

EKO DUO COAL BOILER

Installation and Operation manual



ATTENTION!

- **Install pressure relief of 30psi with expansion tank on the close system.**
- **Use antifreeze glycol solution if the boiler can be subject to below 32F.**
- **Do not operate the boiler without water.**
- **Pressure relief valve and the boiler must not have a valve to isolate.**
- **Do not use the boiler without the pressure relief valve.**
- **The maximum test pressure is 50 psi.**
- **The operating pressure must not exceed 15 psi.**
- **The instruction manual is for all the boilers EKO models.**

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1 INTRODUCTION

Eko Duo is optimized for burning coal up to 1¼". The boiler cycle to keep hot ashes to ignite next fire. In addition, you may also burn pellets, grains and other biomass including manual feed. Producing the boilers EKO, we wanted to satisfy the needs of any consumer based on decades of observations and comments. This leads to the creation of the easy-to-use and highly effective appliance with 90% efficiency rating. Before the installation and operation read the instruction manual carefully. The good operation of the boiler must follow directions and recommendations of the producer.

2 APPLICATION

EKO boiler is a steel water heating appliance for residential, commercial industrial projects. The boiler must be used in closed loop systems.

3 DESCRIPTION

Eko Duo is the last generation of automatic coal boiler. It is equipped with a modern self-cleaning rotary cast iron burner, a feeding auger, an electric gear motor, a hopper and a backdraft prevention system. The automatic burner in the bottom chamber burns coal but also pellets, grains and other biomass up to 1½". You can also manual feed coal, wood chips, peat briquettes and much more using the middle chamber. The unique design allows complete heat recovery. The boiler has a guaranteed efficiency of 90%.

TIS tronic 481R controller master the combustion process depending on user parameter, weather, exhaust sensor and fuel quality. The controller easily adapt to any modern hydronic heating system and combine with domestic hot water, thermal storage, direct feeding, zone mixing design and more. Simply enter the setpoint heating water temperature and the boiler will modulate the combustion to match load. If there is no load the boiler will standby and reignites when needed. The automation with the large capacity hopper provides 4 to 10 days autonomy. The controller also includes functions of circulation pumps, motorized mixing valve, buffer tank, fuel level, summer/winter mode and thermostat feedback.

Eko Duo is manufactured with the finest certified boiler steel ASTM A106. The wide door openings make easy cleaning of the top heat exchanger, middle loading of biomass and removal of ashes from the bottom. All maintenance is performed from the front and there is no need to unscrew anything else. High-quality multi-layer coating, non-combustible 2" insulation, and thermal protection systems ensure long-term and trouble-free operation.

4 DIMENSIONS AND TECHNICAL DATA

Boiler	Unit	Eko 15	Eko 35	Eko 55	Eko 95
Capacity	KBTU	27 - 68	51 - 137	85 - 205	154 - 338
Heat area	ft ²	2000	4000	6000	9000
Relief Valve	psi	30	30	30	30
Water volume	gal	21	32	36	46
Connection	inch	1 ½"	1 ½"	2"	2"
Chimney	inch	6"	6"	8"	8"
Hopper volume	gal	72	111	143	238
Hopper width	inch	22	31	33 ½	33 ½
Boiler width	inch	21	27	27	31
Boiler depth	inch	25	34	36	40
Boiler height	inch	62	56	58	67
Boiler weight	lb	1000	1300	1550	1950

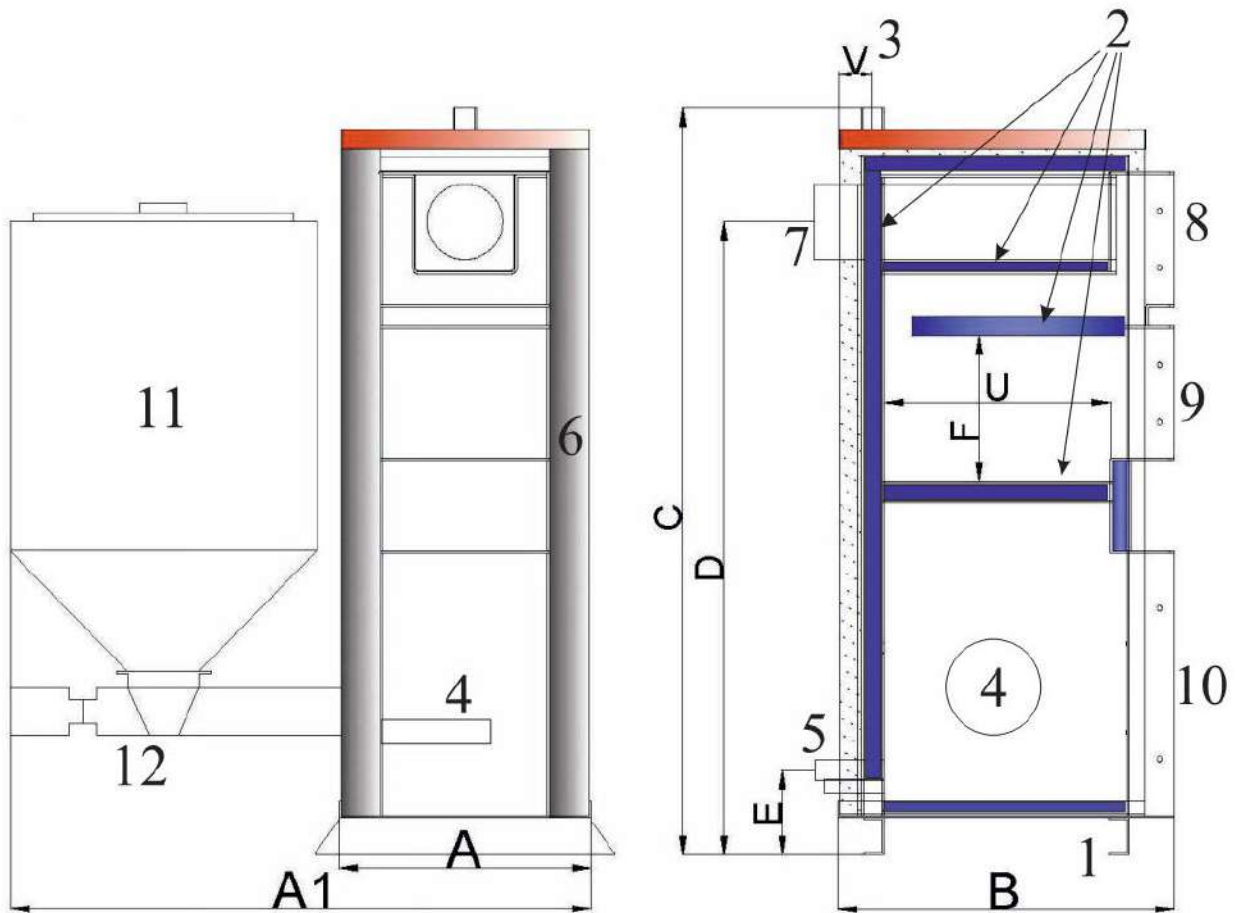
4.1 MINIMUM CLEARANCE

Minimum Front Clearance: 48"

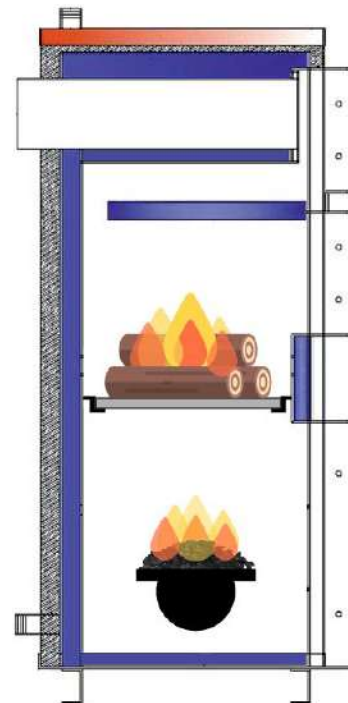
Minimum Side Clearance: 18"

Minimum Back Clearance: 18"

5 DIAGRAM



- 1 Boiler feet
- 2 Water heat exchanger (water jacket)
- 3 Supply Connection
- 4 Burner
- 5 Return Connection
- 6 Insulation
- 7 Chimney
- 8 Tube heat exchanger door
- 9 Combustion chamber door
- 10 Ash removal and burner access door
- 11 Hopper
- 12 Feeder



6 INSTALLATION

Connect the boiler to the heating system according to the scheme. If low water return temperature below 130°F, install a boiler protection valve. Fill the heating system with water, check the water is clear and clean, without any impurities of aggressive substances with the hardness below 100ppm CaCO₃. Hard water causes scale in the boiler which reduces its heat productivity and can cause premature boiler breakdown. 1/32" scale deposit reduces the heat transfer from steel to water by 10%. Use in close loop system with expansion tank. Do not forget to monitor the pressure during season. Only water and water/glycol mix are allowed as heat carrier.

Plumbing: Connect the return line at the bottom rear of the boiler. Connect the supply line one the top connection. Make sure to use steel or copper line for the first 10ft at the boiler outlet.

Expansion: Install the boilers with an expansion tank in a closed heating systems. The expansion tank volume depends on the heating system volume (usually system volume divided by 8 = expansion tank volume).

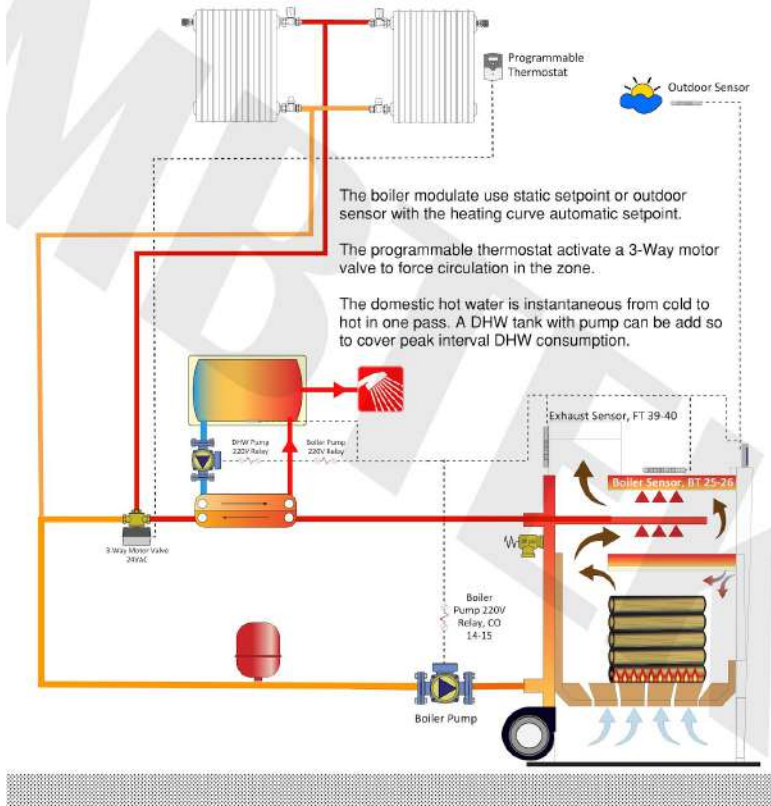
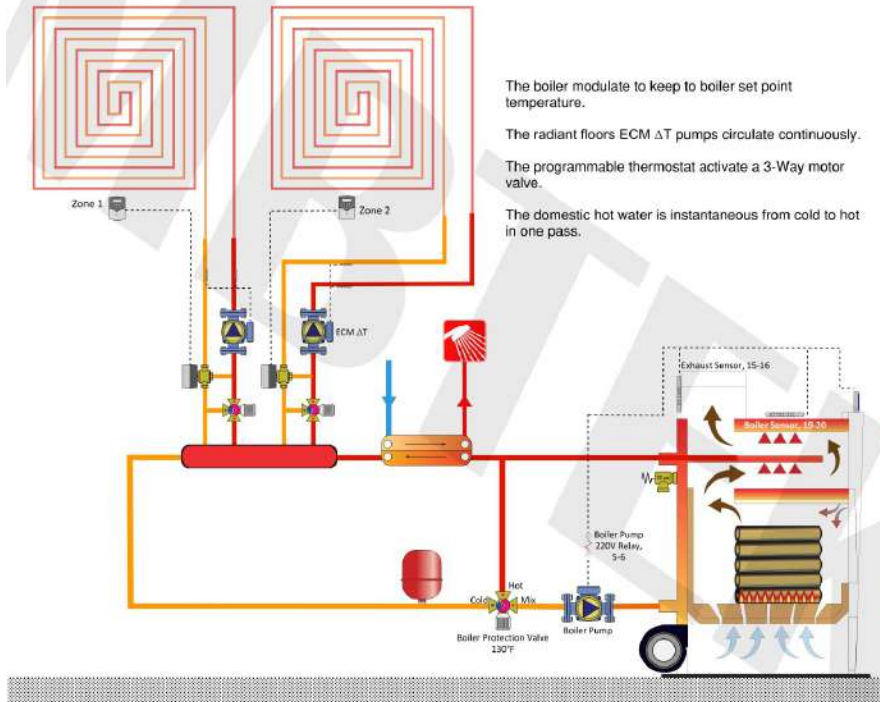
Pressure: The pressure in the boiler must not exceed the maximum working pressure of 30psi in operation with water temperature at 185°F. Install the safety relief valve on the feed line between the boiler and the valve.

Electrical: Use either a double breaker 15A 220V L to L to connect to boiler or you can also use a power adapter using a 110V plug outlet. Power adapter 110V to 220V must be at least 1000W rated.

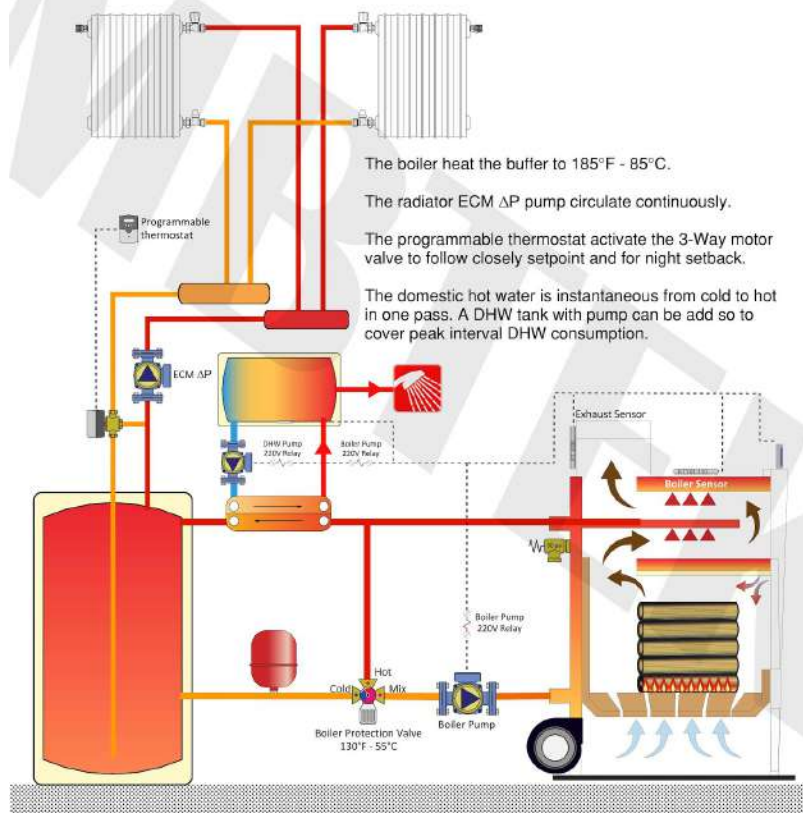
Chimney: Do not reduce chimney diameter unless consultation with manufacturer and local codes.

7 INSTALLATION SCHEME

1 Zone Radiator + DHW

Radiant + DHW

Buffer + Radiator + DHW



8 OPERATION

Before firing the boiler check the condition of the controller unit, temperature sensor, valves, pumps, safety relief valve, and pressure in the heating system, chimney, air inlet in the room and proximity of a fire extinguisher. Make sure the controller is deactivated.

1. Load the coal in the hopper

Keep the hopper loading door closed all the time.

2. Activate the feeder motor until the fuel reaches the burner.

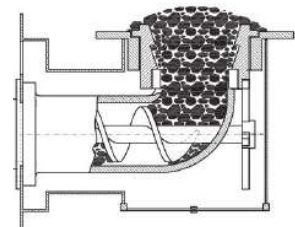
MENU / MANUAL CONTROL / FEEDER / ON

3. Hang the cast iron deflector above the burner.

4. Ignite the fuel on the burner. **! Do not use flammable liquids to ignite fuel !**

6. Activate the fan.

MENU / MANUAL CONTROL / FAN / ON



7. After the fuel burns well turn the boiler into automatic mode.

To enter automatic mode, you must press "**BACK**" until the main screen appears.

8. During **WORK mode** (high fire), make sure that the fuel level on the burner doesn't fall below the upper ring, and doesn't get poured out the burner. If necessary, adjust the fuel level using the "**Feed operation**" and "**Feed interval**" settings.

9. When the setpoint temperature is reached, the boiler goes into the **SUPERVISION mode** (low fire). Make sure **Supervision mode** settings are not too low, so that the fire doesn't goes out.

10. Empty the fuel at the end of season

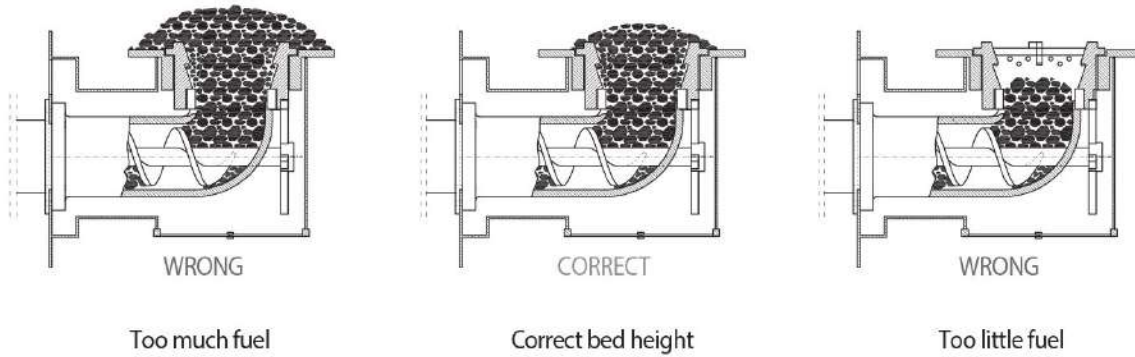
1. Remove the fuel from the hopper completely as possible.

2. Turn ON the FEEDER in MENU / MANUAL CONTROL / FEEDER / ON

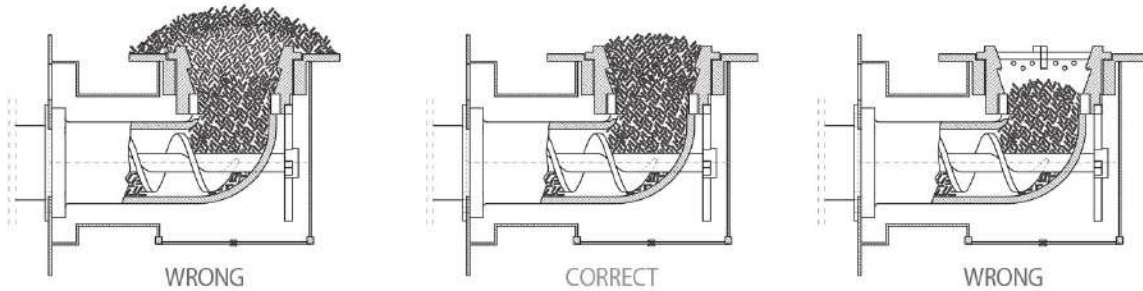
3. Supply fuel to the burner until completely emptied.

Boiler	EKO 15	EKO 35	EKO 55	EKO 95	EKO 300
Coal type	Anthracite	Bituminous	Anthracite	Anthracite	Anthracite
Coal size	Buckwheat	Stoker	Rice	Pea	Pea
Operation	34KBTU, 10KW	68KBTU, 20KW	44KBTU, 13KW	240KBTU, 70KW	750KBTU, 220KW
Blow-in output	90%	90%	90%	90%	90%
Feeder operation	8sec	10sec	12sec	20sec	10sec
Feeder interval	40sec	40sec	40sec	40sec	90sec
Supervision	13KBTU, 4KW	20KBTU, 6KW	27KBTU, 8KW	68KBTU, 20KW	340KBTU, 100KW
Blow-in output	65%	65%	65%	80%	70%
Feeder operation	4sec	5sec	3sec	20sec	8sec
Feeder interval	1min	1min	1min	1min	30min
Burner settings					
Airflow oper. extend. SUPERV.	45min	45min	45min	45min	45min
Fan in SUPERV.	0	1	1	1	1
Pause feeder start OPERAT.	60min	60min	60min	60min	60min
Min. blow-in output	40sec	40sec	40sec	40sec	40sec
Min. boiler temp.	50°C	50°C	50°C	50°C	50°C
Max. boiler temp.	75°C	75°C	75°C	75°C	75°C
Boiler hysteresis	3°C	3°C	3°C	3°C	3°C
No fuel detection time	45°C	45°C	45°C	45°C	45°C
Delta T no fuel	10sec	10sec	10sec	10sec	10sec

The correct appearance of the boiler when burning coal and fine coal



The correct appearance of the boiler when burning pellets



9 FUEL RECOMMENDATION

1. **Maximum fuel size:** Coal fraction is limited to 1 1/4" preferably 1".

2. **Coal type:** Rice, Buckwheat, Pea and Stoker.

	<----- Low Rank ----->		<---- High Rank ----->	
Rank:	Lignite	Subbituminous	Bituminous	Anthracite
Age:	----- increases ----->			
% Carbon:	65-72	72-76	76-90	90-95
% Hydrogen:	~5	----- decreases -----		~2
% Nitrogen:	<----- ~1-2 ----->			
% Oxygen:	~30	----- decreases -----		~1
% Sulfur:	~0	----- increases -----	~4	--- decreases --- ~0
% Water:	70-30	30-10	10-5	~5
Heating value (BTU/lb):	~7000	~10,000	12,000–15,000	~15,000

Good choice of fuel provides:

1. Trouble-free operation.
2. High efficiency of the burner and fuel economy.
3. Reduction of harmful chemicals emission into the atmosphere.

2. Coal combustion: Look for **low volatile matter** content and **non-clinkering** characteristics coal such as anthracite.



Coal clinker reduce efficiency of combustion

3. Humidity level: It is very difficult to burn coal if it contains an excessive amount of humidity. Seek coal of **10% humidity or less**. Store in a dry location.

4. Coal dust: The maximum amount of fine dust coal should be less than 20%.

5. Ash content: Below 15%, preferably 10% or less

6. Ash melting point: Not less than 2200°F

Recommendations for wood pellets

	Minimum	Maximum
Length	-	1 3/16"
Diameter	1/4"	3/8"
Ash	-	1%
Humidity	-	6%
Density	40 lb/pi ³	-

10 MAINTENANCE

Chimney

Attention! Soot and condensate are formed in the chimney during combustion. The chimney must be sweep once a year. A T must be installed so to accumulate condensate from chimney away from boiler. The T may have a drain port for sporadic draining. The chimney must have smooth inside. The chimney

must not lead to soot accumulation that could block exhaust air flow. The number of bends must be as small as possible. Choosing your chimney the same size as the boiler. Make dismantling for maintenance easy for cleaning and follow local fire safety standards.

Service operation and maintenance:

Timely inspect the appliances; regularly clean the boiler and chimney. Soot and ash deposits on the smoke channel cases reduce the heat transfer. Deposits, resin formation and condensation depend on the fuel used, chimney draft and operating mode. Boiler and burner cleaning are recommended to be done in the cold state once a week. Boiler and burner cleaning can be also made when contaminated.

*Remove ash from the boiler daily. Check the boiler external condition, burner, electronic control unit, detectors and wiring. Clean them all if necessary.

*Clean boiler heating surfaces weekly with a poker. Clean the burner. Clean the upper heat exchangers from the soot with a scrubber, then remove soot through the access panels.

Make the repairing, preventive maintenance, cleaning and etc. when the boiler is blown out and then switched off. If there are any malfunctions in electrical equipment (short circuit to the boiler case, insulation failure in cables and etc.) switch off the boiler promptly and call the service representative. Check the existence of draft in the chimney by putting a paper strip to the ashpit (the paper strip should turn to the ashpit side). Watch for the ventilation openings for air inflow and exhaust not to be reduced or closed.

* Use the exhaust hoods for smoke removing within premises where the boiler is placed.

Geared motor and auger construction

1. **External parts of the reducer** (housing) and motor housing are aluminium. The manufacturer fills the reducers with synthetic oil, which does not require replacement during the whole period of operation. The reducer is connected to the feed auger by coupling, the role of protecting mechanism against the damage in screw locking case, is performed by a safety wedge (screw **M5** with incomplete thread, galvanized in the hardness class **5.8**). The use of other safety wedges threatens to the geared motor or electric motor damages and also will void the warranty! The auger transports fuel from the tank to the lower part of the retort.

2. **Retort construction.** Retort with a correspondingly spaced primary air nozzle forms a monolithic component. The retort nozzles, through which primary air is supplied, are made of gray cast iron. The

retort is driven by an auger and rotates inside the burner ring. 3. **Deflector.** The height of the deflector hanging is set by the boiler manufacturer. **Normally the deflector is set to:**

1. for a retort of 15kW and 25kW min.
2. 15cm for a retort of 50 kW min.
3. 15 cm for a retort of 75 kW min 20 cm for a retort of 95 kW min.
4. 20 cm above the retort upper edge. The deflector should be suspended on a heat-resistant wire $\varnothing$ 10. Functions of the deflector: flame support in the retort. Flame breakdown on the heat exchanger mantle

Attention! The use of coking coal leads to a rapid wear of the deflector and other cast iron parts of the feeding device (loss of guarantee). **Attention!** In the TRIO feeder, secondary air nozzles are used. These nozzles must always be installed in the direction of the flame. **Attention!** The boiler has a double "fire fighting" **function I** - in the controller "fire fighting" function (after overheating of the auger tube with returning burning fuel, the controller must give a signal and push the fuel out of the pipe). **Function II** - It is necessary to install a safety valve (thermostatic valve) on the screw tube (the coupling for welding is welded) and the tank with water connected to it.

Daily boiler and burner inspection.

Burner cleaning ash removal from the boiler – at least once a week. Boiler and chimney cleaning – at least once a month.

When using low quality pellets (with increased ash content and slagging), to ensure uninterrupted and reliable operation of the equipment, inspect and clean as needed (to the extent of contamination).

Manual for feeder servicing

Weekly maintenance.

1. Open firebox door and check the condition of the flame.
2. Remove the slag periodically if there a lot of it in the firebox. Take into account the above principles and the need to regulate properly the fuel and air pressure proportions. In case of slag permanent appearance, make sure that the type of fuel meets the recommended characteristics.
3. Check the fuel level in the hopper.

Monthly maintenance.

Perform actions on a weekly maintenance and: 1. Check the accumulation of slag residues in the retort, if necessary, extinguish the boiler and clean the retort.

2. Verify that dust and other wastes do not accumulate in the fuel hopper and the auger casing, and

remove them. 3. Check the condition of the air nozzles and the patency of the air outlets. **Attention !** Actions from 10.2 and 10.3 must be done after the end of heating season or in case of heating hot water – once a year.

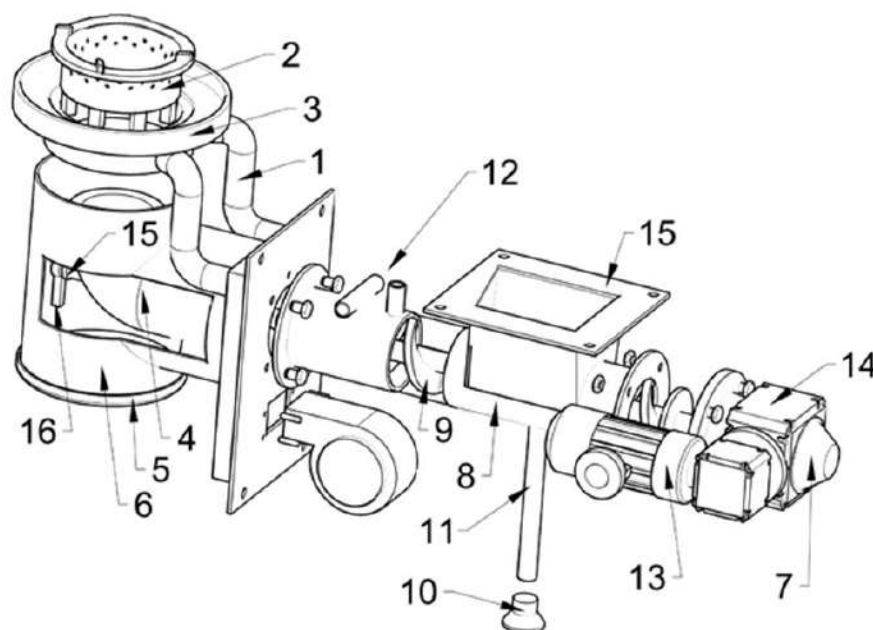
Regular maintenance.

1. It is necessary to preserve the feeder after each heating season or in the case of heating hot water once a year (warranty condition).
2. Run the auger once every three months for 15 minutes. Due to this, it is possible to avoid locking the auger inside the pipe.
3. Clean the pipe of fuel residues, empty the hopper, clean the retort, unscrew the bottom cover, remove the ash
4. Remove the rotary ring from the burner plate, remove the furnace plate from the feeder, remove the feeder by unscrewing four **M10** bolts securing the feeder to the boiler. Remove the geared motor with the auger (unscrewing four **M8** bolts), separate the geared motor from the auger (taking out the safety pin), process with a solid lubricant for bearings an auger spindle and an inner sleeve of a geared motor, to prevent grouting of both elements (geared motor and auger). In order to fold the feeder, follow the steps in reverse order, paying special attention to the centering of the rotary ring inside the burner plate (four **M10** bolts are used for alignment).

Attention! – after installing the burner plate do not tighten the bolts.

Center on the included feeding device!

11 BURNER PARTS



1. Nozzle
2. Retort
3. Firebox
4. Feeding knee
5. Firebox revision cap
6. Air chamber
7. Pin cap
8. Feeder
9. Auger
10. Feeder foot handle
11. Feeder foot
12. Fire protection nipple
13. Engine
14. Geared motor
15. Regenerative sleeve
16. Impeller
17. Flange for hopper installing (fuel tank)
18. Flap for auger revision
19. Air supply duct
20. Sleeve for thermal sensor of fire extinguishing system



12 QUESTIONS AND ANSWERS

Pump

Boiler pump 13-14 and all 110VAC pump must be connected using a 220VAC relay.

Backdraft Safety

The plastic tank should be filled with water and fixed on wall higher than the auger.

The connection of the thermostatic element goes in the middle of the auger.

In the case of backdraft, the thermostatic element opens and water flow in the auger.

Deflector optimizer (*steel rod with a concrete sphere*)

Install by hooking the T bar over the fire bed.

It helps to keep hot coal to burn completely

Some bituminous coal is not compatible with the optimizer since coke sticks together in large chunks and building up making the optimizer useless.





Operation

The hopper must be hermetically closed when operating the boiler

The gear has a safety pin that will break if the auger gets stuck. The additional safety pins are provided with the boiler for replacement.

If you are burning with coal the 2 air inlets must be close.

If you are burning with pellets the 2 air inlet must be open

Some clients prefer to operate with a heavy bed of ashes that reach the burner height. Since the ashes are at the same height as the burner it helps unburned coal to keep burning completely to ashes.



Service Setting Password: 0000

Blank Screen

Verify connection using the electrical diagram.

Make sure to switch ON the controller.

Verify those parameter with multimeter.

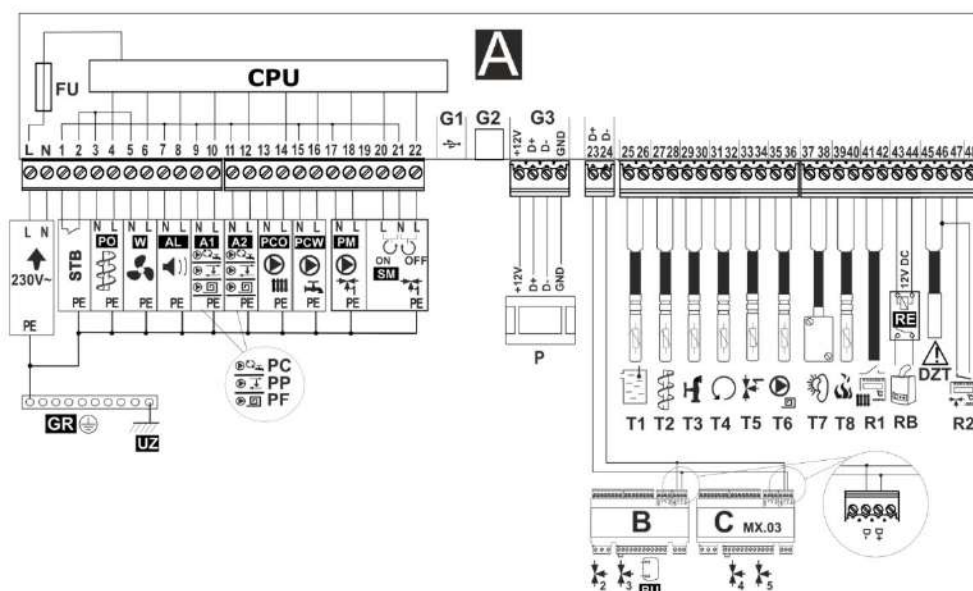
1- 220V L to N

2- Controller fuse continuity

3- Verify terminal 1-2 is jump and 45-46 is jump (11-12 is jump on UNI boiler only)

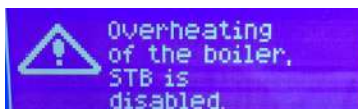
4- If none of these work disconnect all from controller except the L, N and the 2 jumpers.

*The controller must be kept away from water or very high humidity environment. If water or condensation enter the controller immediately disconnect and dry using hair dryer at low temperature. Wait 24hrs and reconnect.



STB Overheating

Terminal 1 and 2 must be jumped.



DZT-1 thermal protection sensor

DZT sensor must be connected to terminal 45-46.

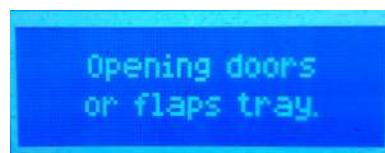
DZT-1 Thermal sensor, Open: 185°F/85°C, Close: 140°F/60°C.

Error code: Opening doors or flaps tray.

If you operate at higher temperature you can order another DZT-2 at:

www.mbtek.com

DZT-2 Thermal sensor, Open: 200°F/95°C, Close: 155°F/70°C.



ecoSTER Touch Service settings

There are two "levels" in the ecoSTER TOUCH menu. The first one concerns the settings of the ecoSTER itself, the second concerns the boiler settings.

Probably the customer enters the service code in the section of the ecoSTER settings, not the boiler.

To get to the service settings of the boiler, please enter the boiler settings and then to the boiler service settings.

For your information code for ecoSTER TOUCH settings is **1410**.

3.12.7 Service settings

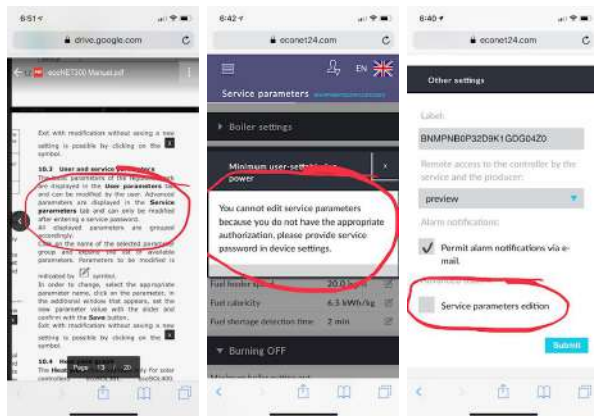


You must enter service password in order to enter the settings.

- *Hotel mode* – disables editing other room thermostats and access to this device menu. User can execute only basic settings.
- *Visibility in other panels* – enabling options of preview and edition of this device from other room thermostats.
- *Restore default settings* – returning to default settings.
- *Touch panel calibration* – enables calibrating the touch panel.

ecoNET WiFi Service settings

The correct password is **2010**



For all settings go to: eko.mbtek.com

13 TROUBLESHOOTING

1 Poor fuel combustion

Reason: Poor fuel combustion, bad chimney draft.

Solution: Clean the flue pipe and gas outlet of soot and ash, check the correct installation (according to the instruction manual). Replace the fuel.

2 Bad Draft

Reason: Clogged chimney, Chimney is not warmed (stale cold air in the chimney). Bad circulation of the heat carrier in the system, circulation pump does not operate, the air presence in the system, the leak of the heat carrier in the system.

Solution: Clear the chimney from soot and ash. Eliminate the leak. Energize the system, bleed the air.

3 The appearance of the smoke in the premises.

Reason: Chimney is not warmed (stale cold air in the chimney).

Solution - Clear the chimney from soot and ash. Restore the chimney draft burning some paper, straw, sawdust, etc. in the cleaning hatch

4 Failure of the grate.

Reason: High temperature of fuel combustion. Incorrect air distribution in the boiler.

Solution: Reduce the air supply. Replace the grate. Clean air ducts .

5 Water inside the boiler (condensate)

Reason: Condensate from the chimney.Low temperature of the heat carrier in the boiler.

Solution: Check the condensate drain. Insulate the chimney. Regulate the combustion process.

Maintain the heat carrier temperature of the boiler 65-80 C.

14 WARRANTY

MBTEK warrants the product produced. Each complaint should be immediately transmitted after malfunctions detection in written form to the seller or producer. The producer is responsible for the guarantee if the defect appears in the device due to producer fault.

The producer decides independently to remedy the defect or replace the whole unit; The warranty is only valid if the warranty card has boiler serial number, boiler brand and seller's mark.

The warranty is only valid if the warranty card is correctly filled and has a note of commissioning date, stamp of the organization or installer who instructed the customer and put the boiler into operation.

Warranty repairs are free.

Warranty repairs may be done only by a specialized organization, installer or service center accredited by the producer.

The warranty only covers the unit, installed in accordance with the instruction manual and the rules written in it.

The warranty period for the boiler drum is 60 months from the sale date.

The warranty period for the control elements, burner, load tank, electronic regulator is 12 months from the sale date.

The guarantee does not cover the boiler expendable material components: door seal, cast iron grate, handles, screws, screw-nuts, incendiary element, scrubber, poker; The warranty expires in case of improper installation or use of the device inappropriately.

The producer is not responsible for the mechanical damage during shipping.

The whole unit or its parts that have lost their marketability on the consumer's fault cannot be exchanged or returned for warranty obligations.

EKO boilers are subjected to compulsory grounding! *Using open heating systems there is a risk of boiler corrosion.

BOILER IS PLACED ON THE VEHICLE ONLY IN AN UPRIGHT POSITION!!! (otherwise it will be removed from the warranty).

The boiler is shipped on a pallet or without it on customer's request but only in an upright position! It is

recommended that in upright position the boiler was transported as close to the installation place as possible, it minimizes the possibility of damage to the boiler case. When the boiler is shipped in another position the warranty removed.

CLEARANCES FOR UNCERTIFIED WOOD – BURNING UNITS

1. Definition of Uncertified Units

An uncertified unit is any wood-burning appliance that does not carry a certification label from a recognized testing laboratory specifying its installation requirements. These appliances must comply with the most stringent clearance rules.

2. Combustible vs. Non-Combustible Materials

Combustible materials: Any substance that can ignite or burn when exposed to heat or flame, including wood, drywall, plasterboard, fabrics, and plastics.

Non-combustible materials: Substances that do not ignite, burn, or release flammable vapors when exposed to high heat, such as brick, stone, concrete, metal, or certain glass types.

Maintaining proper clearance between the unit and combustible materials is essential for fire safety.

3. Standard Clearances (Without Heat Shield)

For uncertified appliances installed near combustible walls or ceilings, the minimum required clearance is:

- 48 in. (1200 mm) — from all sides of the appliance (front, back, and sides).
- 6 in. (150 mm) — from double-wall chimney pipe to combustibles.
- 18 in. (450 mm) — from single-wall chimney pipe to combustibles
- 48 in. (1200 mm) — minimum clearance in front of the appliance.
- 84 in. (2130 mm) — minimum ceiling height, measured from floor to ceiling.

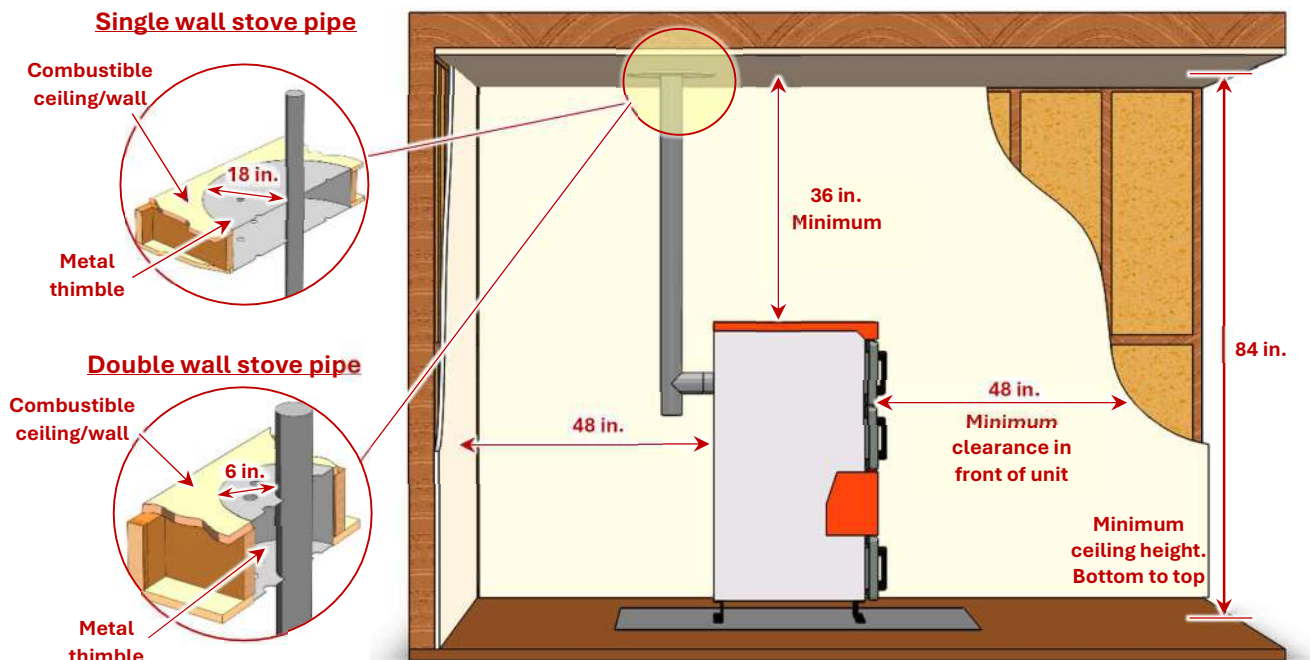


Figure 1 – Minimum clearances for uncertified units (no heat shield)

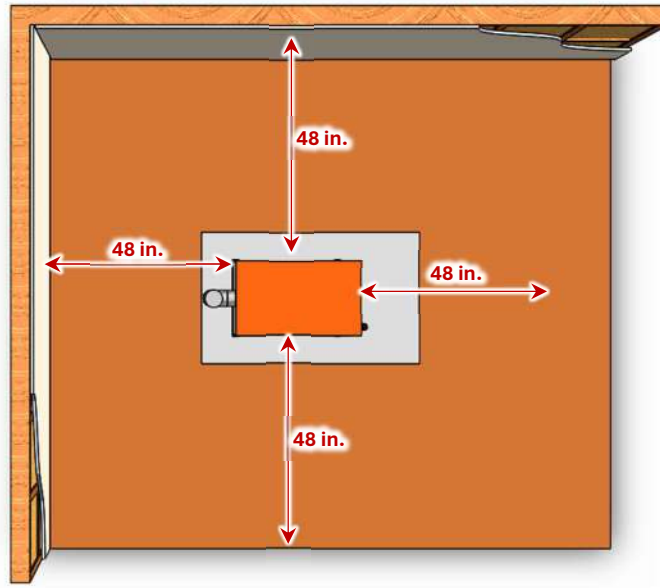


Figure 2 – Clearance to combustible walls (no heat shield)

4. Clearances with a Metal Heat Shield

When a properly constructed 29-gauge sheet metal heat shield is installed with a 1 in. (25 mm) air gap, clearances may be reduced under CSA B365 rules.

Heat Shield Construction Requirements

- Minimum air space between shield and wall/ceiling: 1 in. (25 mm).
- Clearance at bottom of shield: 1–3 in. (25–75 mm).
- Clearance at top of shield: 3 in. (75 mm).
- Shield must extend:
 - 20 in. (500 mm) above the top of the unit.
 - 18 in. (450 mm) beyond each side of the unit.
- Ceiling shields: maintain 3 in. (75 mm) edge clearance.
- Mounting hardware must allow full vertical ventilation and not transfer heat directly to combustibles.

Functional Principle

The heat shield creates a ventilated air space, allowing heat to dissipate before reaching combustible surfaces. This reduces the minimum required clearance safely.

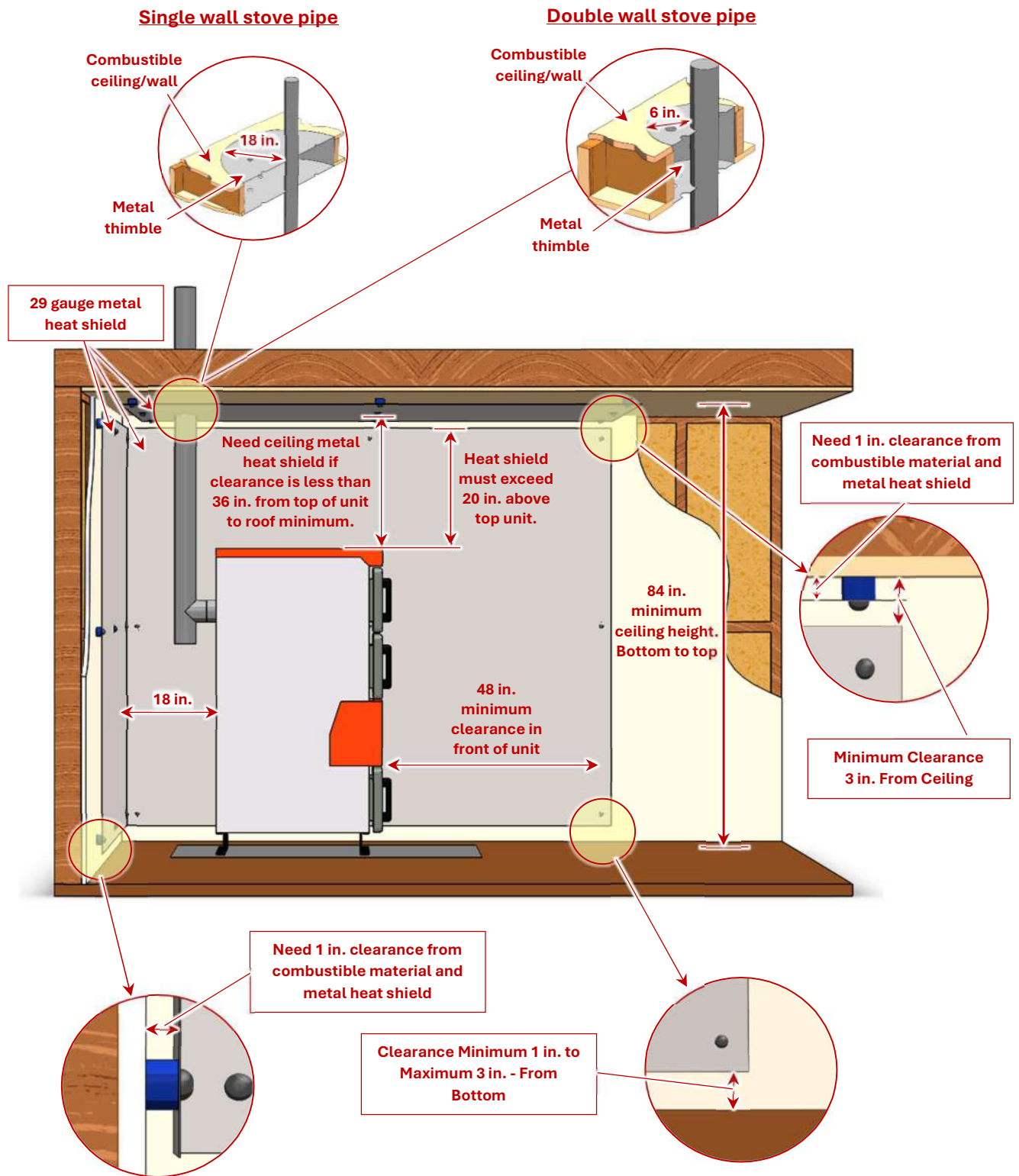


Figure 3 – Minimum clearances for uncertified units (with heat shield)

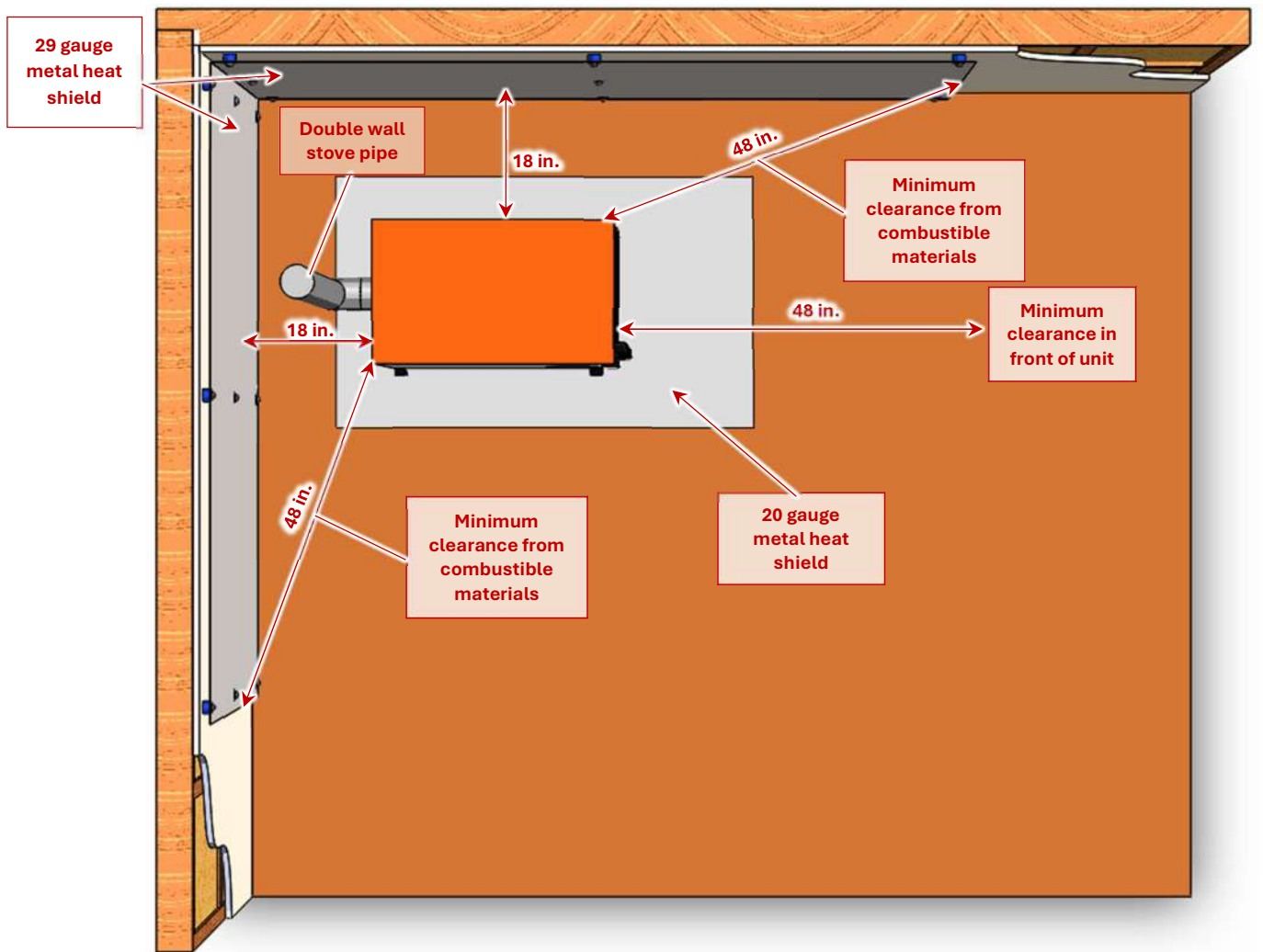


Figure 4 – Clearance to combustible walls (with heat shield)

5. Floor Protection

Ensuring proper floor protection for uncertified wood stove the floor must be protected with two elements:

1. **Floor Pad (Ember Protection):** Protects against live embers and sparks that may fall during fire tending or ash removal.
 - The floor pad must be made of continuous non-combustible material (e.g., ceramic tile, flagstone, brick, or block).
 - It must extend 18 in. (450 mm) beyond any side with a loading door and 8 in. (200 mm) beyond all other sides.
 - All joints between tiles or stones must be properly grouted or mortared to prevent debris accumulation and ensure a continuous surface.

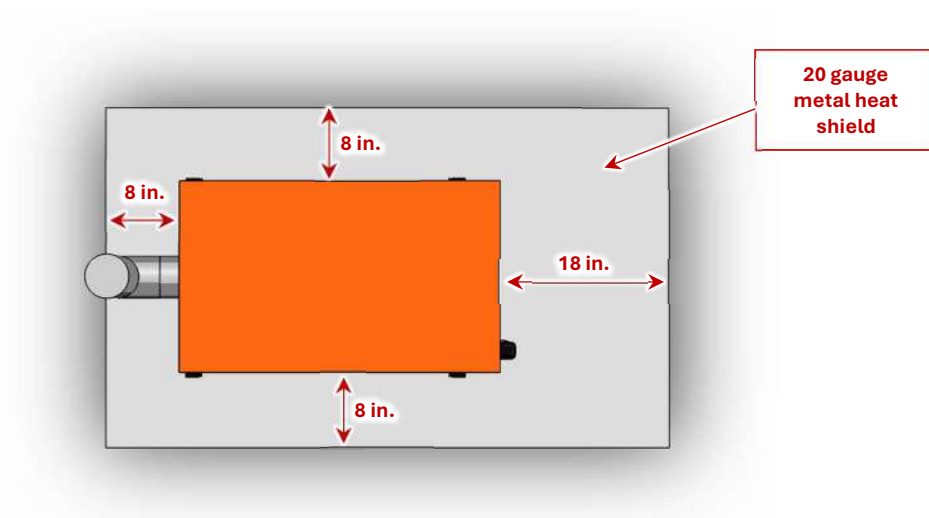
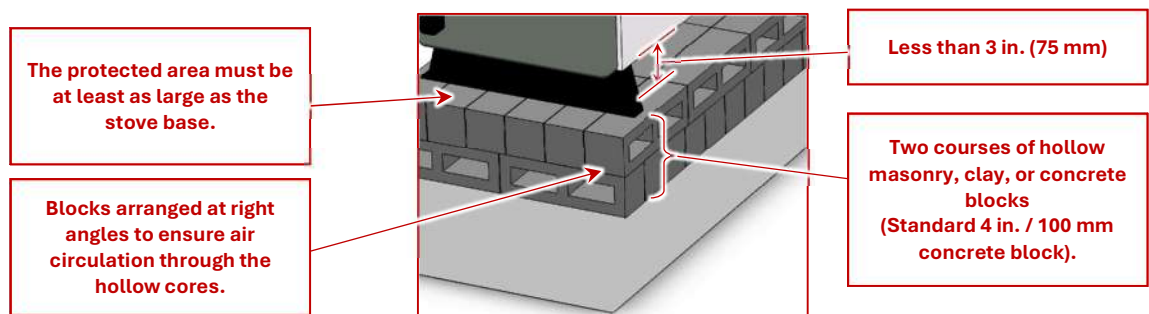


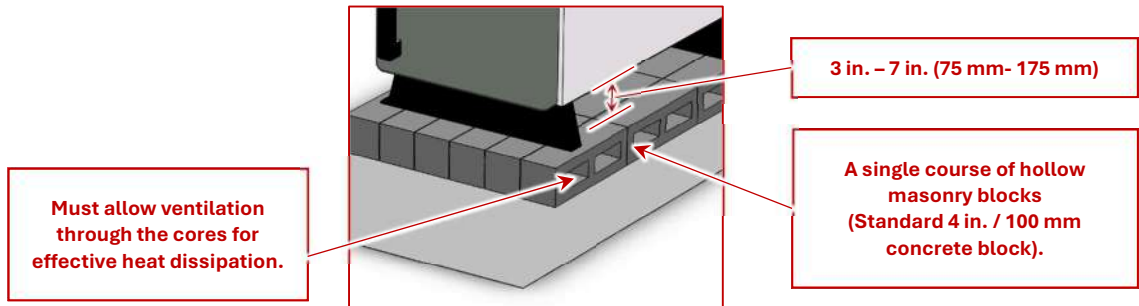
Figure 5 – Floor Pad dimensions (Ember Protection)

2. **Heat Shield or Thermal Protection (Overheating Protection):** Prevents the floor from overheating due to heat radiation from the stove's base. The required construction depends on the clearance between the bottom of the appliance and the floor.

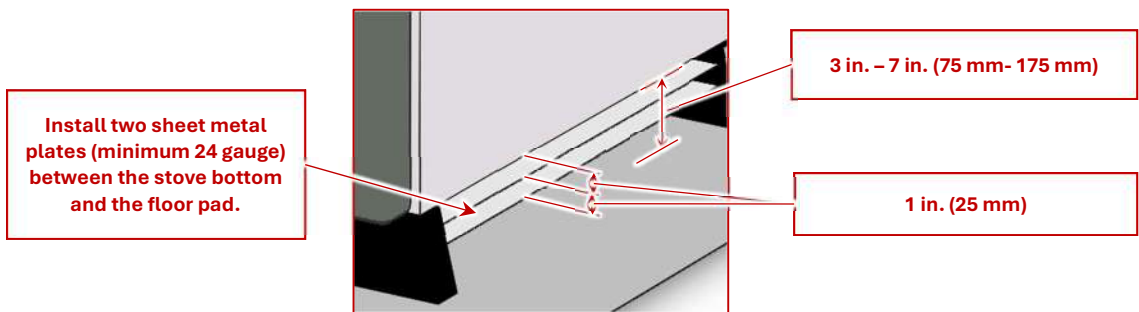
Option 1 – Clearance less than 3 in. (75 mm).



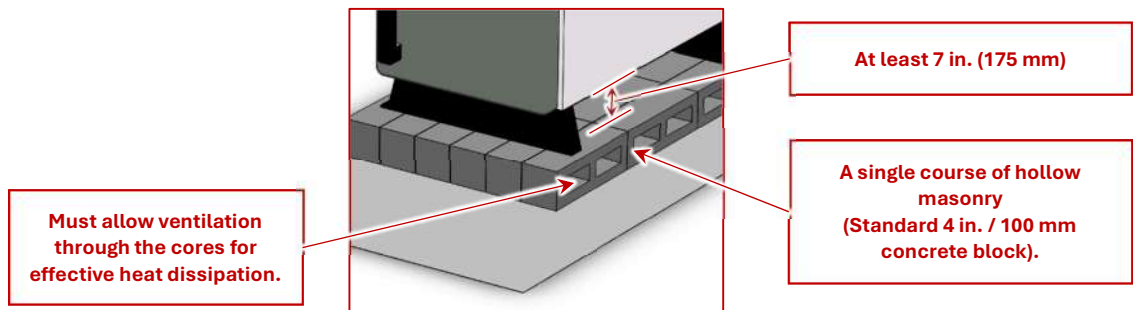
Option 2.1 – Clearance between 3 in. (75 mm) and 7 in. (175 mm) – Hollow Masonry



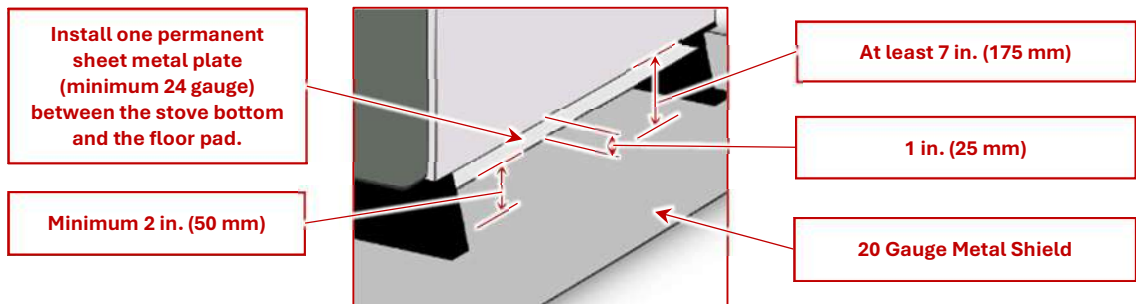
Option 2.2 – Clearance between 3 in. (75 mm) and 7 in. (175 mm) – Metal Plates



Option 3.1 – Clearance greater than 7 in. (175 mm) – Hollow Masonry



Option 3.2 – Clearance greater than 7 in. (175 mm) – Metal Plates



6. Summary

Summary of Clearance and Floor Protection Requirements for Uncertified Wood – Burning Units

Requirement	Without Heat Shield	With 29-Gauge Metal Heat Shield	Notes
Side / Back Clearance	48 in. (1200 mm)	Reduced as per CSA B365 (min. 18 in. / 450 mm with shield)	Heat shield must extend 20 in. above and 18 in. beyond appliance sides
Front Clearance	48 in. (1200 mm)	48 in. (1200 mm)	No reduction permitted
Ceiling Clearance	36 in. (915 mm) minimum	May be reduced with ceiling heat shield (min. 3 in. / 75 mm gap)	Ceiling height must be at least 84 in. (2130 mm)
Single-Wall Stove Pipe	18 in. (450 mm)	18 in. (450 mm)	Must use non-combustible thimble through walls/ceilings
Double-Wall Stove Pipe	6 in. (150 mm)	6 in. (150 mm)	Certified double-wall only
Floor Pad (Ember Protection)	Extend 18 in. (450 mm) in front of loading door and 8 in. (200 mm) on other sides	Extend 18 in. (450 mm) in front of loading door and 8 in. (200 mm) on other sides	Must be continuous non-combustible surface
Thermal Floor Protection (Overheating Protection)	Required (depends on clearance under stove)	Required (depends on clearance under stove)	Options described below

Floor Protection Options (Thermal Overheating Protection)

Clearance Under Stove	Protection Option	Description
Less than 3 in. (75 mm)	Option 1	Two courses of hollow masonry/concrete blocks (100 mm thick), arranged for airflow
3–7 in. (75–175 mm)	Option 2.1	Single course of hollow masonry units with ventilated cores
	Option 2.2	Two sheet metal plates (min. 24 gauge), spaced 1 in. apart
More than 7 in. (175 mm)	Option 3.1	Single course of hollow masonry units with ventilated cores
	Option 3.2	One permanent sheet metal plate (min. 24 gauge), 2 in. above floor pad and 1 in. below stove bottom



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