combustible. As a minimum wall cladding must be made of at least Class 2 material.

2. **Clearances Surrounding the Boiler**

The boiler must be installed in such a way that all maintenance points can be easily accessed. No less than 18" clearance must be provided around the sides of the boiler. The flue pipe must be atleast 18" from any combustible material unless appropriately covered with a non-combustible material. No less than 36" must be left unobstructed in front of the boiler.

3. **Flooring Material**

Floors must consist of (or be covered with) non-combustible material under and around the boiler. There must be non-combustible flooring or material at a minimum of 12" from the boiler side and 20" from the front of the boiler.

4. **Area and Lighting**

The area around the heating system must be large enough to allow for effective cleaning and operation of the pellet boiler system. There must also be adequate lighting so that care and maintenance can be performed safely.

5. **Chimney Requirements**

Chimneys must have a diameter and height that allows for adequate draft. To ensure proper function of the boiler, a draft of atleast .04" of H₂O must be measured at the breach of the boiler when it is cold. If the draft is less than .04" of H₂O, a draft inducing fan that is rated for wood pellet equipment should be installed.



//Warning// If there is not enough draft in the chimney, smoke may linger in the boiler and seep through small cracks allowing toxic fumes to enter into the house and could cause harm or death. It is highly recommended to install a CO alarm and a fire detector in the same room as the boiler.



//Important// It is important that the chimney is high enough above the building to ensure that the smoke does not affect the surrounding buildings. The size of the chimney opening must match the amount of flue gas required to pass.



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//Important// It is very important to design or utilize a chimney that is appropriately sized for the Kedel.

It is permissible to vent this boiler into a common flue with a gas or oil boiler provided the installation conforms with the guidelines provided in NFPA211, state and local code.

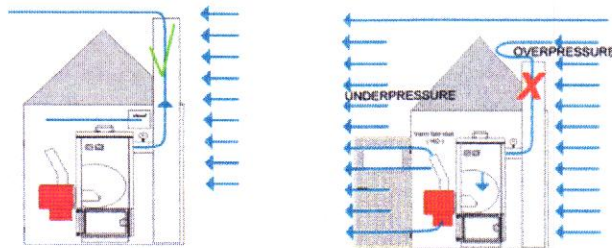
Power venting has been tested and approved as an acceptable means of venting the boiler through a side wall. Power vent kit must be supplied by Interphase Energy to meet listing standard. (pt.# IEVENT)

If there is insufficient draft ($<.04''$ WC), a draft inducer can be installed on the flue pipe which will ensure consistent draft. The draft inducer must be approved for use on a solid fuel appliance and must meet applicable state and local code requirements.



//Death and Damage// If the opening in the chimney is too small, the exhaust flow may be restricted. When the resistance of the flue is too large, smoke could back flow causing toxic smoke to enter the house. Simultaneously, the fuel may not be completely burned due to the lack of oxygen required for combustion. This allows smoke to linger in the chimney and potentially form creosote. This build up could increase the risk of a chimney fire. Chimney openings also must not be too great, since cold air could enter from the top of the chimney. When the chimney is cooled, this can also cause condensation and soot inside the chimney. Soot is a problem since it can penetrate through the chimney and cause unsightly brown splotches on the walls inside the house. Thus cosmetic damages could result.

Correct and Incorrect Draft



Indications of poor draft may include but are not limited to: the light sensor becoming sooty or melted; smoke in the hopper; a warm drop shaft; smoke from the fan/boiler at startup. If there are intermittent problems with draft, it is a good idea to keep a log of when the draft problems occur as draft problems are often associated with wind in certain directions. When the wind blows against one side of the house, it creates a higher pressure on the windward side of the house and a lower pressure on the leeward side of the house. The higher pressure and lower pressure will always try to meet wherever possible, including through the chimney and boiler. It is a good idea to ask your chimney sweep about the location and size of the chimney, location of cleaning doors and possible steps to improve the draft.



6. Ventilation

The boiler must be installed in a room with suitable ventilation. This may be achieved via an adjustable air vent from the outside or through a direct fresh air intake to the burner. The diameter of a fresh air valve should have the same internal diameter of the chimney. It should also be mounted on the same side of the house as the chimney, in order to equalize the pressure difference.



//Note//: Drum dryers, range hoods, oil burners or other appliances located in the same room using high pressure blower can affect the air flow.

7. Fuel

Wood pellet fuel must be made of clean timber. Wood pellets consisting of glue, paint, or plastic, should not be burned in the system. Pellets should be of super premium quality with an ash content of less than .7%. If pellets with higher ash content are used, the ash box will need to be emptied more frequently and it will possibly create clinkers on the burning grate. The boiler is set up for premium wood pellets \varnothing 0.2" - 0.3", which do not clinker. (i.e. turn into hard ashes)

8. Forbidden Chemicals and Materials in the Boiler Room

Boiler room must not contain combustible materials or flammable liquids (except oil for oil burners) and must be kept tidy. The floor must be kept free of spilled fuel, dust and combustible waste, and waste from other activities. Hot coals from the Kedel must be extinguished with water and transported directly to a safe storage location in the open air.

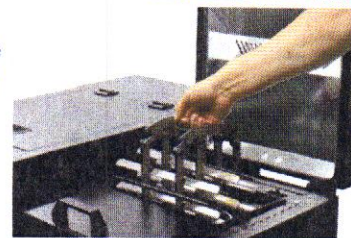
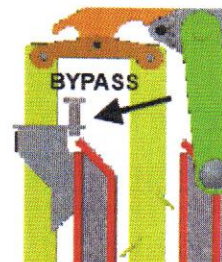
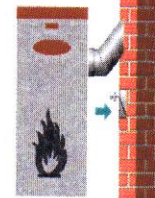
Modern wood pellet boilers maintain high operating efficiency between 88-93%. As a consequence, little heat escapes out the chimney resulting in low chimney temperatures. This creates greater demand on the installer to ensure proper chimney draft and avoid condensation. Below is a guide on how to adapt your existing boiler room for a high efficiency boiler.



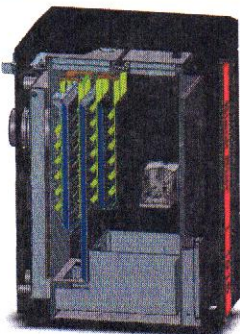
[Note] It is important to prevent condensation. Failure to do so may result in soot and corrosion of the chimney as well as possible damage to the boiler. Damage to the boiler resulting from condensation will result in loss of the boiler vessel warranty

10 things that can prevent condensation in the boiler and chimney

1. **High Chimney > 17'**
Ensures proper draft under normal circumstances
2. **Small chimney diameter 5"**
Provides better flow
3. **Minimize the use of uninsulated flues to <12"**
Will prevent unnecessary cooling of flue gasses
4. **Install a Draft Stabilizer**
Stabilizes the draft and provide dry air to the chimney
5. **Increase the boiler temperature > 160 degrees F**
Increasing the boiler temperature by 10 degrees results in a 10 degree increase in smoke temperature
6. **Make sure that the return temperature is > 130 degree F**
If the flue gasses comes in contact with boiler surfaces that are below 120 degrees F condensation will occur
7. **Increase flue gas bypass in the boiler**
Increasing the bypass allowance in the boiler will allow flue gasses to reach higher temperatures. Increasing the smoke temperature by 27 degrees F will result in only 1% efficiency loss
8. **Heated boiler room**
Reduces cooling of the boiler and flue pipe, as well as providing the draft stabilizer with warm air
9. **Increase the O2 levels during combustion**
Increases the air flow thus carrying the moisture out. Note that a 1% increase in O2 results in 0.5% loss in efficiency
10. **Remove Heat Exchanger Turbulators**
Allows for increased heat flow to the chimney (especially effective in the warmer months if the boiler is providing domestic hot water)



Operating Manual - Installation



Kedel	All In One	K54	K68	K102
Height in:	40	40	40	40
Width in:	35.5	17.8	21.7	21.7
Depth in:	40	28.2	30.6	30.6
Flue in:	5.12	5.12	5.9	5.9
Outlet:	1 1/4"	1 1/4"	1 1/4"	1 1/4"
Return:	1 1/4"	1 1/4"	1 1/4"	1 1/4"
Drain:	1/2"	1/2"	1/2"	1/2"
% Efficiency:	92,4-94,2%	92,4-94,2%	94,2-95,3%	94,2-95,3%
Output Capacity	54MMbtu	54MMbtu	68MMbtu	102MMbtu

General Installation Guidelines:



///IMPORTANT/// Failure to do the following could result in loss of warranty. The boiler must be installed by an authorized technician in accordance with local, state, and work supervision concerning hydronic systems.

The flue pipe connecting the boiler to the chimney should be no longer than 3' and should be insulated so no more than 1' of single walled flue pipe is uninsulated. The chimney draft should be at least .04" H₂O and should be stable. A draft stabilizer (barometric damper) must be installed with the system. If combustion gases condense in the chimney, open the bypass plate (the flap inside at the back of the boiler) as wide as possible to increase the temperature of the flue gasses. The boiler supply and return must be spanned with a shunt valve to ensure the return flow is always kept above 140 degrees F.

///IMPORTANT/// Near boiler piping must be built as shown on page 18 with a shunt valve between the supply pipe and the suction side of the pump. This ensures the boiler will not experience cold shocks which can cause condensation. Vessel failure due to condensation is not covered by warranty.

Mounting the burner:

1. Check that the burner is free from damage or defects.
2. Fit the controls either on the cabinet or on the wall.
3. Install the overheat safety cut off into the 1/2" NPT port on the most suitable side of the boiler and connect the power so that the overheat safety cut-off disables the power in the event of a boiler overheat. (See Wiring Diagram)
4. Install the boiler temperature sensor in the thermowell located on either side, top rear of the boiler opposite the overheat safety cut off.
5. Install the studs supplied in the ash box to the burner mount flange.
6. Fit the burner loosely but do not yet tighten it down with the supplied wing nuts. Insert the drop shaft into the hole in the top of the burner and position it roughly where it will end up. Now tighten the burner firmly to the boiler vessel with supplied wing nuts.
7. Ensure that the burner is in a horizontal position and all connections are tight.
8. Ensure the igniter is in the igniter channel and not loose in the bottom of the combustion air chamber.
9. Install the burner cover and the plug. **(NOTE: When installing the burner on the All In One System, no outer burner cover should be installed).**
10. After positioning the hopper or silo, connect the flexible tube between the external auger and the drop shaft.
11. Ensure the hose is at the proper angle to allow the pellets to fall into the burner