APPLICATION-AREA DOSSIER, AUGUST 2026

Application area energy & combustion: refractory practice from forest wood chips to refuse-derived fuel

Whether a plant burns untreated forest wood chips, waste wood, municipal waste or refuse-derived fuels determines the load on the lining. As the share of waste wood and refuse rises, so do the chlorine, alkali and heavy-metal loads in the flue gas, while the calorific value and the ash composition fluctuate more strongly. A material choice that looks only at the design fuel therefore regularly goes wrong: what counts is the real fuel range you actually run day to day.

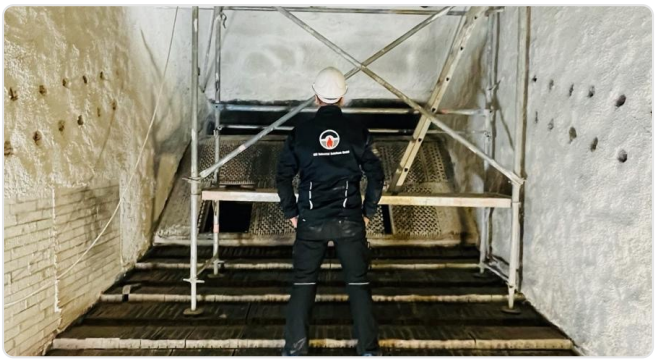
Chlorine and alkali corrosion are the most frequent drivers of damage. Alkali salts condense on cooler wall areas, act as a flux and infiltrate porous refractory material until the structure and the anchoring fail. On membrane walls, dense SiC tile systems have proved their worth: they protect the tubes and still let heat through; above the refractory zone, nickel-base cladding takes over corrosion protection. The two systems complement each other, and placing the boundary correctly is a design task.

Grate and fluidised-bed firing systems call for different lining concepts: on the grate, slag attack and mechanical abrasion dominate, in the fluidised bed it is the blasting effect of the bed material. The common manufacturers of wood combustion plants specify lining concepts, but service life is decided in operation. That is why refractory inspection belongs firmly in the annual rhythm of your turnaround: anyone who knows their wear rates replaces to a plan instead of being driven by emergencies.

Ten levers for the lining on energy and combustion plants

☐ **Fuel analysis before material selection**	The chlorine, alkali and ash content of the real fuel range determines the material quality, not the data sheet of the design fuel alone.
☐ **SiC on the membrane wall**	Nitride-bonded SiC tiles protect tube walls against corrosion and abrasion and keep heat transfer to the water-steam circuit high.
☐ **Cladding as a complement**	Nickel-base weld overlay takes over where refractory would build up too thickly or would disturb heat extraction; the two are partners, not competitors.
☐ **Dense, alkali-resistant qualities**	Low open porosity and a matched bonding phase slow the infiltration of alkali salts and the formation of aggressive melt phases.

☐ **Grate firing**	Side walls and the area around the grate need slag- and abrasion-resistant qualities, because the fuel travels mechanically across the grate.
☐ **Fluidised bed**	The circulating bed material acts like a blasting medium; here abrasion resistance often counts for more than chemical resistance.
☐ **Prevent flow behind the lining**	Tight joints, suitable mortar and a clean expansion concept prevent flue gas from condensing behind the tiles and attacking the tube wall unnoticed.
☐ **Allow for build-up**	Smooth, dense surfaces reduce deposits; water lances and explosive cleaning place additional load on the lining through thermal shocks.
☐ **Drying and heating up**	Every new lining needs a controlled drying and heat-up curve, otherwise trapped steam pressure destroys the structure before the first day of operation.
☐ **Document the findings zone by zone**	Thickness measurement and photo documentation from every turnaround make wear rates visible and the next lining calculable.



Lining of a wood-fired combustion plant

New arch in the combustion chamber

Common mistakes

- Reordering the materials from the original lining unchanged although the fuel range has long since shifted through more waste wood or refuse-derived fuel.
- Continuing to operate SiC tile systems without checking joints, fixings and backfill; corrosion behind the tile otherwise remains invisible until the tube fails.
- Planning the turnaround only once the shutdown has started: without findings from the previous year, material, personnel and scaffolding are missing precisely where wear is greatest.

PRACTICAL NOTE

SBS Refractory Service lines refractory installations on biomass, waste and refuse-derived-fuel boilers, carries out refurbishment during shutdowns and supports your turnaround from inspection to sign-off, manufacturer-independently and also on plants from the common manufacturers of wood combustion plants. Talk to us before your next shutdown. You will find further practice sheets at sbs-rs.de/fachwissen.

Questions about your furnace?

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

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