APPLICATION-AREA DOSSIER, AUGUST 2026

Application area steel & foundry: refractory practice on ladles, runners and furnaces

In steelworks and foundries the refractory lining works at its limit: temperature swings between pouring and standing time, chemical attack from slag and metal, and mechanical loading during charging all act at the same time. Ladles, runner systems, induction and cupola furnaces each show their own wear profiles and accordingly demand different materials, lining concepts and inspection intervals.

The two-layer build-up has proved itself: the safety lining against the steel shell serves as the safety layer, while the working lining in front of it is run down as planned and renewed. Ladles are lined by zones, because the slag zone, the barrel and the bottom are attacked to different degrees. In the coreless induction furnace this role is taken by a dry vibration mix compacted layer by layer; its sintered layer only forms during the controlled first heat-up.

Whether a lining reaches its planned service life is decided less by the data sheet than by the workmanship: compaction, joint pattern, dry-out and a proper acceptance with documented wall thicknesses. The following points help you to check new linings and recommissioning systematically — from the steel ladle to the runner at the cupola furnace.

Checklist: checking the lining and recommissioning properly

☐ **Check the safety lining**	Before every new lining, check for cracks, break-outs and slag infiltration — a weakened safety lining turns the safety reserve into a purely notional figure.
☐ **Line by zones**	Design the slag zone, barrel, bottom and impact area with the material and wall thickness that match their actual loading, not across the board.
☐ **Watch the joint pattern**	Set bricks in bond with staggered, thin mortar joints — continuous joints are preferred paths for slag and metal infiltration.
☐ **Place the dry vibration mix layer by layer**	Fill in even layers and compact to a defined degree; segregation and uncompacted zones later lead to local crucible wear.
☐ **Follow the sintering run**	The first heat-up forms the sintered layer of the crucible — run the heating rate and holding times exactly as specified for the type of mix.

☐ **Test the crucible monitoring**	Check the earth-leakage or leak monitoring of the induction furnace for correct function before recommissioning and document the readings as a reference.
☐ **Log the dry-out**	Run and record the heat-up curve with its holding times; residual moisture in mixes and castables is a safety risk, not a cosmetic flaw.
☐ **Measure the residual wall thickness**	Measure the working lining in the ladle and runner regularly instead of estimating — measurement and template give you dependable replacement criteria.
☐ **Prepare repair areas**	Apply repair mixes only to a cleaned substrate free of slag and loose material, otherwise the bond is missing.
☐ **Document the acceptance**	Record material batches, wall thicknesses, the dry-out log and the responsible persons in writing — the basis for warranty and service life comparisons.

Lining on the cupola furnace

Relining in shift operation

Common mistakes

- Heating up too fast after a new lining: trapped moisture cannot escape in a controlled way, and the steam pressure leads to cracks and even to explosive spalling.
- Running the working lining beyond its wear limit: slag and metal infiltrate the safety lining — a plannable renewal turns into a breakthrough risk with an unplanned shutdown.
- Putting ladles and runners back into service without a visual check: thermal shock cracks and local washouts go unnoticed and grow further with every cycle.

PRACTICAL NOTE

Define fixed replacement criteria for every unit — residual wall thickness, number of cycles, findings from the crucible monitoring — and decide on measured values instead of by feel. That turns refractory wear into a plannable maintenance variable. You will find further practice sheets and technical articles 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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