

Crucible Base Oxidation

Oxidation of the material in the base and lower wall of crucibles will rapidly lead to failure by distortion and cracking of the structure with associated leakage of the metal charge. It is therefore essential that the protective glaze is allowed to develop and function unhindered and that conditions that would promote oxidation are minimised. Molten Metal Systems has identified several common reasons for the occurrence of oxidation in the lower part of the crucible.

1. Ceramic Fibre Used As A Parting Medium

Ceramic fibre blanket should not under any circumstances be used as a parting medium between the base of the crucible and the crucible stand. The use of ceramic fibre blanket promotes thermal shock cracking and increased oxidation of the crucible material.

Ceramic fibre is an insulating material that will restrict heat flow where it is allowed to make contact with the crucible body. This in turn will prevent the external glaze from reaching its normal softening temperature, particularly during the vital pre-heating stage, and thus any micro-porosity or discontinuities that are present will not be sealed against the ingress of oxygen. Ceramic fibre materials contain predominantly alumina and silica. These components will react with the low melting point phases in the glaze coating and thus cause modification to the glass composition. The resulting elevation of the softening range of the glaze will result in greatly impaired performance at normal operating temperatures thus leading to premature oxidation of the carbon and silicon carbide within the body.

2. Open Drain Hole

The furnace drain hole must be sealed at all times by means of a cover plate. Failure to properly seal the drain hole will result in cold air being drawn into the furnace chamber, creating localised thermal shock cracking, and oxidising conditions at the adjacent lower portion of the crucible wall. This in turn will result in oxidation of the crucible body material in this region, leading to distortion and cracking of the structure.



Crucible Base oxidation caused by using ceramic fibre as a parting medium between the crucible and base.

Detailed instructions for the care and use of crucibles are available on request.

For additional information on MMS' products & services or to find a location nearest to you, please visit:
www.morganmms.com

All dimensions are subject to normal manufacturing tolerances. Molten Metal Systems reserves the right to change specifications at any time.

