

SAUNASAMPO SMART STOVE

1. PRINCIPLE

The smart stove is a storage, insulated stove with a steam hatch and a double-acting fan. When the stove cover is closed, the fan circulates air in the rock space of the stove whenever the resistors are on. Air recirculation protects the heating elements in the stone space from burning and heats the stove stones to a constant temperature. Although the temperature of the stones can be 300 °C, the blowing is cooled by resistors with a surface temperature of 600-800 °C and an internal temperature of about 1,100 °C.

When the lid is opened, the fan circulates the sauna air through the stove until the desired temperature is reached. The sauna heats up to the desired temperature in an instant, because heating the air in the sauna does not require much energy.

The principle of operation of the smart stove is easy to understand when it is compared to the operation of a car stove in winter frost, which allows the stove to raise the car's internal temperature by up to 50 °C compared to the outside temperature. An ordinary, always-on stove is like a car with a stove fan that doesn't work. The car heats up slowly, if at all, as all the heat binds to the car's icy structures. When the stove fan is running, the car heats up in an instant, as more heat enters inside than it is necessary to bind to the structures. The same goes for the Smart Stove fan, which brings more heat to the sauna than it is necessary to bind to the benches, walls and ceiling.



The large amount of stones in the smart stove acts as both a heat store and a heat exchanger. When the lid is closed, the stove has a heat store and when the lid is open, the stove has a heat exchanger that transfers the heat in the stones to the sauna. The large surface area of the rugged stones ensures the rapid transfer of heat from the stones to the sauna without compromising the sufficiency of the steam.

Although the fan heats the sauna very quickly, its operation is hardly noticeable. Only the noise of the air passing through the stones is heard. The heated air blown through the stove rises directly to the ceiling. The hot, lightest air spreads on the roof and descends along the walls of the sauna. In this case, the air flow rate decreases imperceptibly with the increase of the cross-sectional area of the flow.

The lid of the stove is always opened by the lid opening motor, which also closes it after the desired time. The opening of the lid is controlled by a push button or a motion sensor in the control center and / or in the sauna and / or changing room.

2. SMART STOVE IN USE

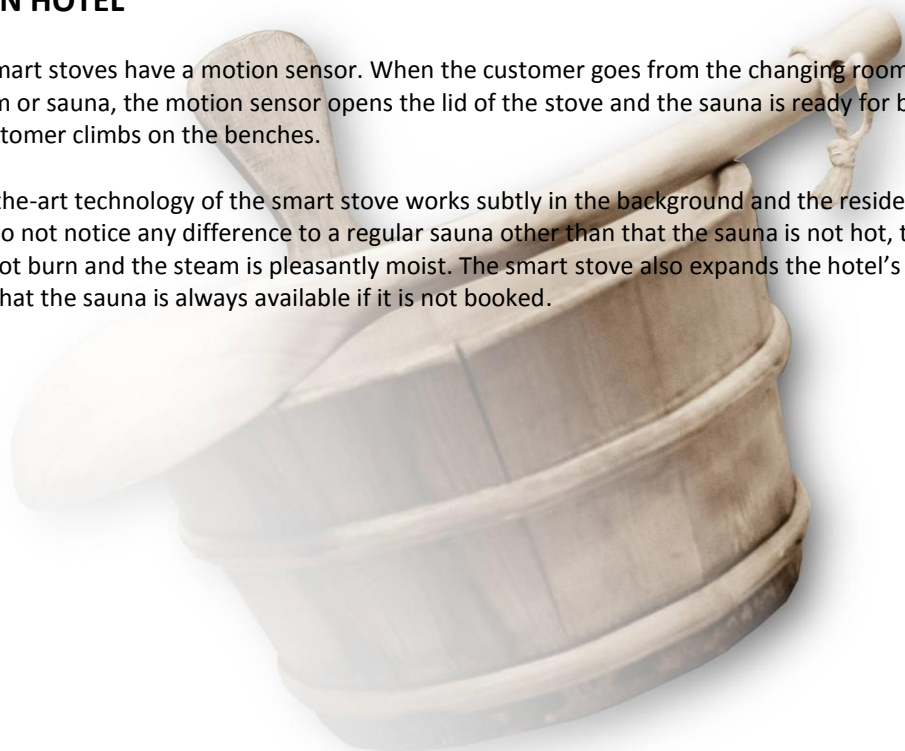
The smart stove is especially suitable for use where the sauna is needed occasionally throughout the day. Where an ordinary stove replaces the sauna panels all the time, a sauna with a smart stove is only hot when there are bathers. In such use, the smart stove saves more than half of the energy consumption and, most importantly, extends the panel replacement interval many times over.

The less you use the sauna, the greater the savings in electricity and panels. The women's sauna in particular is often underused. The sauna reinderees hot, even if there are no saunas. In such a sauna, the Smart Stove can save up to 80% of electricity and almost 100% of panel wear. The standby temperature of the smart sauna is 40 Celsius degrees, which is the same temperature of the corresponding genuine sauna before opening the lid.

3. SMART STOVE IN HOTEL

The hotel's smart stoves have a motion sensor. When the customer goes from the changing room to the washroom or sauna, the motion sensor opens the lid of the stove and the sauna is ready for bathing as the customer climbs on the benches.

The state-of-the-art technology of the smart stove works subtly in the background and the residents of the hotel do not notice any difference to a regular sauna other than that the sauna is not hot, the benches do not burn and the steam is pleasantly moist. The smart stove also expands the hotel's service level so that the sauna is always available if it is not booked.





4. SMART STOVE AT WORK

In Finland at the workplace, the smart heater is mostly used in the saunas of shift workplaces and, on the other hand, of staff in gym and sports facilities.

In the saunas of shift workplaces, the smart stove is used in more than a hundred rescue and police station saunas. The smart heater is used e.g. At Seutula Airport, UPM-Kymmene, Enso, Metsä-Botnia, Sanoma and Helen.



5. REPRESENTATIVE SAUNA

In the representative sauna, the Smart Stove releases from schedules. If going to a regular sauna is delayed, the sauna will be hot. When the sauna has a Smart Stove, the sauna waits at 40-50 Celsius degrees when the sauna is on schedule. In the representative sauna, the host can ask if the guest wants a moist, gentle or dry burning steam.

6. SMART STOVE AT GOLF COURSE

Sauna on the golf course is random. In bad weather, there are few players, but the need for a sauna is great when cold and wet players return from the round. When there is a Smart Stove in the sauna, the sauna is always ready and the staff does not have to assess whether there are saunas today or not.

The smart stove is standard on better fields. There are smart stoves in the sauna of more than a hundred golf courses, for example Tawast Golf has had a smart stove since 1995.



7. SMART STOVE AT APARTMENT BUILDING

In the apartment building, the Smart Stove frees residents from schedules and brings with it a home-made sauna culture.

There are smart stoves in dozens of apartment buildings. Especially in the line renovations of old apartment buildings, the old ascetic house sauna has been transformed into a spa-like sauna department, where an Intelligent Stove has been chosen to bring home-made saunas.

The practice is to extend and lengthen the sauna time many times over. There are still fixed sauna shifts in the saunas, but what is new is that you can go to the sauna outside the standard shifts if there are no other reservations. And what's new is that a regular person can choose the temperature of their own sauna shift - Low temperature and moist steam or hot dry steam or something in between.

Standby maintenance costs an average of € 0.20 per hour, so even 12 hours of standby per day does not incur unreasonable costs. The smart stove eliminates the problem of missing sauna shifts from a house sauna. An untenable sauna shift does not replace the sauna for the next one and does not waste electricity.

8. MAXIMUM SAFETY

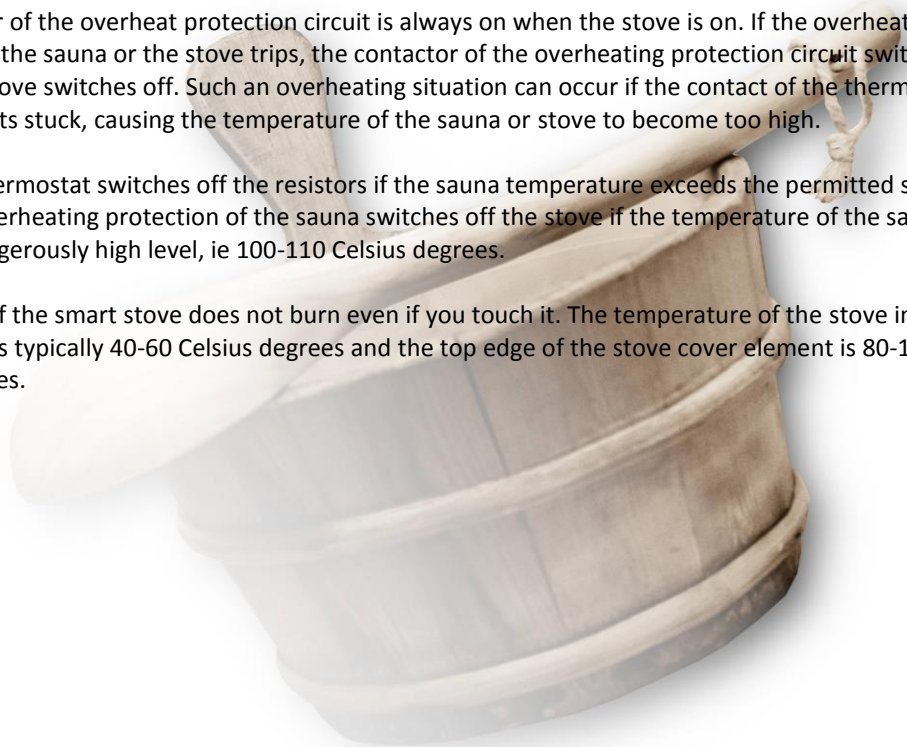
The smart stove does not burn a sauna, nor a sauna stove. The smart stove has multiple overheating protection.

The control system of the stove has two successive contactors, one of which is connected to the overheating protection circuit and the other is controlled by the thermostats of the stove and the sauna. The contactor of the thermostat circuit keeps the resistors on when the temperature of both the sauna and the stove is below the set values. If the temperature of the sauna or stove rises above the default values, the contactor switches off the resistors.

The contactor of the overheat protection circuit is always on when the stove is on. If the overheating protection of the sauna or the stove trips, the contactor of the overheating protection circuit switches off and the stove switches off. Such an overheating situation can occur if the contact of the thermostat circuit gets stuck, causing the temperature of the sauna or stove to become too high.

The sauna thermostat switches off the resistors if the sauna temperature exceeds the permitted set-point. The overheating protection of the sauna switches off the stove if the temperature of the sauna rises to a dangerously high level, ie 100-110 Celsius degrees.

The surface of the smart stove does not burn even if you touch it. The temperature of the stove insulation jacket is typically 40-60 Celsius degrees and the top edge of the stove cover element is 80-100 Celsius degrees.





9. SAVES ELECTRICITY AND NERVES

For home use, the smart stove is a luxury and a treat. In community use, a smart stove is often a satisfying, profitable investment with a payback period of less than a year.

The smart stove consumes 0.7-2.0 kWh in standby mode. An ordinary continuously heated stove consumes approximately half of its rated power continuously when it is on, ie a 20 kW stove consumes 10 kW. Consumption cannot be minimized without compromising the quality of the sauna. When the sauna is maximally insulated and decorated with a panel alone and ventilation is minimized, the sauna consumes little. Excessive insulation and reduced ventilation create a situation where the sauna stays hot for a short period of time on the resistors and the stones do not get enough heat. A situation arises where the sauna is hot and the stones are cold, it almost even with the sauna. In this case, the temperature of the sauna must be raised so that the stones remain hot. In a sauna, the thermostat must be easily set to over a hundred Celsius degrees before the steam is sufficient. The current trend with glass doors, large windows, glass bricks and tiled walls increases the energy consumption of the sauna and the time it is on the resistors, so that the sauna can easily consume more than half of its nominal power even when empty.

The standby temperature of the smart sauna is usually 40-50 Celsius degrees, so the walls are comfortable to lean on and do not breathe cold. The higher temperature saves electricity consumption during the sauna, as the sauna is immediately ready for bath and does not need to be heated with a pointless steam throw. The sauna warms up to 80-100 Celsius degrees in a few minutes when the walls are not quite cold.

The energy consumption of a sauna depends on the structures of the sauna, the ventilation and the amount of steam, ie the use. The smart stove now has a measurement of electricity consumption, so the consumption of the stove is always clear. In Helsinki, the Haaga fire station has a stove equipped with electricity consumption measurement. The stove had been on for a year when we went to present it. The panels of the sauna were as made yesterday and the stove had consumed 2.7 kW per hour, including saunas. The panels in the large sauna of the Tampere fire station were replaced after the stove had been on the same level for 9 years - the stove had consumed 5 kW per hour with saunas.

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10. SAVE ON REPAIR COSTS

An ordinary continuously heated stove requires insulation from the sauna, as the sauna heats up at the same rate as the walls of the sauna. The smart sauna is only hot during the sauna session, ie normally for 20 minutes at a time. This is so short that the heat will not move through the panel. It's exactly what's behind the panel. Insulation has no meaning.

If an Smart Stove is purchased for an old sauna, it is not advisable to touch the insulation during sauna renovations. It is enough to replace the panels. The builder of a new sauna should adhere to the legal minimum.

Saves nerves

The smart sauna is used on almost all new and prosperous golf courses, where it saves electricity and panels. In addition to financial savings, it saves staff nerves. In the past, the fields were used to turn on saunas when someone ordered a sauna or there were a lot of players.

It often happened that the sauna had been forgotten to turn on, or the sudden wetting in the rain caused the sau skin to wake up. The constant taking care of the sauna caused stress for the staff and a bad feeling for the disappointed players.

When there is a smart sauna on the ground, no one has to worry about the saunas and the saunas are always available.

The same relief the Smart Stove brings to the workplace. In a representative sauna, there is no need to fear that the sauna, which compensates for the delay in saunaing, will burn hot. At the hotel, the saunas are always ready, and not after the one-hour waiting period as before.

11. EASY TO SERVICE AND MAINTANCE

The smart stove has 160-300 kg of stones and is so large and heavy that it cannot be taken to the sauna in its entirety but is assembled in the sauna.

The core of the stove is an indoor stove unit with all the electrical and motor functions of the stove. The sieve stove has heating elements, a fan motor, a lid opening motor, temperature sensors and overheating protection as well as electrical connections. There is a stone grate on top of the indoor stove that carries the stove stones.

The stone bowl rests gravity on the inner stove and the lid of the stone bowl is 8 mm thick tempered glass, which allows you to throw steam on all the stones. The lid glass is gravity on the stove and can be replaced without tools.

Outside the stone bowl is an outer casing with an RST surface that insulates the heat of the stone bowl and is in contact temperature, even though the temperature inside the stove is 300 Celsius degrees.

The entire stove is so constructed that it can be dismantled by unscrewing the two screws connecting the deck element to the stone bowl, after which all parts can be lifted off. Thanks to the modular design of the stove, all parts of the stove can be replaced as spare parts.

Replacing the stove resistors and the fan motor requires removing the stones and dismantling the stove. This is a conscious choice and essential for conscientious maintenance of the stove. The weakest link in the maintenance of the stove is the durability of the stones, which is directly proportional to the amount of steam thrown into the stove.



In heavy indoor pool use, an ordinary stove stone lasts for a couple of months and a ceramic Kerkes stove stone for a year. The service life of the stones is shorter than that of the resistors and the fan motor, the failure of which is almost always due to the failure to replace the stones.

If the stones in the stove are allowed to crumble into gravel, no more air will pass through the stones and cooling of the resistors will be prevented and their surface temperature will rise, which will sharply shorten the life of the resistors. When the air circulation of the stove is prevented, the air starts to rotate and the temperature rises below the blockage at the bottom of the stove. This creates a different thermal expansion in the walls of the stone bowl of the stove and the stone bowl begins to bulge and lose its shape. When the blockage is really bad, the blow will not get through and the heat will discharge downwards towards the fan motor, which will be damaged and will initially make a noise as the bearings rattle.

Even this complete clogging does not destroy the stove. When the stones, the stone bowl, the resistors and the fan motor are replaced, the stove is like new again. The effects of failure to change stones are exacerbated by clogging. When the blow does not get through, the sauna no longer heats up quickly. This increases the amount of steam and the stones crumble at an even faster rate.



12. SMALL MAINTENANCE

For good and easy care of the stove, periodic inspection and small replacement of the stove stone. The stove stones crumble due to the change in temperature caused by the steam. Even boiling steam water is cold compared to 300 Celsius degrees rocks. The stones first crumble under the surface stones above the resistors. These stones are simultaneously subjected to cooling the steam water from above and heating the resistors from below. These most stressful stones can be replaced without tools without dismantling the stove. It is enough to inspect and, if necessary, replace 20-40 kg of stones from the hatch. In this way, the replacement interval of all stones can be extended many times over.

One must always remember that breaking stones is not a bad thing but a good thing. It is an indication that the sauna has not been an empty deposit, but that the sauna has been used and a lot of steam has been thrown by satisfied bathers.