

# SAFETY AND HYGIENE REGULATIONS



UNIVERSITAT POLITÈCNICA DE CATALUNYA  
BARCELONATECH  
Servei de Prevenció de Riscos Laborals

## MUFFLE FURNACES AND OVENS

CODE

SHR 215

Date:

April 2019

Revision:

01

Page:

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### DESCRIPTION OF A MUFFLE FURNACE AND OVEN

**Muffle furnaces are items of work equipment designed for cooking ceramic materials** or melting metals using thermal energy, calcination, etc. The temperature varies depending on the task to be undertaken (1000°C, 1400°C, up to 1800°C approx.).

**Ovens are used** for different purposes, including:

- Drying glassware
- Desiccation
- Sterilization

These pieces of equipment are essential for the incubation of cultures in bacteriology. They are normally used at a temperature of 37°C for cultures of bacteria, fungi, etc.

**Ovens can operate up to temperatures of 450°C.**



Electric muffle furnace



Oven

### GENERAL RECOMMENDATIONS

- Ovens and furnaces must be placed horizontally on a flat surface. **They cannot be placed on a base that is easy to combust or within a fume cupboard.**
- The gap between the laboratory walls/ceiling and the oven or furnace should be large enough to allow good circulation of air around the equipment (see Figs. 1 and 2).
- This work equipment must have the required safety devices to protect users from the risk of contact with hot surfaces and electricity.

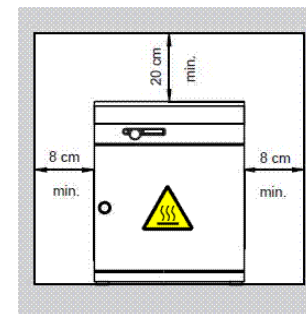


fig. 1

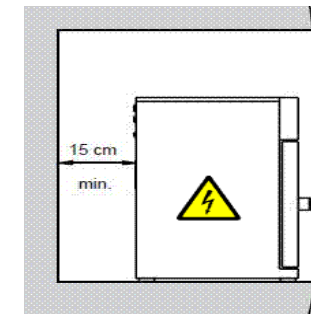


fig. 2

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### PERSONAL PROTECTION EQUIPMENT TO USE

- For ovens:
  - **Thermal protection gloves and safety goggles** to put any material into the oven and to take it out, to handle the internal trays and hot materials, etc.
- Wear a laboratory coat** to put samples into the oven and to take them out.
- For muffle furnaces:
  - **Thermal protection gloves and face shield** to put any material into the muffle furnace and to take it out, to handle hot materials, etc.
  - **Protective clothing (apron)** resistant to heat transfer by convection and radiation.
  - **Safety footwear.**



Protecció obligatòria de la vista



Protecció obligatòria de les mans



Protecció obligatòria per a les vies respiratòries



Protecció obligatòria de la cara



Protecció obligatòria dels peus



Protecció obligatòria del cos

**Wear a respiratory protection mask for both the oven and the furnace** depending on the reagents you are working with. First consult the **safety data sheet** for the chemical product that you are going to use.

### BEFORE USING THE FURNACE / OVEN

- Check the temperature required for the task, to avoid using more energy than required and increasing the time it takes for the furnace/oven to cool down.
- To ensure even heating of all material placed in the furnace/oven, place it on the shelves in such a way that the air inside the oven can circulate freely.
- If the process releases vapours or fumes, use a **local exhaust ventilation system (fume hood)** to capture them.
- In the case of **furnaces**:
  - The door must be closed at all times, and only opened when you need to put something in/take something out.
  - Material that cannot withstand high temperatures should not be put in.
  - Do not use the furnace to dry or sterilise equipment. Use an oven to perform these actions.
- In the case of **ovens**:
  - Ovens should not be used as heating mantles to warm liquids.
  - If the vapours that are given off are flammable, use ovens with increased safety features or with an explosion-proof treatment.

### DURING USE OF THE FURNACE / OVEN

- Ensure that the various indicators (temperature, on light, etc.) are working properly throughout the process.
- Whenever the process so allows, if samples that need to be taken out of the oven/furnace are very hot, lower the temperature and wait until the material is cooler. This guideline applies particularly to furnaces.
- If you need to pick up hot, expendable material, **use tongs with a curved point.**
- If any glassware breaks, **pick up all of the shards using safety gloves**, to avoid accidents such as cuts and punctures.
- If a liquid or solid spills in the oven, disconnect the equipment and dry/tidy the affected area using an absorbent paper towel.
- When you have finished using the oven or furnace, check that there is no material left inside, and turn it off using the general **ON/OFF** switch. If the equipment will not be used again for a relatively long time, unplug it from the electricity supply.
- Cleaning and maintenance operations must always be carried out when the equipment is disconnected and cold.



Clamps



Absorbent paper towel