Silicon Carbide Batts, Shelves and Tiles

For heat-treatment processes working above 1300°C silicon carbide is the material of choice for kiln furniture due to its unique blend of properties. For thin items such as batts, shelves and tiles, the high strength of silicon carbide means that shelves can be made much thinner. Silicon carbide also has a low rate of creep / hot-bending, so that even thin shelves stay flatter for longer, giving a longer service-life if handled carefully: -

- **Dry before firing** - Kiln furniture products can absorb water during manufacture, transportation, or storage. Wet items may crack if exposed to temperatures of more than 100°C (210°F) as the absorbed water will create uneven rates of heating across the product. Please note that shelves left in a packing crate will not dry effectively and may retain moisture for many months. Shelves should be separated for drying (e.g with wood strips), with a typical drying cycle being 5 hours at 90°C (194°F). Larger items may require longer drying times.
- **Handle with care** – Thin silicon carbide shelves can be more brittle than traditional cordierite shelves so must be handled carefully. Any bumps, bangs or other impacts during handling the shelves (or on loading and unloading the ware) must be avoided as these can often cause a shelf to instantly break.
- **Storage** - Shelves should ideally be stored on edge. If stacking flat, limit the number of shelves to prevent cracking from the cumulative weight. Be aware of the risk of moisture absorption during storage. Storage areas should be dry and it is good practice to lift any shelves slightly off a concrete floor using thin wooden strips (to avoid chipping the edge and to minimise the risk of water pick-up from damp concrete or spills).
- **Correct size of shelf** – IPS Ceramics recommends that shelves are sized correctly so that there is a 50mm (2”) gap between the edge of the shelf and the kiln walls (to ensure proper heat distribution in the kiln). Shelves should not be placed directly on the kiln floor but should be raised off the floor by at least 25mm (1”) using props / spacers.
- **Thermal cracking** – Silicon carbide shelves are not as resistant to thermal cracking as traditional cordierite shelves. We would recommend reviewing your firing cycle when changing to silicon carbide. As a guide, heating / cooling rates up to 5°C per minute can be used, however larger shelves (or if you are placing large, heavy ware) may need a slower firing cycle. Particular attention should be paid to potential points of rapid cooling (e.g. opening damper vents, starting cooling fans, ‘cracking’ the kiln door).
- **Glost firings** - A thin coating of an alumina-based wash is recommended for glost firings to prevent glaze drips from strongly bonding with the surface of the shelf (items must be dried after coating). Heavy glaze contamination can be removed in most cases by using a grinding wheel or by sandblasting (safety equipment must be used to avoid breathing the dust created). Silicon carbide shelves are not recommended for salt-glaze use, as the shelves can develop a thick ‘foam’ coating.
- **ELECTRICAL SAFETY** - Silicon carbide shelves can conduct electricity; ensure shelves do not come into contact any part of the heating elements in electric kilns to prevent short circuits and the risk of electrical shock.