

## DESIGNING GUIDE FOR SAUNA CONSTRUCTION

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Saunas are normally sized by the maximum number of persons having sauna at the same time in sitting posture. A sauna is economic if:

- it has capacity for 3 to 5 persons in a house
- it has capacity for 8 to 12 persons in community places (i.e. hotel, swimming pool)

In case of larger space demand, it is recommended that two saunas be constructed.

### The following technical prerequisites shall be ensured in advance of building a sauna:

1. Cold floor underneath the sauna. For larger saunas, it is advised to build a floor drain to facilitate easier cleaning
2. Plastered sidewall.
3. Clear height of the room is at least 2.15 m
4. The sauna is equipped with gravity ventilation. If the sauna room has small airspace or it has no window, outlet of the used air exiting the sauna room shall be ensured (i.e. by a ceramic ventilation grill built in the wall).
5. Heating of the sauna rooms is ensured through electric sauna stoves with a performance of 3 to 22 kW.

Sauna stoves with a performance of 3.0 to 4.5 kW may be operated from one phase but models with higher performance may only be operated from three phases (3 x 220V) (except for the Moderna stove range which has 6 kW and 8 kW models that can be operated from a single phase)

Best practices for the calculation of the required performance: 0.8 to 1.2 kW/each m<sup>3</sup> of the sauna room. The following connections shall be installed, in a maximum distance of 2 metres from the sauna's external wall, using copper cables:

Stove perf. (kW)	Sauna volume (m <sup>3</sup> )	Copper cable		Fuse (A)		Supply voltage (V)	
		3 phase	1 phase	3 phase	1 phase	3 phase	1 phase
3,0	2 - 4,5	5 x 1,5	3 x 2,5	3 x 6	3 x 2,5	3 x 400	230
4,5	3 - 6	5 x 1,5	3 x 6	3 x 10	3 x 6	3 x 400	230
6,0	5 - 8	5 x 2,5	-	3 x 10	-	3 x 400	-
8,0	7 - 12	5 x 2,5	-	3 x 16	-	3 x 400	-
9,0	8 - 14	5 x 2,5	-	3 x 16	-	3 x 400	-
10,5	9 - 15	5 x 4	-	3 x 20	-	3 x 400	-
13,5	10 - 18	5 x 4	-	3 x 20	-	3 x 400	-
15,0 v. 16,5	15 - 26	5 x 6	-	3 x 25	-	3 x 400	-
20	18 - 30	5x10	-	3 x 35	-	3 x 400	-
26,0 – 33.0	30 - 66	5x16	-	3 x 50	-	3 x 400	-

The parameters above are factory data, that can be found or downloaded on harvia.fi website.

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### **Sauna heating:**

Before turning on the stove make sure that there are no objects on or in the immediate vicinity of the stove.

During the first operation of the stove both the stove and the stones emit smell. Effective ventilation of the sauna is needed to remove the smell. The purpose of the stove is to heat up the sauna and the stones to the temperature suitable for the use of the sauna. In case of a stove output that matches the size of the sauna and if the sauna is properly insulated, the sauna can be heated up to the temperature needed for the sauna use in around one hour. The proper temperature of the sauna is about 65-80°C.

Sauna stones reach the proper temperature generally simultaneously with the sauna. If a stove with too much output is used, the air of the sauna heats up rapidly, however the temperature of the stones remain lower than necessary and the sauna water flows between them without evaporation. However, if the output of the stove is too low for the size of the sauna the cabin heats up slowly, and the sauna user is forced to try to raise the temperature by pouring. But this results in the rapid cooling of the stones, after a while the stones will not be able to provide enough heat to the air of the sauna when pouring.

The sauna experience will only be complete when you carefully select the stove output that matches the size of the sauna.

### **The output of the stove:**

If the walls and the ceiling are covered with cladding and the insulation behind the cladding properly prevents the wall material to absorb the heat, the cubic meters of the air determine the needed stove output. In case of bare and uninsulated walls (brick, glass brick, glass, concrete, tile, etc.) air cubic meters increased with 1,2 m<sup>3</sup> as per wall square meters are to be taken into consideration when determining the needed stove output from the chart (see [www.harvia.fi](http://www.harvia.fi))

Stoves with CE mark comply with all the standards for sauna installation. Compliance with the standards is checked by the competent authorities.

To ensure efficient stove output it may be necessary to lower the ceiling of the sauna. Less output is needed for the heating of less air cubic meters.