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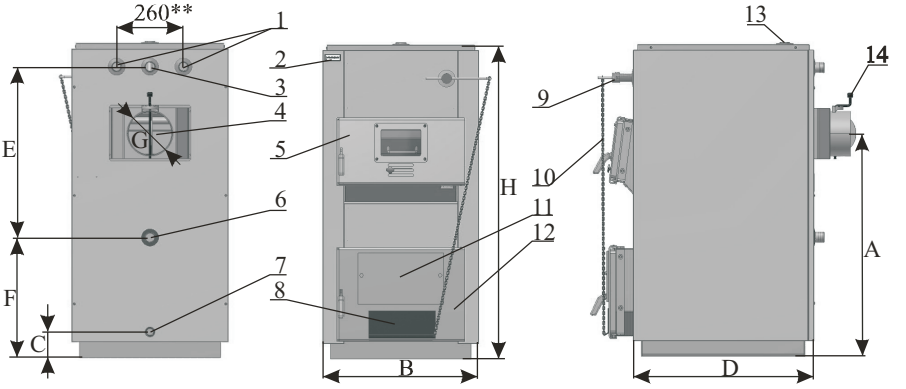
TECHNICAL MANUAL

PERMANENT BURNING HOT WATER SOLID FUEL CAULDRON

TYPE - MVS

MUST READ!
DOCUMENT FOR KEEPING

IMAGES OF THE CAULDRON



TYPE	DIMENSIONS								Mass	Water
	A	B	C	D	E	F	H	G	(kg)	(l)
MVS 25	880	510	100	615	670	470	1232	180	275	105
MVS 30	880	510	100	715	670	470	1232	180	295	114
MVS 35	880	560	100	715	670	470	1232	180	310	123
MVS 40	880	610	100	715	670	470	1232	180	335	132
MVS 50	880	660	100	715	670	470	1232	180	350	141
MVS 63	950	660	100	775	750	490	1332	200	385	164
MVS 80	980	740	90	815	740	480	1332	200	415	182
MVS 100	1080	780	80	850	850	450	1415	220	470	209
MVS 120	1080	840	80	850	850	450	1415	220	495	248
MVS 140	1080	900	80	850	850	450	1415	220	520	334

THE LEGEND:

1.thermal protection port **
2.thermometer
3.hot water outlet to the instalation
4.smoke emission drain
5.fuel door
6.chilled water inlet from the instalation
7.filling-emptying
8.valve for air supply
9.draft regulator *
10.draft regulator's chain *
11.burner port
12.cleaning door
13.safety line
14.smoke pipe flap's handle

* Not in the standard equipment.
** MVST cauldrons have thermal protection in the form of copper pipe coil.
** MVS cauldrons up to 80kW have 1" ports for thermal protection.

1.A BRIEF DESCRIPTION OF THE CAULDRON

High temperature standard cauldron is based on years of experience by the "FEROTHERM" Maribor technology, from Slovenia. Primarily, cauldron is made for solid fuel combustion - wood and medium caloric coal with granulation bigger than 30mm. High temperature standard cauldron can be stoked with the heating oil, by installing burners for the liquid fuel, or with pellets, by installing burners for pellets. High temperature standard cauldron can also be made with water heater. Cauldron is made out of highest quality material. Cauldron's construction is simple and it can be easily stoked and cleaned. Cauldron is connected to the chimney with corresponding section and height. If there isn't enough draft, auxiliary fan can be installed.

Cauldron is equipped with appropriate ports:
-hot water outlet port,
-chilled water inlet from the installation port,
-safety valve port,
-cauldron filling and emptying port,
-thermometer port.

MVST cauldrons have built in protection against overheating in the form of copper pipe helix.

* Cauldron with water heater has also water heater ports:
-cold water inlet,
-hot water outlet,
-safety line.

The cauldron is tested for the water pressure, and allowable water pressure is 2.5 bar.

The cauldron is well designed and well isolated with formwork.

The basic features include: hot water boiler, thermometer, formwork plasticized with quality powder coated paint.

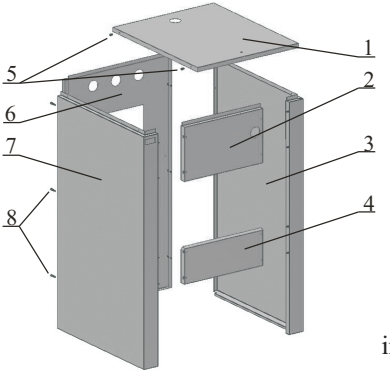
2. INSTALLATION OF THE CAULDRON

The cauldron is set on the planned area in the cauldron room on the horizontal concrete base that is 60-100mm high. The cauldron has to be set in a way that there is room on all sides so the formwork can be installed. On the side there has to be some space for cleaning the cauldron. Distance fron the chimney entrance is 300mm.

Installation of the cauldron (and the burner, if it's going to use liquid, gas fuel or pellet) should be delegated to the **expert**, as well as the instalation process with predefined project. **The cauldron must be connected to the open central heating system** (scheme 1). Central heating installing must be in accordance with standards JUS.M.E6 201 and JUS.M.E6.202. The cauldron and the installation must have safety valves.

Framework installation is simple and it has to be done before connecting wheel to the system, img 1

FRAMEWORK



The legend:

1. shroud
2. upper middle part
3. right laterally side
4. middle part
5. shorter tin screw
6. back side
7. left laterally side
8. longer tin screw

img 1

3.STOKING THE CAULDRON

For stoking the cauldron, and later for it's proper working, the cauldron room needs to be supplied with a sufficient amount of air, so the combustion can be proper and properly regulated and the chimney properly built (standard cauldrons work with chimney draft that is at least 20 Pa), see the table.

	THE CHIMNEY		
	min.pressure(Pa)	diameter	height(m)
MVS 25	15	200	7-9
MVS 30	15	200	7-9
MVS 35	15	200	7-9
MVS 40	20	200	8-10
MVS 50	22	200	8-11
MVS 63	25	250	8-12
MVS 80	28	250	8-12
MVS 100	30	300	8-12
MVS 120	32	300	9-14
MVS 140	32	300	9-14

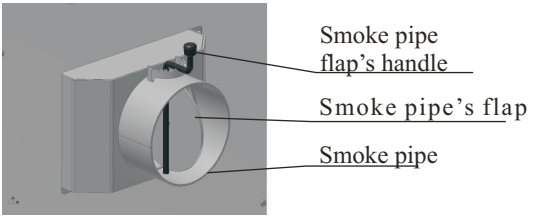
Chimney data from the table are average and they depend on more factors: altitude, the environment itself (plain, lee, foot of the hill and mountain etc.) wind power, height in relation to top of the roof, angle of roof slope etc.

However, for smooth and proper cauldron work, the traction force is relevant and should be supplied.

It is desirable to provide direct port to the chimney pipe from the chimney, without any curves and with no hat on the top of the chimney.

a) First stoking

For the first stoking certain terms must be provided:
-the chimney and the chimney channel must be clean and in good condition.
-the smoke pipe must be set on open space, smoke pipe flap's handle must be set in the axes direction flute pipe (see img 2)



img 2

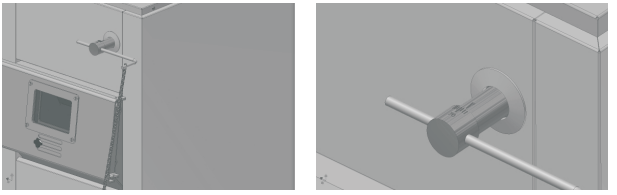
-system must be filled with water and vented.
-the cauldron must have safety vents for the open system.

b) Stoking with solid fuel

We stoke the cauldron with paper, slivers or wood. The cauldron is kindled on lower door, while stoking the cauldron Is made trough upper door.

We choose water temperature in the cauldron over the draft regulator, which is assembled on 3/4'' port on the front of the cauldron.

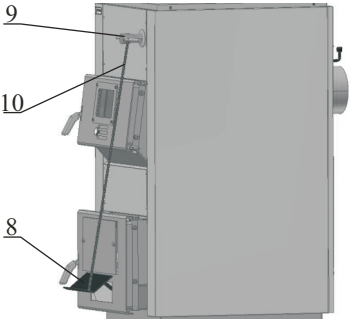
We set draft regulator's handle to the temperature position 70^{o}C, img 3



img 3

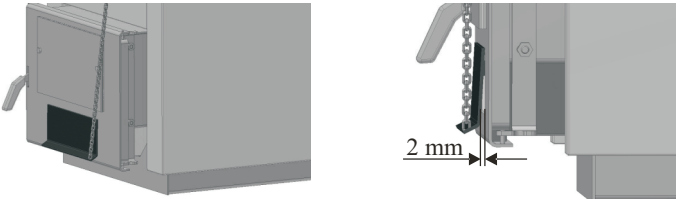
-we set valve for combustion air supply in horizontal position which has enough airflow required for achieving set working temperature in the cauldron and the valve needs to be linked to the draft regulator's chain.

8.valve for air supply
9.draft regulator
10.draft regulator's chain



img 4

-when the set working temperature of the water in the cauldron is achieved, which can be read on the cauldron's thermometer, valve for air supply must close air vent, if it doesn't, chain should be set so the valve can close air vent, provided that there should be 2mm clearance (img 5), so the minimal conditions for high temperature combustion are provided. Chain must always be stretched, so the regulator can work properly. We do not touch chain set like that anymore, and the cauldron's temperature is set to 70 degrees.



img 5

While the cauldron is working, all dors must be closed, and air supply has to be provided by regulation.

Preferable, when the fire is burning, drag embers with rake towards the front of the cauldron (with cast iron grate) and put new fuel towards the back side of the cauldron. That way we can achieve better combustion, make the most of the fuel, and hot smoke gases and flames spread the heat to the first chamber and the cauldron is used to the maximum. While stoking, pay attention on the pieces of the coal and wood so they fall down and block the valve for air supply. With every stoking check functionality of the draft regulator. If the cauldron is stoked with wood, **use only the wood that has been drying for at least 2 years, because it has the least amount of moisture, so the condensation in the cauldron can be avoided.**

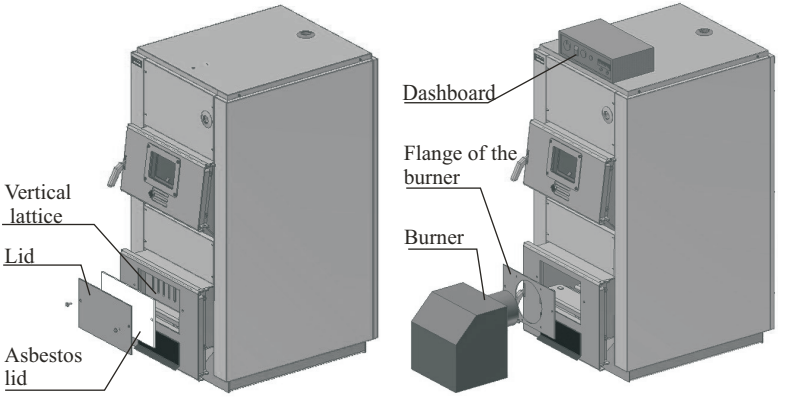
The cauldron is not designed for working on low temperatures. While it is working, the temperature of the returning water from the installation shouldn't be lower than 60 degrees. Temperature that low can directly affect lifetime of the cauldron. It particularly reflects on the reduction of the thickness of the tin on watercooled chambers, where the temperature of the smoke gases is lower than temperature of the condensation or the smoke gases are cooled in chilled water chambers which can lead to condensation. In extreme low water temperature conditions, condensation that happens can be measured in liters, so we can suspect the cauldron is leaking when it's actually condensing. Condensation is bad because it contains sulfuric acid, which is formed by sulfur reaction, and it extracts while burning from the fuel and the condensation on water chambers in the cauldron. Sulfuric acid causes tin corrosion.

Condensation can also occur by choosing unsuitable cauldron we instal to the system by it's power

To avoid this, mixing valve should be installed, so it can protect the cold part of the cauldron by directing one part of the cauldron's liquid to the backflow and by that increase the backflow temperature. Liquid temperature in the backflow that is increased like this prevents the condensation, which directly affect prolongation of the lifetime of the cauldron.

c). Stoking with heating oil and pellet

Cauldrons are primarily made to be stoked with solid fuel. Possibility of using liquid fuel is provided by installation of the burner, and dashboard for the regulating liquid fuel combustion. The burner is set on lower door, for the cleaning, which already have the vent for the head of the burner installed, with appropriate flange (there is possibility to install several types of the burners). Before installing the burner, the lid, asbestos lid and vertical lattice should be taken off, clean the stokehole, smoke channels, chimney shore and the chimney itself well. Draft regulator is taken off, with the chain, and temperature and general work regulation is done by the dashboard, which is not provided in the standard equipment, while burner working on pellet is regulated in the burner itself.



The cauldron is designed so it provides good results while using liquid fuel or pellet. While using liquid fuel or pellet there's also need to be careful that the water temperature doesn't go below 60 degrees.

While stoking with solid fuel or pellet don't put any refuse or solid fuel in the stokehole.

4.MAINTANCE OF THE CAULDRON

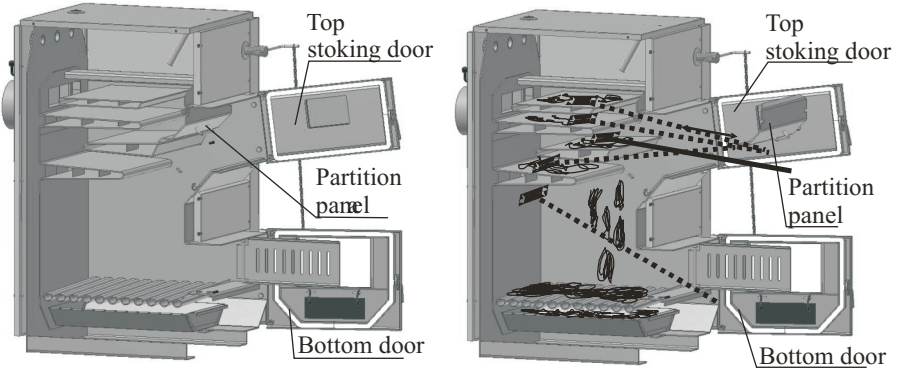
While stoking with solid fuel, which cauldron is primarily designed for, smoke channels and space for ash should be cleaned daily, because the inside of the cauldron, where there are a lot of smoke gases, and pipes accumulate layer of soot and tar. It is **necessary** to throughly clean it once a week.

Maintaining clean stokehole is basic rule for proper cauldron working. In the case that the soot layer becomes thicker and can not be easily taken off (because the cauldron was not cleaned normally or because the fuel made big amount of tar), the cauldron needs to be stoked more under the personal control (so the water temperature doesn't go over 90 degrees), for about an hour, because in that way tar burning can be achieved.

Maintaining clean surfaces helps to use more of the cauldron, because soot on the surfaces prevents spreading the temperature to the work fuel in the cauldron, and also contributes to the cooling and condensation.

The cauldron's stokehole is cleaned over the top stoking door and bottom cleaning door. Before cleaning the top part of the stokehole, after opening the cleaning door, partition panel should be taken off, because that way we have full access to the chambers and to the upper part of the stokehole so we can clean the soot as good as possible.

Cleaning includes taking off the soot and tar from the inside parts of the stokehole with the appropriate cleaning tools. Scratched soot falls in the bottom part of the stokehole, trough the pipe lattice, and it's taken out trough the bottom cleaning door, as well as the ashes.

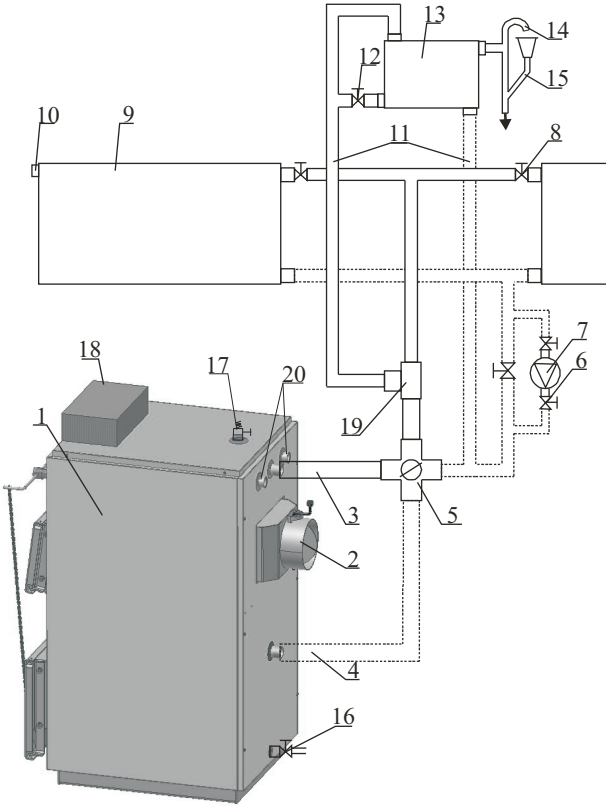


While using liquid fuel it's necessary to clean the cauldron at the end of the heating season, and while cleaning it power should be unplugged and fuel income stopped. While using pellet, when cleaning the burner should be turned off and stokehole should be cleaned.

Pay special attention that the installations and the cauldron do not freeze.

When turning the cauldron off for a longer time during the winter, installation and the cauldron should be emptied (if the working liquid in installations is water), as well as clean the cauldron. At the end of every heating season the cauldron needs to be properly cleaned and left to wait for the next season. During the summer, or after stopping the heating season, installations shouldn't be emptied, they should be left full.

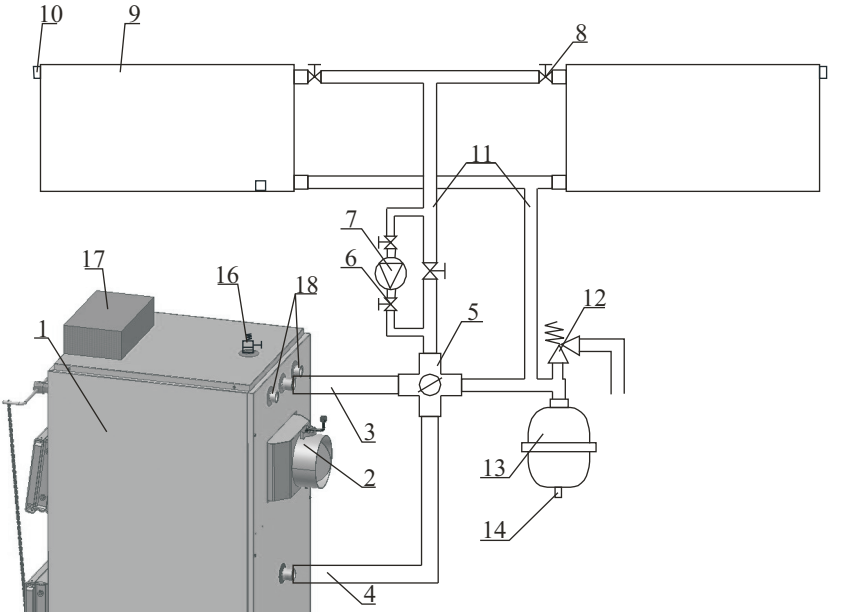
At cauldrons with water heater, installations should definitely be turned off if during the warm period warm sanitary water from the heater is used.



1. warmwater cauldron
2 smoke plug
3. distribution line
4. backflow
5. mixing valve
6. valve
7. pump 5/4”
8. radiator valve
9. radiator (heater)
10.venting valve
11.safety lines
12.shut-off valve
13.open expansion vessel
14.venting tube
15.overflow tube
16.filling and emptying faucet
17.safety valve
18.dashboard(if the burner is installed)
19.”T” knee
20. thermoregulation plug

- open heating system – scheme 1

Remark: while stoking with liquid, solid fuel or pellet, automatic range 35-90 ^{o}C is installed and there is no need to install mixing valve to the installation.



1. warmwater cauldron
2 smoke plug
3. distribution line
4. backflow
5. mixing valve
6. valve
7. pump 5/4”
8. radiator valve
9. radiator (heater)
10.venting valve
11.safety lines
12.safety valve
13.closed expansion vessel
14.air valve
15.filling and emptying faucet
16.safety valve
17.dashboard(if the burner is installed)
18.thermoregulation plug

-closed heating system– scheme 2

Remark: while stoking with liquid, solid fuel or pellet, automatic range 35-90^{o} C is installed and there is no need to install mixing valve to the installation.

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WARRANTY PAPER

Type of the cauldron

MVS 25 30 35 40 50 63 80 100 120 140

Cauldron w-o heater ☐ **with heater** ☐

Fabric number _____

Warranty period **5 years**

Creation date _____

Control signature _____

Place of sale _____

Date of sale _____

Salesman signature _____

M.P.