



TIS HARD BIO SERIES

Steel water heating
boiler, solid fuel boiler

ATTENTION!

Proceed to installation and operation of the heating boiler only after careful familiarization with the installation and operation manual.

This manual applies to the boilers of TIS HARD BIO models, regardless of their configuration and heat output.

Note: The manufacturer reserves the right to make changes in the design of boilers and accompanying equipment, which do not deteriorate their consumer qualities.

- Boiler completeness is indicated in the attached packing list. When buying the boiler, it is necessary to check its completeness and appearance together with the seller. After the sale of the boiler the manufacturer does not accept claims for incompleteness and mechanical damage.
- Transport the boiler only in a vertical position.
- Ensure the boiler is properly grounded before use.
- Do not operate the boiler without connecting the fire-extinguishing device to the water supply system.
- Boiler operation without flue gas sensor is prohibited.
- Do not operate the boiler without a flue gas sensor installed and functioning.
- Never operate the boiler without a safety valve.
- Use a safety valve rated for a maximum pressure of 22 psi for open systems or 58 psi for closed systems.
- Do not install shut-off valves between the boiler's hot-water outlet and the safety valve.
- Do not set the coolant temperature in the boiler water jacket above 185 °F
- Do not exceed the operating water pressure: 15 psi.
- Do not start the boiler if the coolant is absent or frozen.
- Do not leave the boiler filled with water when the ambient air temperature is below 41 °F.

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INTRODUCTION

Thank you for choosing the TIS HARD BIO Series solid fuel boiler.

This product is designed to provide reliable, efficient, and environmentally responsible heating for residential, commercial, and light industrial applications.

The TIS HARD BIO is engineered for long-term performance and ease of use.

By combining robust steel construction, advanced combustion technology, and user-friendly controls, it delivers consistent heating while maximizing fuel efficiency.

Why Choose the TIS HARD BIO Boiler?

- **Proven Reliability** – Heavy-duty steel construction and precision manufacturing ensure durability and trouble-free operation for many years.
- **Fuel Flexibility** – Designed to operate on wood chips, an economical and renewable energy source readily available in most regions.
- **High Efficiency** – Optimized combustion and advanced airflow management reduce fuel consumption and lower operating costs.
- **Low Environmental Impact** – Clean-burning technology minimizes emissions of harmful substances in the flue gases.
- **Safety First** – Equipped with advanced safety features, including a fire-extinguishing system interface, temperature and pressure controls, and a flue gas sensor.
- **Ease of Maintenance** – Thoughtful design with accessible cleaning points and optional automated ash removal simplifies upkeep.

Benefits of Owning a Boiler Heating System

- **Consistent Heat Supply** – Provides steady, comfortable warmth even during the coldest months.
- **Independence from Fossil Fuels** – Utilizes renewable solid fuel, reducing reliance on gas or oil.
- **Lower Operating Costs** – When paired with quality wood chips, heating costs can be significantly reduced compared to conventional systems.
- **Long Service Life** – With proper care, a boiler can operate efficiently for a decade or more.
- **Adaptability** – Compatible with both open and closed hydronic heating systems, as well as natural or forced circulation.

1. GENERAL INFORMATION ABOUT THE PRODUCT

1.1 Product Description

TIS HARD BIO boilers (hereinafter referred to as “boilers”) are steel, low-temperature, hot-water boilers designed to operate on wood chips. They are intended for the heating of buildings equipped with either open or closed heating systems, using natural or forced circulation of the coolant.

1.2 Installation Location

Boilers must be installed indoors, in closed rooms equipped with either natural or forced ventilation to ensure adequate air exchange.

1.3 Handling and Transportation

Methods of loading and securing the boiler must ensure complete protection against mechanical damage.

Boilers may be transported by any type of transport, provided that:

- The product and its packaging are protected against mechanical impact and exposure to precipitation.
- All transportation complies with the rules of cargo transport for the method used.

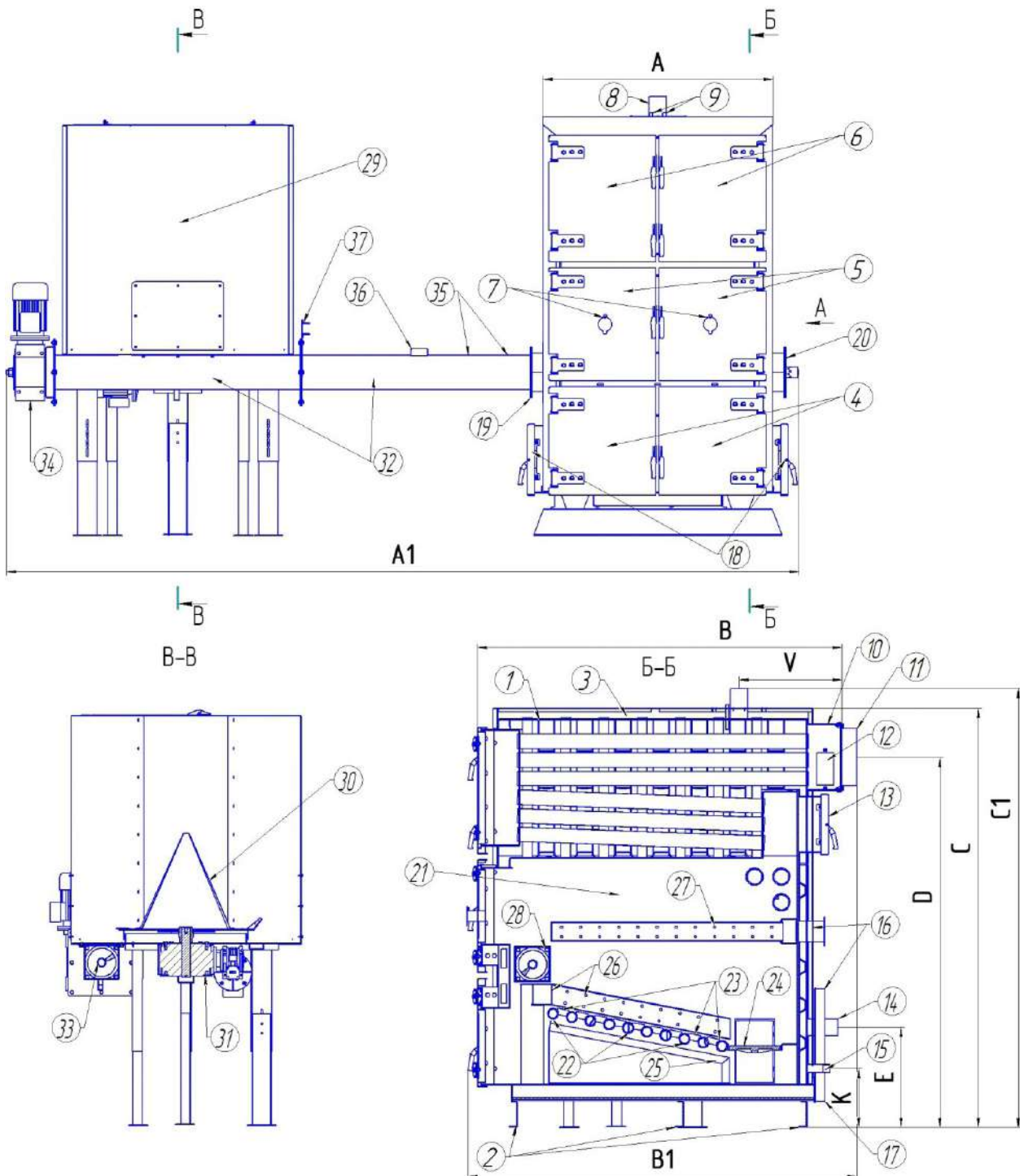
⚠ ATTENTION: Transport the boiler **only in a vertical position**.

2. TECHNICAL CHARACTERISTICS

Parameter	Unit	BIO 300	BIO 400	BIO 500
Power (heat output)	BTU/h	307,000–1,023,000	409,000–1,364,000	512,000–1,705,000
Maximum operating temperature	°F	185	185	185
Maximum operating water pressure (open systems)	psi	22	22	22
Maximum operating water pressure (closed systems)	psi	58	58	58
Boiler furnace vacuum	in. w.c.	0.08–0.20	0.10–0.22	0.10–0.22
Aerodynamic resistance	in. w.c.	0.6	0.7	0.8
Efficiency	%	86	86	86
Heating surface	ft ²	258	344	430
Maximum fuel consumption	lb/h	276	366	458
Water flow rate through boiler	gpm	57	75	97
Water volume in boiler	US gal	250	277	303
Drop Pressure	psi	3.6	3.6	3.6
Connections (supply/return)		3"	3"	3"
Chimney diameter	in	12"	12"	12"
Boiler weight	lb	5,940	6,830	7,720
Boiler weight with hopper & auger	lb	7,070	7,960	8,840
Boiler width A	in	47	47	47
Boiler depth B	in	75	83	91
Boiler height C	in	86	86	86
Size A1	in	163	163	163
Size B1	in	80	88	96
Size C1	in	91	91	91
Dimension D	in	76	76	76
Size E	in	21	21	21
Size V	in	21	21	21
Size K	in	13	13	13
Hopper volume	US gal	528	528	528
Hopper width	in	48	48	48
Hopper depth	in	60	60	60
Hopper height	in	100	100	100

Note: Dimensions and weights may vary by up to ±5%.

3. DEVICE AND PRINCIPLE OF OPERATION



Note: The actual boiler configuration may differ from that shown in the illustration.

3.1 Boiler Drum and Front Access Doors

The boiler drum functions as a heat exchanger (pos. 1) and is mounted on supports (pos. 2). The exterior of the drum is covered with cladding, which is thermally insulated from the heat exchanger using insulation (pos. 3).

Three swing doors are hinged to the front wall of the boiler drum:

- Lower door (pos. 4) – for ash removal.
- Middle door (pos. 5) – for furnace maintenance.
- Upper door (pos. 6) – for cleaning the upper section of the heat exchanger.

The lower and middle doors are each fitted with one handle, while the upper door has two handles. These handles press the doors tightly against the boiler drum using locking mechanisms mounted on the drum.

The middle doors include sliding inspection windows (pos. 7).

On the top of the boiler is a socket with a supply-pipe flange (pos. 8) and immersion sleeves for automation sensors (pos. 9).

On the rear wall of the boiler are the following components:

- Chimney box (pos. 10) with chimney pipe (pos. 11).
- Side cleaning hatches (pos. 12).
- Removable door (pos. 13) for cleaning the rear section of the heat exchanger.
- Return pipe flange (pos. 14).
- 1½" drain pipe for emptying the boiler (pos. 15).
- Three duct boxes (pos. 16) for fan mounting.
- Boiler grounding point (pos. 17).

On the side walls of the boiler are removable service doors (pos. 18) for access to the lower furnace section, as well as flanges (pos. 19) for feeder connection, one of which is sealed with a plug (pos. 20).

Inside the lower section of the boiler is the grate assembly (pos. 21), which forms the base of the furnace. The grate consists of:

- Grate pipes (pos. 22), with grate plates (pos. 23) positioned between them.
- Cast iron grates (pos. 24) installed in the rear section of the furnace.

The number and size of cast iron grates match the furnace dimensions, allowing for the necessary thermal expansion gap.

In the lower part of the boiler are the lower air ducts (pos. 25), which supply primary air beneath the grate for fuel combustion. Additional primary air is supplied above the grate through the middle air ducts (pos. 26).

In the upper part of the furnace, upper air ducts (pos. 27) deliver secondary air, improving combustion efficiency and reducing harmful substances in the flue gases.

Fuel is supplied to the furnace through either the left or right supply window (pos. 28). Along the furnace walls, between the middle and upper air ducts, refractory bricks are installed.

The boiler is supplied with an ash pan, which must be removed during operation.

The automation system is mounted in a convenient location and consists of a control panel with sensors and a control cabinet.

Optional configuration: The boiler may be equipped with an automatic ash removal system consisting of an ash box and a screw conveyor with a gearmotor, installed in place of the grate through the removable service doors. In this case, cast iron grates are not included.

3.2 Fuel Hopper and Feeding System

Each boiler is supplied with a fuel hopper (pos. 29) complete with a feeding device. Inside the hopper, at the bottom, is a tedder (pos. 30) driven by a gearmotor (pos. 31) mounted beneath the hopper base. The tedder moves wood chips into the feed tunnel (pos. 32), inside which the auger (pos. 33) is located.

After the feeder is connected to the boiler, the auger extends into the boiler feed window. At the hopper side of the tunnel, a gearmotor (pos. 34) drives the auger. When rotating, the auger pushes wood chips into the boiler's combustion chamber, where they are burned.

On the outside of the tunnel are two temperature sensor sleeves (pos. 35) that monitor the feeder's internal temperature, and a 3/4" connection socket (pos. 36) for the fire-extinguishing device, mounted on the intermediate flanges (pos. 37) of the outer tunnel.

The fire-extinguishing device must be connected to a water supply system with a pressure between 14 – 87 psi and a water reserve of at least 264 gal US.

⚠ ATTENTION: Operating the boiler without the fire-extinguishing device connected to the water supply is prohibited.

3.3 Ignition

Boiler ignition is performed manually.

3.4 Automatic Operation

Once ignition is complete, boiler operation is managed by the automatic control system, which activates the fans to supply the combustion air required to maintain the set temperature.

During operation, the fans run continuously. The air volume is regulated according to the fuel quality and fuel quantity. Fuel is delivered to the combustion chamber by the feeder, following a programmed cycle based on the fuel feed time and interruption settings.

The fuel feed must be sufficient to maintain operation within the boiler's rated power range. Insufficient fuel levels are not permitted, as they can create a fire hazard within the feeder.

When the set temperature is reached, the automation switches the boiler to combustion support mode, which includes:

- Periodic furnace purging to remove accumulated combustible gases.
- Cyclic fuel feeding to maintain stable combustion.

4. INSTALLATION AND CONNECTION TO THE HEATING SYSTEM

4.1 Placement Requirements

Install the boiler on a flat, non-combustible floor.

The hopper supports include holes to secure them to the floor.

Allow the following minimum clearances for servicing:

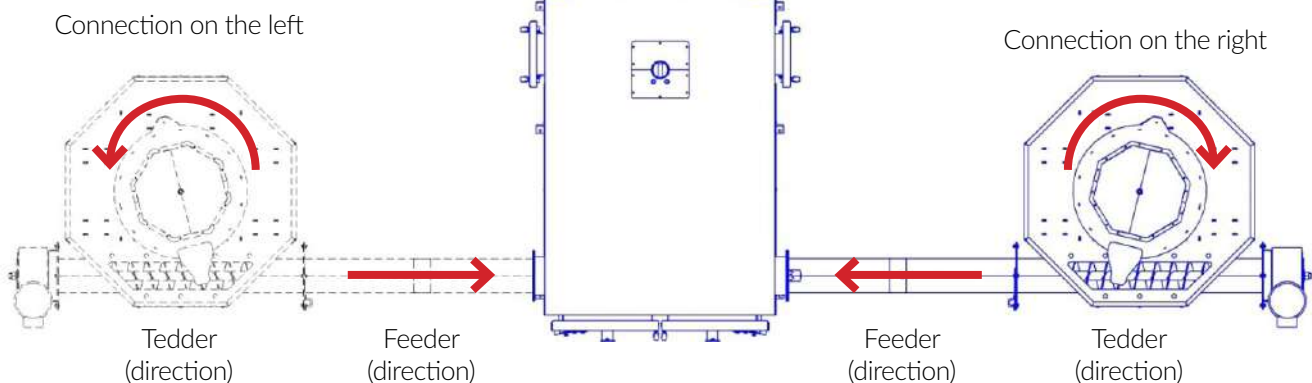
- Front of boiler: ≥ 59 in
- Rear of boiler to wall: ≥ 39 in
- Boiler side opposite hopper to wall: ≥ 59 in
- Hopper gearmotor side to wall: ≥ 177 in, or ≥ 59 in if there is a wall opening to remove the screw.

4.2 Connecting the Hopper and Feeder

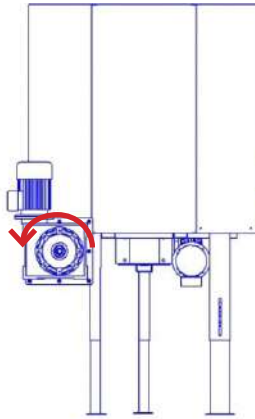
After positioning the boiler:

1. Insert the inner tunnel into the boiler from the side opposite the hopper.
2. Position the hopper with feeder and bolt its flange to the boiler flange.
3. Temporarily disconnect the screw gearmotor from the feeder's outer tunnel.
4. Insert the screw into the feeder from the hopper side.
5. From the side opposite the hopper, install the auger cover with integrated bearing onto the auger end. The boiler, feeder, and cover flanges form a single connection.
6. Mount the auger gearmotor on the feeder end.
7. Connect the hopper tedder's electric motor phases, ensuring correct rotation direction according to hopper position (left or right). according to the following diagram:

Connection diagram (top view)



8. On the control cabinet, set the selector switch to achieve the correct screw (feeder) rotation direction per the provided diagram.



4.3 Piping and Hydronic Connection Requirements

- Connection to the heating system must be performed by qualified heating specialists according to a thermal-mechanical project.
- The boiler may be installed in either an open or closed heating system, equipped with an open or membrane-type expansion tank. The expansion tank volume must be calculated based on total system volume.

⚠ WARNING: In open systems, internal corrosion of the boiler is possible.

- Install a safety relief valve on the boiler supply line, between the boiler and the shut-off valves.
- If the system includes boiler filling and make-up from the water supply, install a check valve before the shut-off valve in the make-up line.
- Connect the boiler's fire-extinguishing system to the building's water supply.
- Pressure-test the heating system (piping, radiators) with the boiler isolated. Do not exceed the boiler's maximum allowable working pressure specified in the design.

4.4 Electrical Connection Requirements

- Electrical connection must be performed by a licensed electrician authorized to carry out such work.
- All work must comply with the approved design and specification documents.

4.5 Filling the Heating System

- Use clean, clear water, free from aggressive substances, with a total hardness ≤ 6.8 gpg (≈ 117 ppm as CaCO_3).

⚠ WARNING: Damage from scale formation is not covered under warranty.

- If hardness exceeds the limit, treat the water before filling. Even a 0.04 in layer of scale can reduce heat transfer by approximately 10%.
- Maintain a constant coolant volume and system pressure during the heating season.
- Refill the system only when boiler water temperature is ≤ 158 °F.
- Do not exceed the boiler's maximum allowable working pressure during filling.
- Use only fluids specifically designed for heating systems as heat carriers.
- For improved natural circulation, position the boiler so that the return pipe is located below the radiator level.

5. IGNITION PROCEDURE

⚠ ATTENTION: The first start-up of the boiler must be performed by manufacturer-certified specialists or, if unavailable, by an accredited service organization under a formal service contract.

5.1 Pre-Ignition Checks

Before igniting the boiler, perform the following:

1. Verify that all actuating mechanisms are in proper working condition and safe for operation.
2. Ensure the boiler's fire-extinguishing system is operational:
 - Confirm water is present in the supply line.
 - Check for tight connections and leak-free supply lines.
3. Check and confirm adequate chimney draft.
4. Fill the hopper with the appropriate fuel (wood chips).

5.2 Ignition Sequence

1. Switch the boiler automation regulator to the ON position.
 2. Using Manual Mode, run the fuel feeder until it is fully primed with fuel (see regulator manual).
 3. Deliver the required amount of fuel into the firebox for ignition.
 4. Open the middle door and ignite the fuel using an approved ignition material.
- ⚠ CAUTION:** Do not use flammable liquids to start the fire.
5. Monitor the ignition process continuously. Once ignition is established, close the boiler door securely.
 6. Exit **Manual Mode**, then press the **START** button.
 - The **START** indicator will blink until the controller switches to **Automatic Operation Mode**.

6. OPERATING RECOMMENDATIONS

⚠ ATTENTION: Boiler operation without a functional flue gas sensor is prohibited.

⚠ ATTENTION: During operation, the ash pan must not be installed inside the boiler..

6.1 Return and Supply Water Temperatures

To prevent condensate formation:

- Maintain a return water temperature of at least 122 °F.
- Maintain a supply water temperature of at least 149 °F.

6.2 System Pressure Limits

At the maximum boiler water temperature of 185 °F:

- In a closed heating system, do not exceed 58 psi.
- In an open heating system, do not exceed 22 psi.

6.3 Fuel Changes

When changing fuel type or quality, readjust the automation settings manually or with assistance from a qualified service technician.

6.4 General Operating and Maintenance Guidelines

- Operate the boiler in complete configuration as supplied by the manufacturer.
- Monitor fuel levels in the hopper and replenish as needed.
- Ensure adequate combustion air supply in the boiler room.
- Maintain the fuel bed level in the furnace.

⚠ ATTENTION: Do not allow the fuel level in the combustion zone to drop during operation.

- Monitor the feeder temperature; it must not increase sharply during operation.
- Inspect the chimney regularly and keep it clean.

⚠ ATTENTION: Soot and moisture may condense in the chimney, reducing draft and creating a fire hazard.

- Ensure that air intake and exhaust vents remain unobstructed and at full cross-section.
- Use smoke extraction hoods in the furnace room.
- Before the start of each heating season, inspect the boiler personally or with the assistance of a service technician.

Daily:

- Remove ash from the boiler.
- Inspect the boiler exterior, controller, sensors, and wiring.
- Clean off dirt or debris as necessary.

⚠ ATTENTION: If you detect any electrical fault, such as a short circuit to the boiler body or damaged insulation, disconnect power immediately and contact a qualified service or installation technician.

Weekly (with the boiler cold):

- Clean heating surfaces, the furnace, and the stoking chamber.
- Use a scraper for furnace air ducts and a brush for the upper heat exchanger.

⚠ ATTENTION: If flue gas temperature reaches 392 °F, clean the heating surfaces after extinguishing the boiler and allowing it to cool to a safe temperature.

7. ORDER EXTINGUISHING

7.1 Extinguishing Sequence

1. Switch the boiler regulator to Manual Mode.
2. Turn on the fans.
3. Allow the remaining fuel in the furnace to burn until the flame front reaches the feeder area.
4. Push the remaining fuel toward the rear of the furnace.
5. Add a small portion of fresh fuel and push it toward the rear of the furnace as well.
6. Wait for complete combustion of all remaining fuel in the rear of the furnace.

Note: If necessary, repeat the process until the boiler is fully extinguished.

ATTENTION:

- Do not allow fuel to ignite in the feeder zone during shutdown.
- Never leave the boiler unattended while extinguishing.
- Monitor all automation sensor readings continuously.
- The feeder temperature should decrease during the process.

7.2 Confirmation of Shutdown

The boiler is considered fully extinguished when:

- No glowing embers remain in the furnace or feeder.
- There is no visible combustion process.

Note: A reliable indicator of complete shutdown is the flue gas temperature sensor reading. As the furnace cools, the flue gas temperature will drop and may fall below the boiler outlet water temperature.

8. CHIMNEY REQUIREMENTS

8.1 General Requirements

The boiler must be connected to a chimney that meets the following criteria:

1. The flue diameter must be no smaller than the diameter of the boiler's flue outlet.
2. The number of bends in the chimney should be kept to a minimum.
3. The internal surface of the chimney should be as smooth as possible to:
 - Prevent accumulation of moisture and soot.
 - Ensure unobstructed evacuation of flue gases and combustion products.

⚠ ATTENTION:

- A freestanding chimney must be double-walled and insulated.
- When installing a chimney in a brick channel, use a single-walled design.
- It is recommended that the chimney be constructed from stainless, acid-resistant steel, in compliance with:
 - UL 103 (for factory-built chimneys)
 - NFPA 211 (for chimney installation).

9. FUEL REQUIREMENTS

9.1 Approved Fuel

The boiler is designed to operate on solid fuel, specifically wood chips.

9.2 Recommended Fuel Quality

To achieve maximum efficiency, use wood chips with a moisture content of 40% or less.

Note:

- Higher moisture content reduces the fuel's calorific value and decreases boiler efficiency.
- Wood harvested in early winter and hardwood species generally have the lowest moisture content and produce the best performance.

10. SAFETY INSTRUCTIONS

10.1 Installation and Connection Safety

When installing and connecting the boiler, ensure the following requirements are met:

1. The boiler room floor must be made of non-combustible material.
2. Maintain a minimum clearance of 59 in in front of the boiler.
3. All electrical connections must be performed only by qualified personnel.
4. Install a safety relief valve in the heating system, rated for:
 - Maximum 21.8 psi for open-type systems.
 - Maximum 58 psi for closed-type systems.
5. Do not install shut-off valves on the supply line between the boiler and the safety valve.
6. Do not make any modifications to the boiler without written approval from the manufacturer.

10.2 Operational Safety

When operating the boiler, observe the following:

1. Ensure no children are present in the boiler area.
- ⚠ **ATTENTION:** The boiler may only be operated by persons 18 years or older.
2. Read this manual completely before first use.
3. Do not operate the boiler unless the heating system is completely filled with coolant.
4. Do not use flammable liquids for ignition.
5. Do not set the heat carrier temperature above 185 °F.
6. Do not operate the boiler without the fire-extinguishing system connected.
7. Do not open the boiler door when the temperature is at or above the setpoint, or when the fan is running.
- ⚠ **ATTENTION:** Opening the door while fuel is burning may cause burns, injure the operator, and damage boiler components.
8. Do not operate the boiler with open doors.
9. Maintain the fuel level in the combustion zone during operation.
10. Do not leave the boiler unattended for extended periods while in operation.
11. Before cleaning or performing maintenance:
 - Disconnect the power supply.
 - Allow the boiler to cool to a safe temperature.
- ⚠ **WARNING:** Use personal protective equipment (PPE) to avoid burns and injuries.
12. Keep the boiler room clean and free of combustible materials.
13. Do not store fuel or other combustible materials closer than 39 in to the boiler.

14. Maintain the boiler in good working condition. For repairs, use only manufacturer-supplied or approved parts.
15. Ensure all screw connections are tight.
16. Do not perform repairs or similar work while the boiler is in operation.

10.3 Fuel Safety

- Burning garbage, plastics, or flammable liquids can release toxic gases.
- Use only the fuels specified in this manual.
- If there is a risk of explosion, fire, or the release of gaseous combustion products or vapors, shut down the boiler immediately.

11. TROUBLESHOOTING

The table below lists the most common faults, their likely causes, and the recommended corrective actions. If the problem persists after following these steps, contact an authorized service center.

N°	Symptom	Likely Cause	Corrective Action (performed by the owner of the boiler)
1	Poor fuel combustion	Insufficient chimney draft.	Clean chimney design and draft
		Wet or low-quality fuel	Use dry, high-quality wood chips
2	Set temperature not reached	Boiler and air ducts are dirty	Clean heating surfaces and furnace air ducts
		Incorrect regulator settings	Adjust regulator settings per manual
3	Insufficient temperature in the heating system at high boiler temperature	Poor circulation in the heating system	Check system installation for slope, airlocks, or restrictions
		Circulation pump not working	Repair or replace circulation pump
		Coolant leak in the system	Repair leaks and refill system
		Air trapped in the heating system	Bleed air from the system
4	Smoke in the room	Chimney not heated (cold, stagnant air)	Preheat chimney by burning paper, straw, or sawdust in the cleaning hatch
		Chimney blockage	Clean chimney of soot and ash
		Cold or uninsulated single-wall chimney	Insulate chimney
		Worn or damaged door seal	Replace sealing cord
5	Water or condensate inside boiler	Condensate leakage from the flue pipe	Check the condensate drain from the chimney, insulate the chimney.
		Low temperature	Maintain outlet water temperature between 149–176 °F
		Low return water temperature.	Change the boiler piping arrangement to increase the return water temperature by installing a thermostatic three-way mixing valve.
6	Grate failure	Wrong fuel type	Replace damaged grates and adjust the fuel type in accordance with the instructions provided in this manual.
		Fouled grates	Replace damaged grates and clean them regularly

⚠ WARNING: Never attempt to operate the boiler with unresolved faults that affect safety or performance.

12. SERVICE LIFE AND DISPOSAL

12.1 Service Life

When installed, operated, and maintained in accordance with this manual, the boiler has an **expected service life of 20 years.**

12.2 End-of-Life Procedure

When the boiler's heating surface (inner water jacket) reaches the burnout limit:

1. Disconnect the boiler from the heating system.
2. Ensure the boiler is fully drained and electrically isolated.
3. Once disconnected, the boiler no longer poses a hazard to human health or the environment.

12.3 Disposal and Recycling

The following components are recyclable:

- Boiler drum and outer shell (steel).
- Hopper and feeder assembly (steel).
- Cast iron grates.

 Recommendation: Dispose of all recyclable metal components at an authorized recycling facility in compliance with local environmental regulations.

13. WARRANTY OBLIGATIONS

- ⚠ ATTENTION:** The manufacturer's warranty is valid only if the commissioning of the equipment is carried out by a certified specialist or an accredited service organization.
- The warranty period for the boiler body is 60 months, for the associated equipment - 12 months from the date of boiler sale by a trade organization.
 - The warranty does not apply to consumable components: grate, ash pan, sealing cord, handles, fasteners, scraper, brush.
- ⚠ ATTENTION:** When buying a boiler, check with the seller its completeness and appearance. After the sale of the boiler, the manufacturer does not accept claims for incompleteness and mechanical damage.
- The warranty does not cover malfunctions resulting from:
 - Using the boiler for other purposes or with violations of the requirements set forth in this manual;
 - Mechanical damage to units and/or parts of the boiler;
 - Making changes to the design of the boiler without the consent of the manufacturer;
 - Incorrect setting of the boiler operation parameters;
 - Scale formation in the boiler;
 - Damage in the electrical network;
 - Carrying out repairs during the warranty period by unauthorized persons.
 - After detecting a malfunction, contact the service organization or the seller of the boiler immediately.
 - Warranty repair can only be carried out by service organizations accredited by the manufacturer.
 - When contacting a service organization to perform repairs, the customer is obliged to provide all conditions and access to the product to the employees of the service organization.
 - After the warranty repair is completed, the service organization fills in the warranty card. The warranty card will be considered invalid if it lacks the necessary stamps, signatures and dates.
- ⚠ ATTENTION:** Require dealers and service organizations to fill out warranty documents properly.

Support

For support, contact:

✉ support@mbtek.com

MBTek USA:

🌐 www.mbtek.com



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.

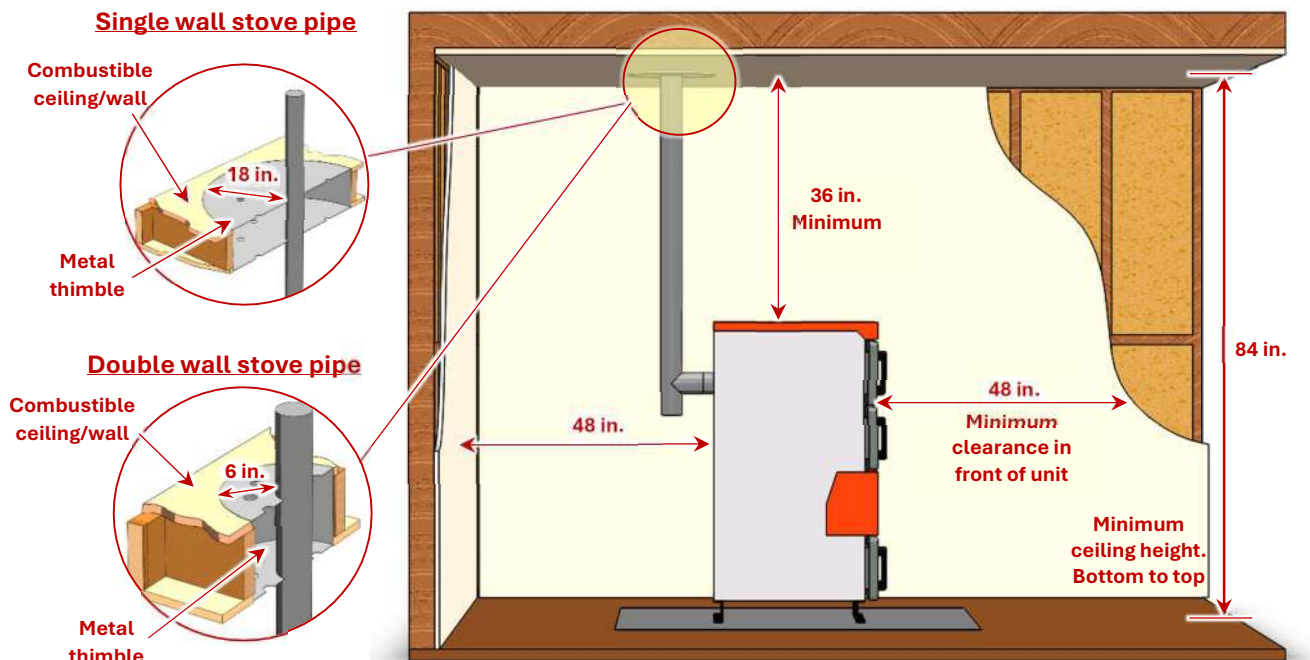


Figure 1 – Minimum clearances for uncertified units (no heat shield)

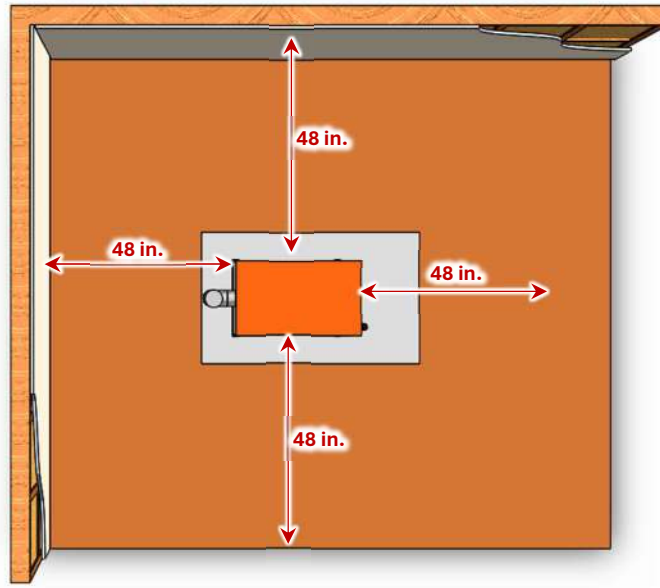


Figure 2 – Clearance to combustible walls (no heat shield)

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.

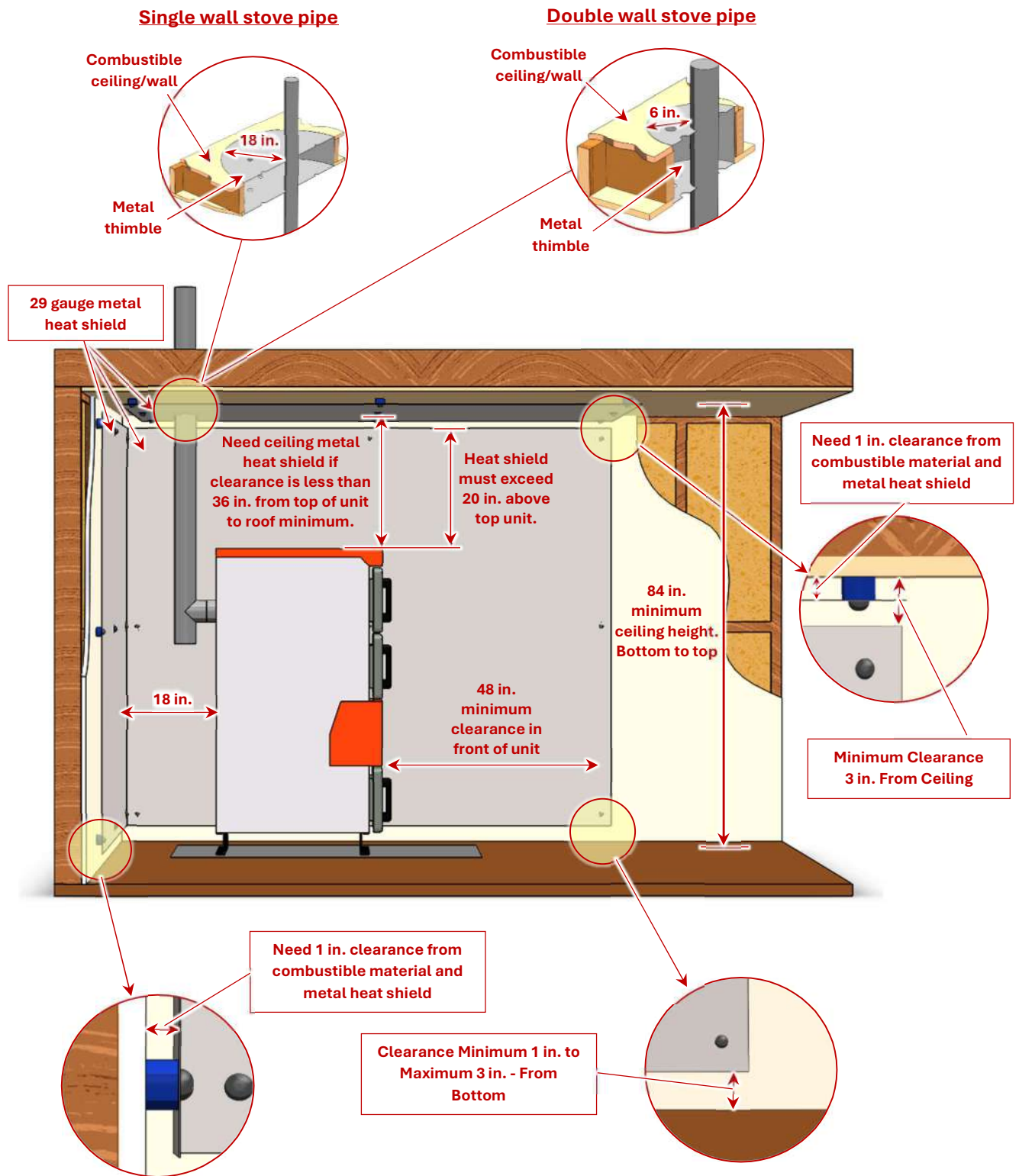


Figure 3 – Minimum clearances for uncertified units (with heat shield)

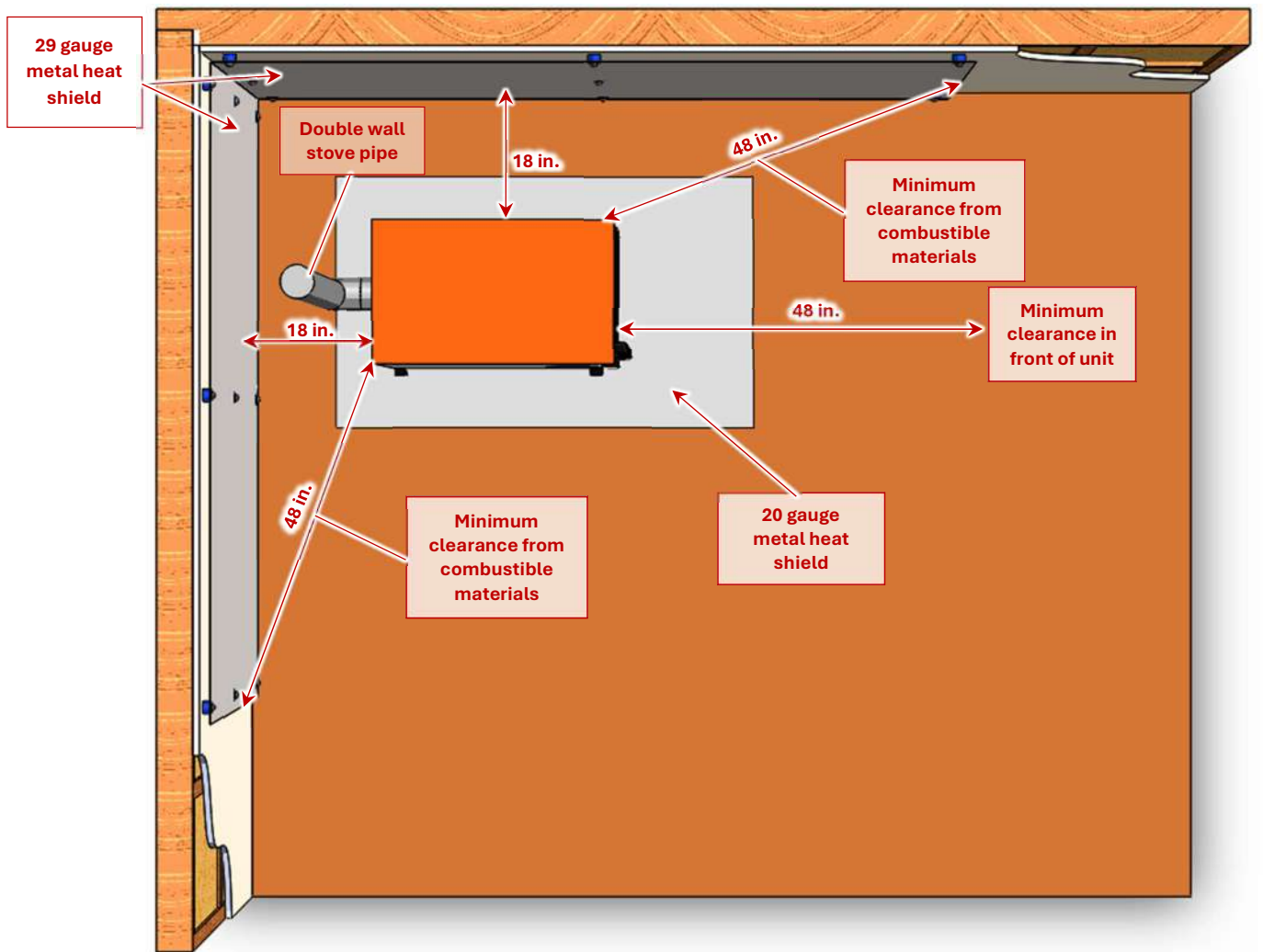


Figure 4 – Clearance to combustible walls (with heat shield)

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.

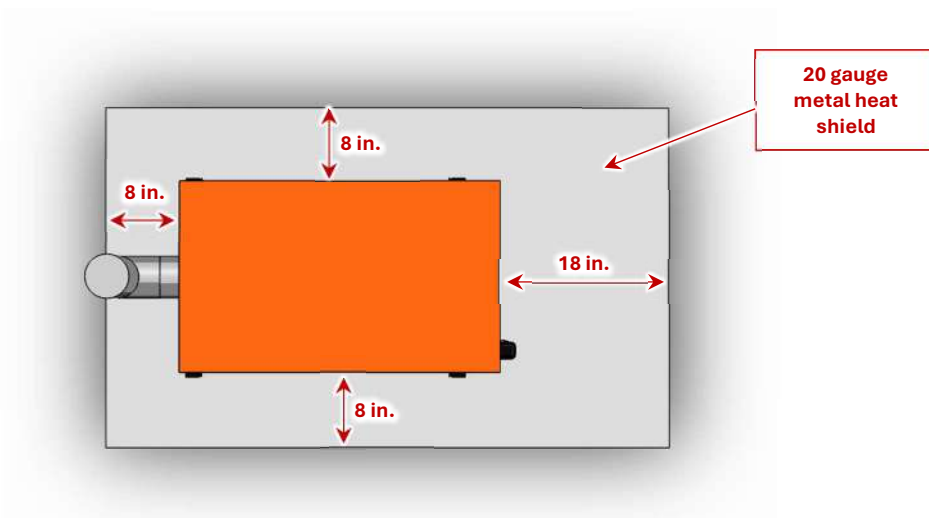
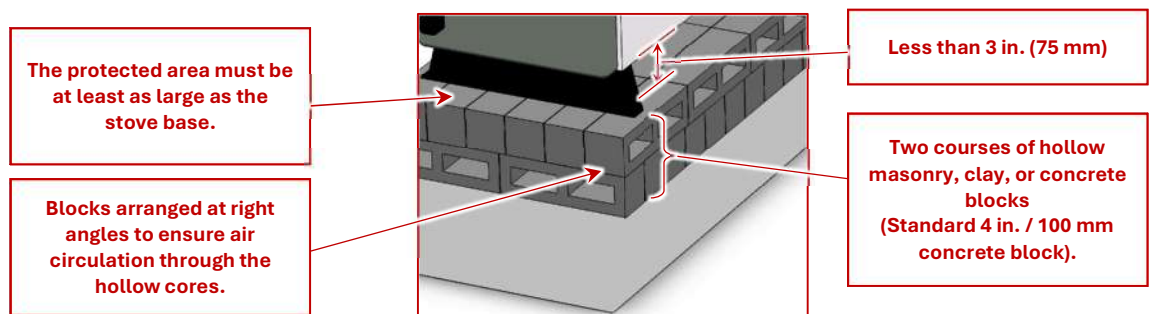


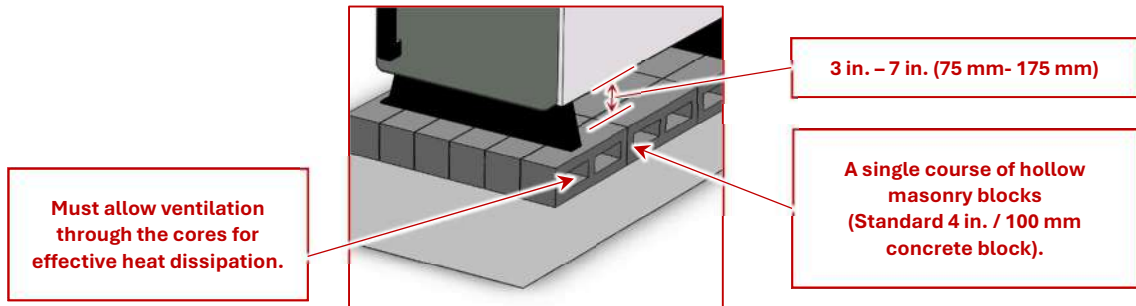
Figure 5 – Floor Pad dimensions (Ember Protection)

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.

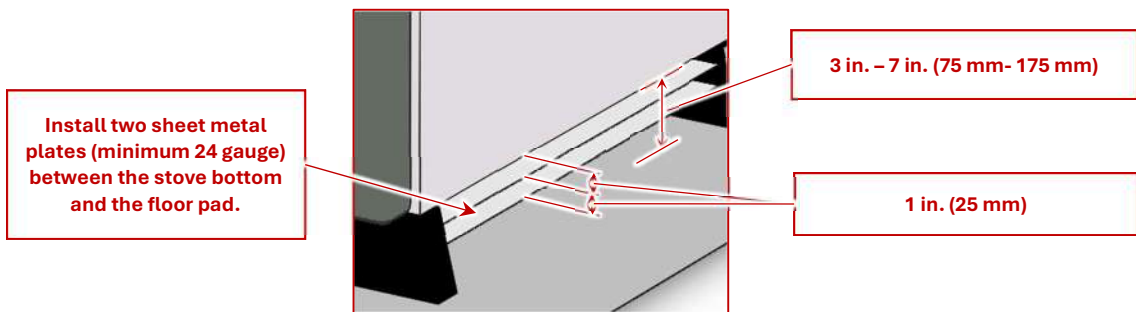
Option 1 – Clearance less than 3 in. (75 mm).



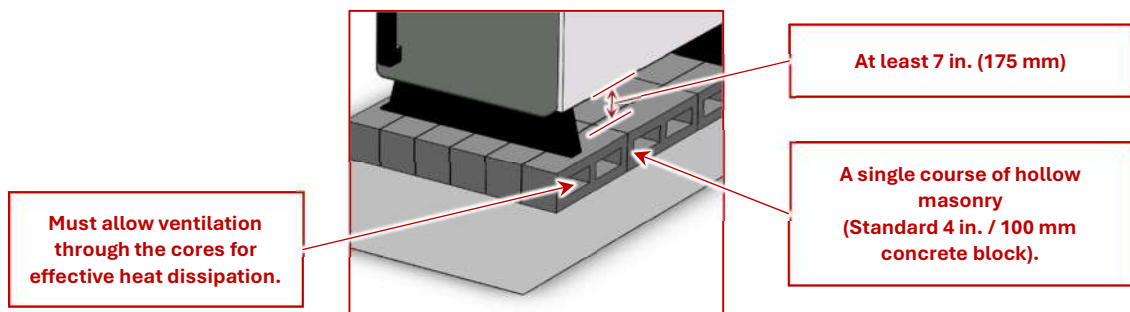
Option 2.1 – Clearance between 3 in. (75 mm) and 7 in. (175 mm) – Hollow Masonry



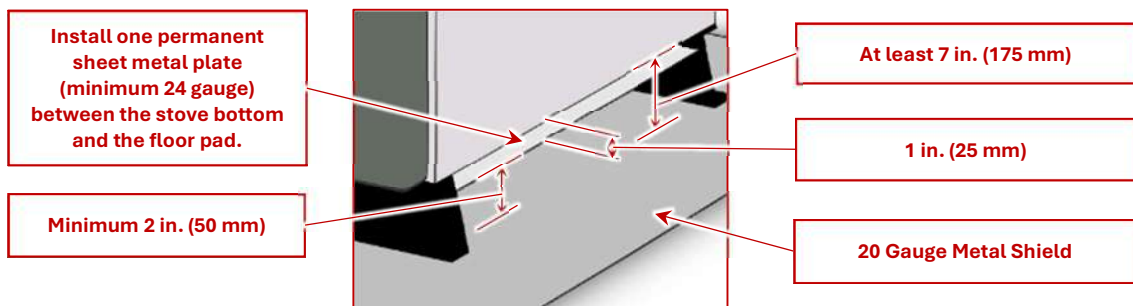
Option 2.2 – Clearance between 3 in. (75 mm) and 7 in. (175 mm) – Metal Plates



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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