

# INSTALLATION AND OPERATING MANUAL



## BIOMIX 20 Multi-energy Boiler

## 1. GENERAL

Thermia Biomix represents a new wave in alternative heating. The boiler has twin fireboxes and can be heated with oil, wood, pellets or electricity! The oil/pellet firebox is effective and economical and represents Thermia's know-how at its best. The wood firebox, on the other hand, has been designed specifically for solid fuels. Due to the functional vertical convection structure, the need to soot the boiler is reduced considerably from that of the traditional solutions. The large ash space reduces the need for maintenance even further. The boiler is equipped with one 6 kW electric immersion heater. It is also possible to install another 6 kW immersion heater. To make best use of the boiler, it is important to follow the instructions in the manual.

## 2. TRANSPORTATION, STORAGE AND OPENING THE PACKAGE

### 2.1 Reception

The boiler is shipped in a wooden grate. Underneath there is a pallet by which the boiler can be lifted safely. The package should be unloaded as close to the assembly area as possible. The factory has insured the boiler for transportation damage for the transport from the factory to the first temporary storage site. It is important for the receiver of the boiler to check the condition of the boiler before accepting it. In case of damage, contact the dealer immediately.

### 2.2 Storage

The boiler can be stored outdoors if it is shielded from rain. However, indoors storage is recommended.

### 2.3 Opening the Package

After opening the package, the hatch should be opened and the final inspection report checked for all accessories shipped loose.

Disposing of the package: The plastic hood is landfill waste; the planks can be burned.

## 3. INSTALLATION

The boiler should only be installed by a qualified professional. The installation should be carried out so that it fills the requirements of Standard SFS 3332. Any possible electrical and burner installations should only be carried out by a qualified professional.

### 3.1 Space Requirements

The boiler room must comply with the EI 30 fire safety classification according to the Finnish Building Regulations Section E9. There needs to be approx. 1 metre of free space in front of the boiler for cleaning and maintenance operations. There needs to be at least as much free space above the boiler as the height of the boiler, for convection duct brushing.

### 3.2 Duct Connection and Combustion Air Opening

The duct connection can be made either horizontally towards the back of the boiler or straight upwards.

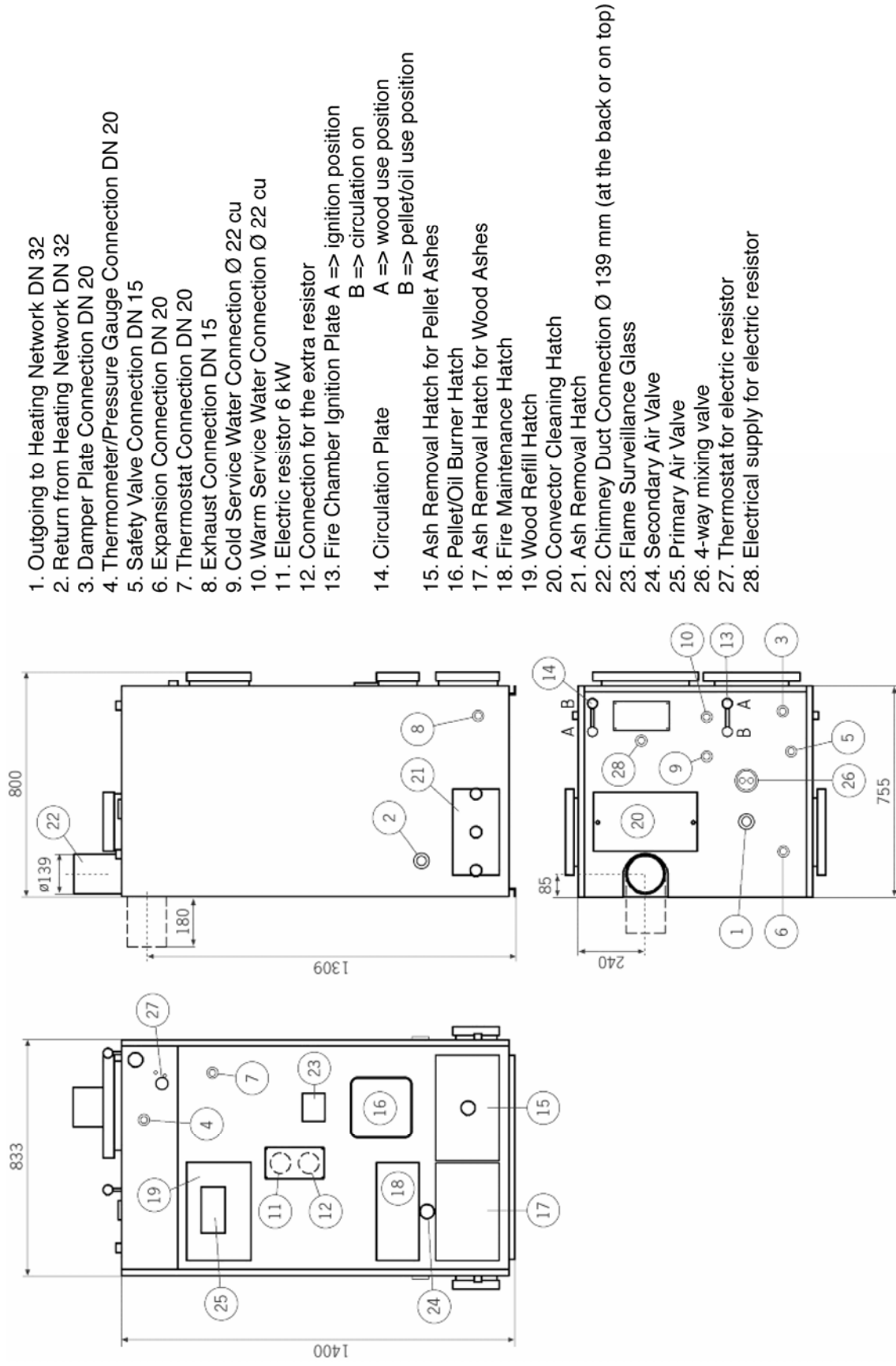
Chimney Duct Requirements:

- Steel duct: a height at least 6 m, inner diameter at least 150 mm

- Bricked duct: a height at least 6 m, free square area at least 225 cm<sup>2</sup>

The free area of the combustion air opening must be at least the size of the chimney duct. It is forbidden to cover the combustion air opening.

### **Biomix 20 Measurements, Connections and Hatches**



1. Outgoing to Heating Network DN 32
2. Return from Heating Network DN 32
3. Damper Plate Connection DN 20
4. Thermometer/Pressure Gauge Connection DN 20
5. Safety Valve Connection DN 15
6. Expansion Connection DN 20
7. Thermostat Connection DN 20
8. Exhaust Connection DN 15
9. Cold Service Water Connection Ø 22 cu
10. Warm Service Water Connection Ø 22 cu
11. Electric resistor 6 kW
12. Connection for the extra resistor
13. Fire Chamber Ignition Plate A => ignition position  
B => circulation on
14. Circulation Plate  
A => wood use position  
B => pellet/oil use position
15. Ash Removal Hatch for Pellet Ashes
16. Pellet/Oil Burner Hatch
17. Ash Removal Hatch for Wood Ashes
18. Fire Maintenance Hatch
19. Wood Refill Hatch
20. Convector Cleaning Hatch
21. Ash Removal Hatch
22. Chimney Duct Connection Ø 139 mm (at the back or on top)
23. Flame Surveillance Glass
24. Secondary Air Valve
25. Primary Air Valve
26. 4-way mixing valve
27. Thermostat for electric resistor
28. Electrical supply for electric resistor

### 3.3 Pipe Installations

Biomix 20 can be used with a bio burner and an oil burner without an accumulator.

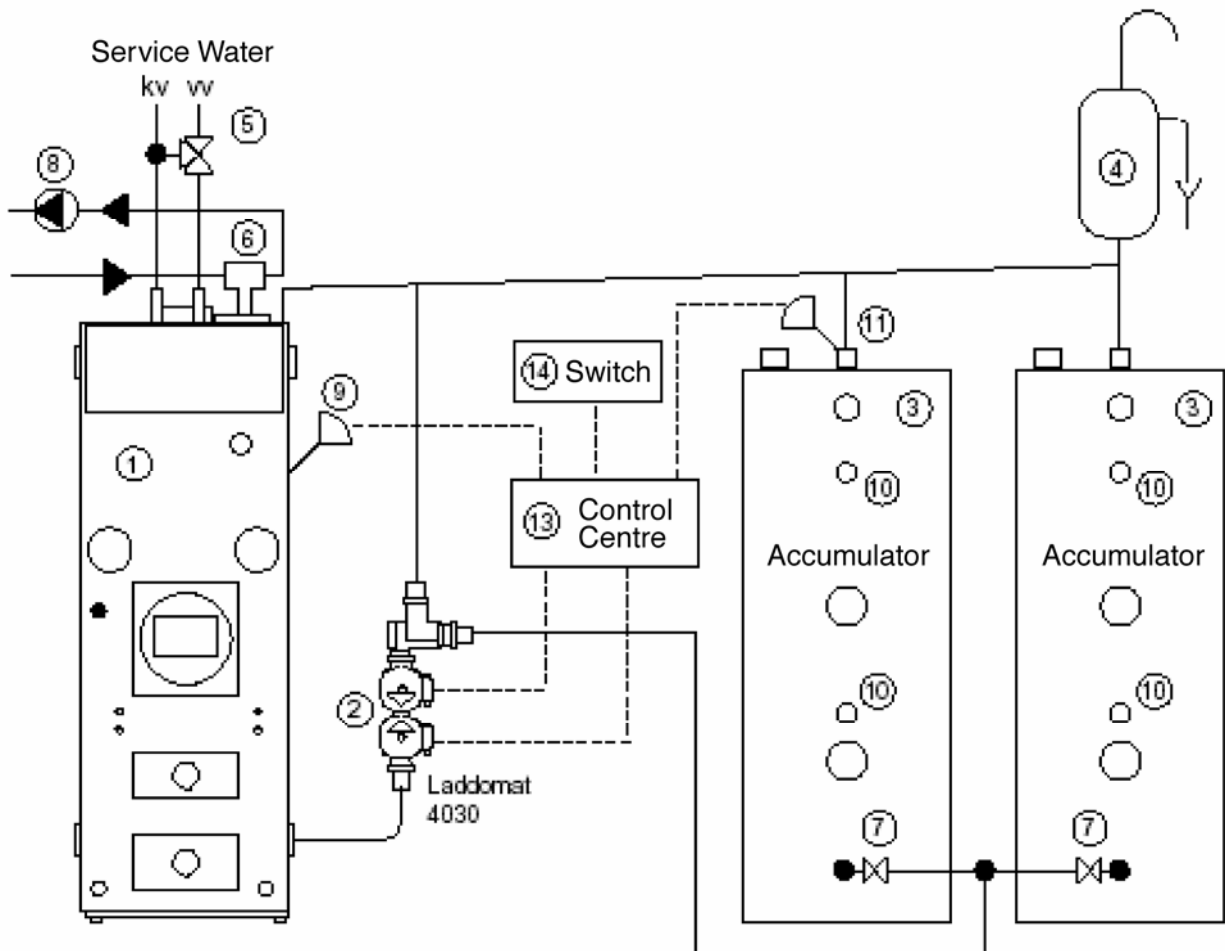
Thermostats, overheating shields and similar safety devices are installed according to the burner instruction manual. Before assembling the boiler, the heating network must be flushed and tested with a water-pressure test. The connections must be checked for leaks after installation. The factory is not responsible for damages caused by leaking connections.

#### Installing the Safety Valve!

Minimum size of valve DN 15

It is forbidden to install a closing device between the valve and the boiler. The exhaust pipe must be measured and installed so that it does not lessen the exhaust velocity of the valve and will not cause danger while the valve is in operation.

#### Connecting Pattern Option 1 (Accumulator Connection)



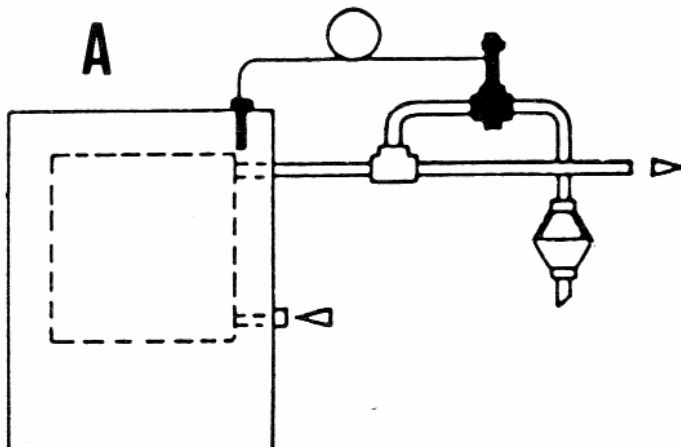
1. Boiler
2. Accumulator Connection
3. Accumulator Tank
4. Expansion Tank
5. Mixing Valve, Safety Valve
6. Four-way Mixing Valve
7. Shutter Valve
8. Water Circulation Pump
9. Boiler Sensor
10. Thermometer
11. Accumulator Top Sensor
- 12.
13. Control Centre
14. Switch

### **Assembling Temperature Relief Valve into Wood Boiler with Spiral**

The Pressure Equipment Directive requires that manually filled wood boilers to be equipped with a safety device that will stop the boiler from overheating. We recommend the SYR 3065 temperature relief valve for this boiler. However, other safety devices, such as a pressure relief safety valve, will still be required.

#### **Installation:**

The temperature relief valve is connected to a fork junction in the warm service water pipe so that the operating valve lets out hot water into the drain. The temperature sensor is installed into the sleeve on top of the boiler using the DN 15 x 150 protective pocket.



#### **Specifications:**

Max ingoing water pressure  
Opening temperature  
The valve is available from Thermia Oy

10 bar  
97°C  
Product number 10318

#### **4. GENERAL INFORMATION ON BURNING WOOD**

To achieve a good burning result, it is necessary for the wood fuel, boiler and chimney to function faultlessly together. At the same time, you as a wood heating user need to be actively involved in maintaining and operating the heating device. It pays to have some basic information about the burning process.

##### **4.1 Firewood**

80-90% of the weight of unseasoned firewood is water during the growth period. In the wintertime, the amount of water is 70%. This means that the wood has to dry in order to be burned. It is better to fell the trees during wintertime, when they contain less water. It is important that the firewood is cut to a suitable length for the heating boiler's fire chamber.

Good firewood should contain only 15-25% water. Raw wood must be cut and split into a suitable size so that it will dry well and fit into the heating boiler. Small firewood is stripped (bark is removed lengthwise in "stripes"). Sturdy and moist wood will burn badly and become charred slowly. This causes the formation of a lot of tar and soot in the boiler and makes for bad burning efficiency.

The water content of firewood can be checked by weighing. Take a test piece from freshly chopped wood. The weight must be reduced approximately 60%. If the piece weighs 1000 g when it is fresh, it has to be reduced to 400 kilograms before it is suitably dry.

##### **4.2 Burning**

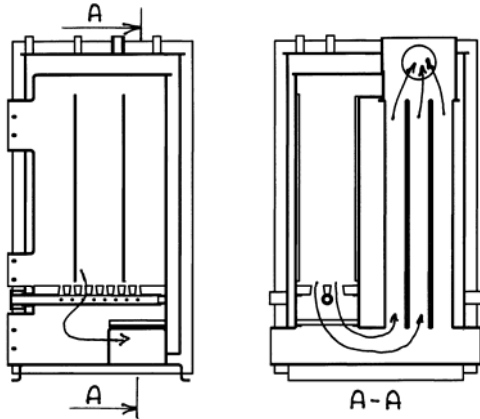
Wood is an organic substance. Its burning constituents are carbon and hydrogen. As the wood heats, these constituents are discharged and gasified. If the burning goes well (there is enough primary and secondary air), carbon monoxide and water vapour is formed and the burning is clean. Wood also includes a small amount of minerals which cause pollution. To achieve a good burning result and energy production with the least amount of pollutant and soot emission, the following things need to be present:

- Dry firewood. The water contained in the firewood must vaporise before the wood can be burned. If the water content is too high, the burning result will be incomplete
- A sufficient amount of burning air and a high enough temperature in the burning chamber. It is important that the amount of air is suitable.
- Damp weather, a cold chimney and small chimney duct area affect draught negatively.

At the lighting stage, a generous amount of oxygen is needed to produce an ample coal layer and efficient burning quickly. If the draught conditions are not ideal, heat longer with the straight damper plate and spacing hatch open.

##### **4.3 Using Wood with Biomix 20**

Biomix 20 is intended for heating with solid fuels, also in densely inhabited areas. Biomix 20 is a so-called reverse fire boiler in which the burning happens downwards through a ceramic fire grate.



#### 4.3.1 Ignition:

- Set the fire chamber ignition hatch (13) into ignition position A .
- Set the circulation plate (14) into wood use position A
- Open the chimney gas plate.
- Clean the fire grate. Remove ashes if necessary.
- Insert neatly sliced firewood so that it covers the bottom of the burning chamber.
- Close the wood refill hatch (19). The fire maintenance hatch (18) and ash removal hatch (17) must be closed.
- Adjust the primary and secondary air valves so that they are slightly open.
- Ignite through the fire maintenance hatch with birch bark, newspaper or similar.
- When the fire is burning properly and the coal layer is ready, the burning chamber is filled completely with wood and the ignition plate is set into ignition position B

(circulation on). This will cause reverse burning.

- Primary and secondary air feeds are adjusted so that the burning is clean.

#### 4.3.2 Adding More Wood

Set the fire chamber ignition plate into ignition position A.

Wait a moment. Open the wood refill hatch a few centimetres, so the fire will turn and the fire chamber will get air (avoid smoking).

Open the hatch fully and add more wood.

Move the ignition plate into ignition position B.

#### Chimney Gas Temperature

If the chimney gas temperature is continuously over 350 ° C:

Constrict the draught with the chimney gas plate or install a draught compensator into the chimney pipe. Differences in draught are due to different chimney builds, wood quality etc., which is why there is a possibility of adjusting the maximum temperature of the chimney gas.

#### 4.4 Pellet Use

Biomix 20 is also well suitable for use with Thermia BeQuem pellet burner. Biomix 20 has a separate fire chamber for a pellet or oil burner.

All the other draught hatches are closed tight. The circulation plate (14) is set into position B.

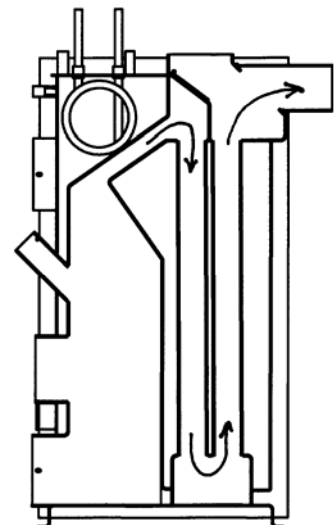
More detailed instructions for the installation and operation of the pellet burner are included with the burner.

#### 4.5 Oil Use

As with pellet use

#### 4.6. Use with electricity

Biomix 20 is equipped with an 6kW electric immersion



heater, thermostat and over heat protector. Additionally a second immersion heater can be installed, max installation depth 680mm. The second immersion heater requires a separate thermostat.

**5. OPERATION**

Before the boiler is switched on, the following points must be checked:

- the heating network and the boiler are filled with water, pressure at least 0.5 bar
  - the damper plate is open, if applicable  
the heat supply pump is operating
  - the network valves are open
  - the combustion air opening is clear  
the connection of the safety valve to the boiler is unhindered and the valve is functional
- Switch on and test the operation of the burner as instructed in the burner manual. Make sure the circulation is functional and remove any accumulated air.

**6. DAILY USE AND MAINTENANCE**

The principal maintenance procedure is cleaning the boiler. The chimney gas thermometer is a good indicator of whether cleaning is required; when the chimney gas temperature rises over 30°C of the equivalent value of a clean boiler, it is time for cleaning.

The most important part to be cleaned is the boiler's convection duct, which is cleaned by applying a brush through the cleaning hatch on top. A well-adjusted burner will keep the fire chamber clean, so it is usually unnecessary to clean it.

Ashes are removed through the hatches on the sides and in the front.

**7. SPECIFICATIONS**

<b>Performance Characteristics:</b>	<b>Biomix 20</b>
Power - wood, pellets, oil - electricity	20 kW 6 kW (additional 6 kW)
<b>Measurements:</b>	
Width	833 mm
Depth	800 mm
Height	1400 mm
Weight when empty	495 kg
Water capacity	190 L
Electric immersion heater connection	DN 50 planting depth 680 mm
<b>Design and Adjustment Values</b>	
Boiler operation pressure	0,5 - 1,5 bar
Allowed boiler temperature	Max 120 °C
Max. service water pressure	10 bar

## **8. WARRANTY**

Ariterm Oy gives the boiler a two-year warranty from the date of installation. The warranty applies to manufacturing and material faults in the boiler. The manufacturer does not accept liability for faults caused by incorrect installation, leaks outside the boiler, misuse, freezing, overheating or overpressure. If repairs have been attempted without permission from the manufacturer or the warranty card has not been returned to the factory, the warranty is void. The factory is not responsible for any possible indirect damage or expense caused by the boiler.

Ariterm Oy reserves the right to decide how the repair under warranty is performed. Ariterm Oy is not responsible for any damage occurring outside the warranty period, but arrangements can be made on a case-by-case basis.

## **9. DISPOSAL**

A worn-out boiler can be scrapped and recycled.

## **10. CONTACT INFORMATION**

### **Ariterm Oy**

PL 59, 43101 SAARIJÄRVI  
FINLAND  
Tel. +358 14 426 300  
Fax +358 14 422 203  
Homepage [www.ariterm.fi](http://www.ariterm.fi)

**VAATIMUSTENMUKAISUUSVAKUUTUS**

Valmistaja: ARITERM OY  
Osoite: PL 59, 43101 SAARIJÄRVI

Laite: **Arimax keskuslämmityskattila**

Valmistaja vakuuttaa,

- että tämän yksilön valmistuksessa on huomioitu Euroopan yhteisön neuvoston painelaitedirektiivin (97/23/EY) olennaiset turvallisuusvaatimukset.
- Vaatimustenmukaisuuden arviointimenettelynä on käytetty H - moduulia. (ilmoitettu laitos 0424)
- Toimitukseen ei sisälly varolaitteet.

**DECLARATION OF CONFORMITY - MANUFACTURES DECLARATION**

Manufacturer: ARITERM OY  
Address: P.O.BOX 59, FIN-43101 SAARIJÄRVI

Equipment: **Arimax central heating boiler**

Manufacturer assures,

- that in production of above mentioned example has been observed the essential safety demands of EC council's directive for pressure vessels (97/23/EY).
- As estimation method of conformity has been used H - module. (notified body 0424)
- Safety device are not included in the delivery.

**FÖRSÄKRAN OM ÖVERENSSTÄMMELSE - TILLVERKAREDEKLARATION**

Tillverkare: ARITERM OY  
Adress: P.O.BOX 59, FIN-43101 SAARIJÄRVI

Apparat: **Arimax centralvärmepanna**

Tillverkare försäkrar,

- att vid tillverkningen av ovannämnda exempel har man iakttagit väsentliga säkerhetskrav av EG rådets direktiv för tryckkärl (97/23/EY).
- Som värderingsmetod av överensstämmelse har använts H - modul. (notified body 0424)
- Säkerhetsventilen ingår inte i leveransen.

Ariterm Oy

Kari Väliäho  
Toimitusjohtaja  
Managing director  
Verkställande direktör