



APPLICATION-AREA DOSSIER, AUGUST 2026

Application area ceramics & bricks: refractory practice on tunnel kilns, bogie hearth kilns and roller kilns

In the ceramics and brick industry the refractory material literally travels along: with every firing, tunnel kiln cars and bogie hearths pass through the complete temperature curve from setting to unloading. Unlike the stationary kiln brickwork, which largely stays at a constant temperature, the car lining experiences continuous thermal cycling. This cycle of heating up and cooling down is the most important driver of wear and puts the car fleet at the centre of every maintenance strategy.

The tunnel kiln car is a multi-layer system: the insulating layer sits on the steel frame, and above it the dense car deck that carries the setting or kiln furniture. Lateral skirt plates dip into the sand-filled sand seal of the kiln wall and thereby separate the hot firing chamber from the cool under-car channel. Any leak at the skirt, sand seal or car joint lets hot gas break through downwards and endangers the running gear and the steel structure.

On top of thermal cycling comes chemical attack: alkalis and other volatile constituents from the ware and the flue gas condense on cooler surfaces, sinter the deck surfaces and migrate into open joints. The kiln roof also demands attention: classic arches work with high mass and thrust loads on the abutments, whereas flat roofs of fibre or suspended construction are considerably lighter but remain dependent on intact anchors and a fibre-friendly operating regime.

Nine inspection points on tunnel kilns, bogie hearth kilns and roller kilns

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| ☐ Sand seal | Check the fill level and free-flowing condition of the sand regularly; encrusted or empty channels draw false air and disturb the kiln atmosphere. |
| ☐ Skirt plates | Distorted, eroded or cracked skirts no longer dip cleanly into the sand; the separation from the under-car channel is lost. |
| ☐ Car deck | Inspect deck slabs and setting surfaces for cracks, spalling and loose elements before broken pieces topple the setting or block the sand seal. |
| ☐ Car joint | The end seal between the cars, usually fibre packs, wears during coupling and pushing; an open joint gap heats up the steel frame here. |

- ☐ **Roof and arch** On suspended roofs check anchors and suspensions, on fibre modules check shrinkage joints and embrittlement; re-set sagging modules promptly.
- ☐ **Burner zones** Inspect burner blocks and adjoining brickwork for melt phases and washouts; local overheating also attacks neighbouring fibre surfaces.
- ☐ **Kiln furniture supports** Reaction and bonding layers form between cordierite or silicon carbide slabs and the car deck; maintain separating layers and release baked-on supports gently.
- ☐ **Alkali deposits** Sintered, glassy surfaces on deck and walls indicate alkali attack; remove deposits before joints and pores close up.
- ☐ **Running gear and wheels** Overheated wheel bearings, loss of lubricant and deformation of the undercarriage are often the first sign of a failing seal above.



Cyclic temperature changes are the toughest load



The heat-up curve decides the service life

Common mistakes

- Simply keeping damaged cars in service: a loose deck brick turns into a burnt-through deck, the dreaded car fire, which damages axles, wheels and rails as well.
- Carrying out repairs with whatever leftover stock is available: if the bulk density and thermal expansion of the patching material do not match the existing lining, the repaired area cracks open again after a few kiln campaigns.
- Treating the sealing as a side issue: missing sand in the channel or worn car joint seals distort the kiln atmosphere and firing curve and cost energy as well as product quality.

PRACTICAL NOTE

The great advantage of this application area: kiln cars can be taken out individually and repaired in the car workshop while the kiln keeps producing. Plan deck repairs, skirt replacement and seal maintenance as a rolling car rotation, and bundle work on the kiln itself into the shutdown windows. Further practice sheets can be found at sbs-rs.de/fachwissen.

Questions about your furnace?

We assess lining, zones and condition — with a reply within 24 hours on working days.

+49 89 541 960 200

info@sbs-rs.de

www.sbs-rs.de/en/fachwissen