

REFRACTORY SAGGERS AND MUFFLES

Saggers or Saggars are boxes or cases made of refractory materials in which pottery ware, glazed or unglazed articles are heated to higher temperature. In other words sagger is a refractory container for protecting ware during heating. Because they are kept in the sagger they do not come in contact with the flames and objectionable gases. In pottery works they form an important item and are used in large numbers. Saggars are usually made of fireclay and grog but for special use they can be made of other refractory materials.

Muffle is an enclosure in a furnace protecting the ware from the flame and products of combustion. These are also made of the same type of refractory raw materials as saggars. Muffles are generally used in small furnaces for firing small quantities of wares.

The most important property of these saggars and muffles is that they should have sufficient durability. They should also have good load bearing capacity, high mechanical strength (CCS and MOR) and also high thermal conductivity. Usually a highly refractory clay with good binding power is used so that it can take a large amount of grog. Very highly plastic clay is never suitable due to its high shrinkage. Usually two clays are used one being a refractory fireclay as base material and the other a plastic clay as a bond material. Grog is used in various sizes so that the saggars (saggars) and muffles are porous enough to withstand the thermal shocks. The grog must be made from a highly refractory fireclay.

Since the proportion of grog is larger than the clay so there should be a through mixing of the two. The shaping (green manufacturing) can be done by either of the following processes:

1. Hand moulding or Pneumatic Ramming
2. Casting
3. Power pressing.

The articles are kept in the saggars and these saggars are piled one on the top of the other in the furnace. One pile may have 15 saggars depending on the size. These piles are commonly called "**Bungs**". The space between the two is closed by a wad of clay so that flames etc. do not enter the saggars (saggars) and the articles inside are heated by the clean heat alone.

To fire enameled ware or for firing pottery decoration etc. muffles are used. These are open at one end and are kept over a small fire box in such a way that the flames from the fuel envelope the muffle from all sides. One end remains open and this acts as a door to place things or to take them out. This is closed by a plug or door before firing.

The bottom of the saggars as well as muffle is usually made thicker than the sides and in some cases the bottom is made from a mixture containing higher percentage of refractory grog. After green manufacturing a saggars or a muffle is dried slowly and then fired to a temperature of around 1350°C.

Saggers and Muffles should have a high mechanical strength in unburned stage and also at high temperature. They should be refractory enough to withstand the high temperature and should be able to resist the thermal shocks and should have a good thermal conductivity. Their porosity should be 20 - 25% and should have a stable volume. It is important that the walls of the saggers and muffles have a uniform thickness as otherwise strains are set due to unequal distribution of heat. These saggers (saggers) or muffles are also made of sillimanite, kyanite, silicon carbide etc. using these in the form of grog with a binding agent.