

SLIDE PROMOTING LININGS



SLIDE PROMOTING LININGS KEEP PRODUCTION FLOWING

Bunkers, chutes, troughs or similar equipment used for the storage and transportation of fine grained bulk materials often suffer problems of flow.

The sliding properties of typical wall materials, such as concrete or steel, are in most cases inadequate to ensure mass flow for the utilization of the complete storage volume. Depending on the bulk material being handled, sticking and/or material accumulations will develop. Clogging, reduced storage volumes or plant interruptions may occur which require costly flow promoting efforts. In actual practice, these flow promoting efforts reach from manual tapping to expensive air blast guns and mechanical discharge machines.

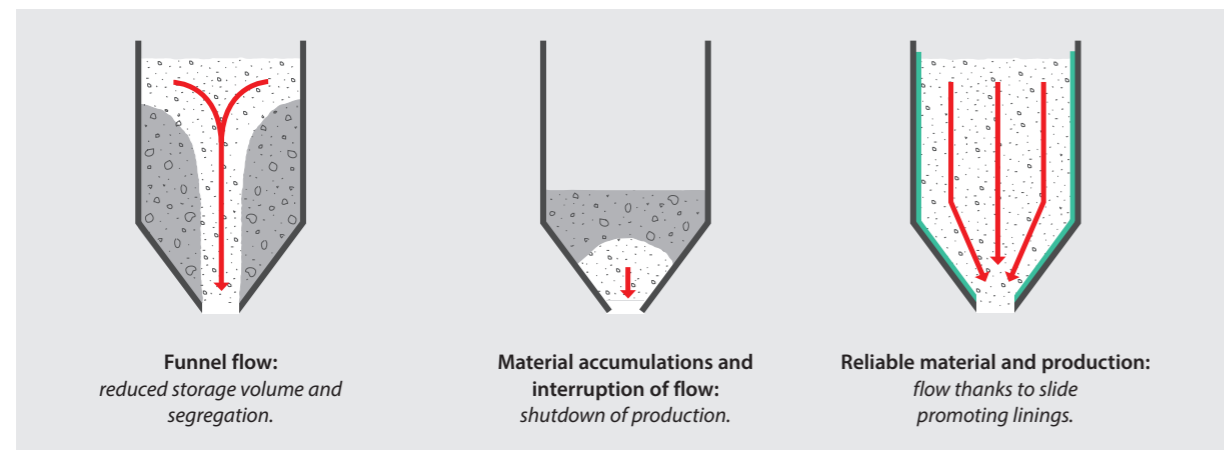
Even newly built installations can have these problems which cannot be avoided by structural measures, such as steeper sliding surfaces. The situation is even more complicated for plants that are already in operation. Significant improvements can be achieved by selective measures to reduce wall friction and to avoid adhesion, i.e. by the use of slide promoting linings.

Kalenborn uses different materials for that purpose and offers the most suitable lining and fastening techniques.



Bunker for fine coal:
The slide promoting lining ensures the material flow without sticking and clogging.

PROBLEM AND SOLUTION:



KALEN

synthetic sliding material has extremely good, material-specific sliding properties.

KALCERAM

KALCERAM hard ceramics are used for slide promotion wherever more intense abrasion and sticking constitute a twofold problem.

ABRESIST

With its hard and smooth surface, ABRESIST fused cast basalt is used to protect against harsh abrasion and ensure good material flow.

KALEN LININGS THERMOPLASTIC SYNTHETIC MATERIALS

KALEN linings are characterized by good corrosion resistance, an excellent surface finish and low weight.



TYPES AVAILABLE

The KALEN product range mainly comprises various polyethylene (PE) types with different properties.

All sliding plastics are processed and assembled into linings depending on the application.

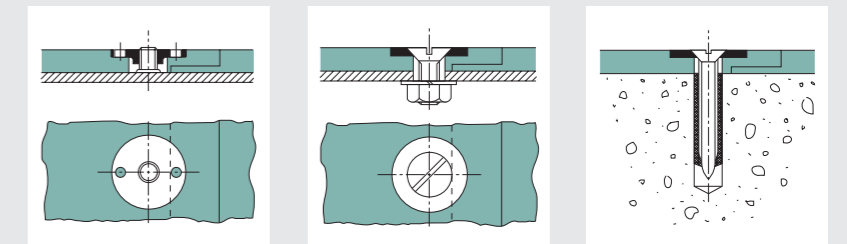
KALEN-250 (high molecular weight)	KALEN-500 (high molecular weight)	KALEN-1000 (ultra high molecular weight)	KALEN-1006 (ultra high molecular weight)
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FIXING AND INSTALLATION

Fixing depends on the component to be protected and the properties of the material chosen. Generally, mechanical fixing methods have proven particularly successful.

Kalenborn offers different types of bolts, doweling methods and specific weld studs with special nuts.

To avoid joints, particular types of KALEN allow welding of the sheets.



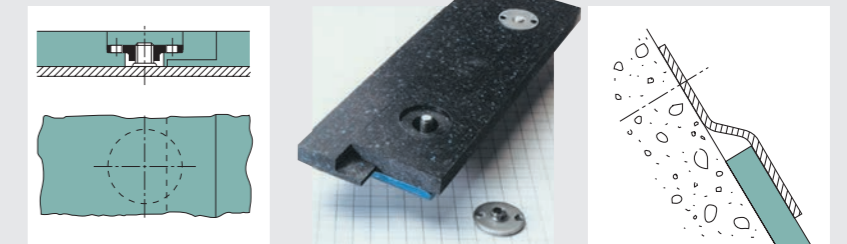
Fixing on steel by means of weld studs with special self-locking two-hole nuts.

Fixing on steel by means of countersunk bolts with nut and lock washer.

Fixing on concrete by means of countersunk screws and impact anchors.



Shaped in a furnace, KALEN linings cut to size adapt themselves to curved surfaces.



The "closed" solution has all fixing points of the lining closed with KALEN plugs.

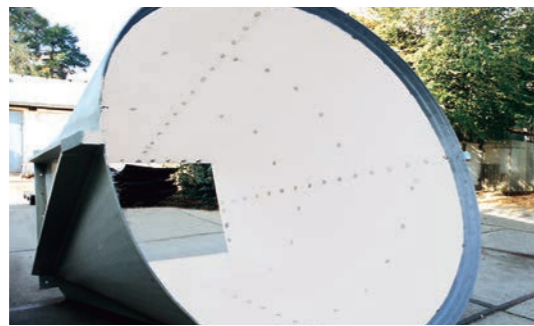
To ensure perfect sliding, fixing of the weld studs and the special nuts is flush with the KALEN surface.

A Z-shaped ledge prevents conveyed material depositing behind the KALEN sheets.

Thermoplastic Synthetic Materials Featuring Slide Promoting Properties

Clogging of outlets of large bunkers, e.g. for cement raw materials, fine coal or other easily sticking materials is a particularly annoying problem.

The desired mass flow will be achieved with the aid of a slide promoting lining. Sticking material accumulations and clogging will be avoided.



Silo cone with rectangular outlet. Plant components of any shape can be lined with slide promoting KALEN cut to the required size.



KALEN lining in the upper part of a fine coal bunker.

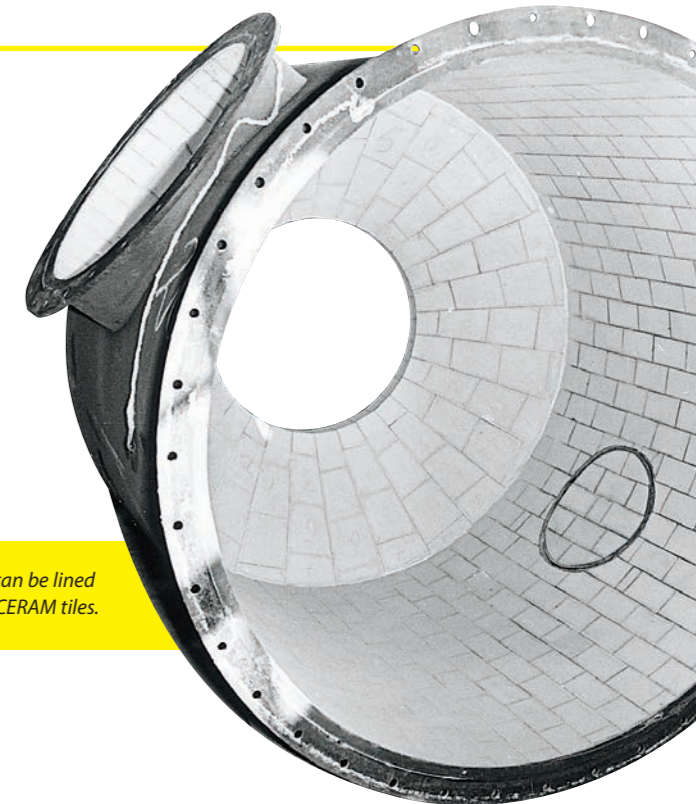


KALEN lining installed in a large German coal-fired power station. The material in the bunker is fine coal.

KALCERAM ABRASION RESISTANT HARD CERAMICS WITH GOOD SLIDING PROPERTIES



Even conical surfaces can be lined as required by cut KALCERAM tiles.



KALCERAM is particularly suitable where apart from sticking problems intense wear occurs and where the wear resistance of higher quality linings cannot be economically justified.

In contrast to high-priced wear protection materials, KALCERAM's properties offer an optimal price/performance ratio.

The production of KALCERAM places particular emphasis on abrasion resistance.

TYPES AVAILABLE

KALCERAM is supplied as standard tiles or, if required, as made-to-measure tiles. They are used for plant components for which a smooth surface and medium wear resistance are requested. These include coal bunkers and chutes, fine-coal troughs, thickeners and chain conveyors.

FIXING AND INSTALLATION

Depending on the application, KALCERAM tiles are set in different KALFIX systems.



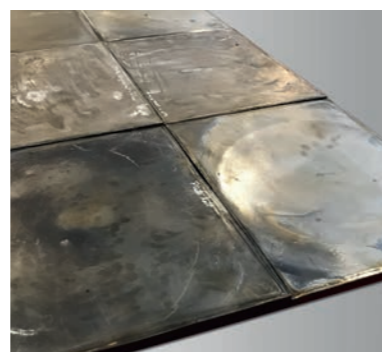
Chutes with KALCERAM lining are a durable solution, e.g. for sack loading facilities in cement plants

ABRESIST WEAR RESISTANT FUSED CAST BASALT WITH SLIDE PROMOTION

The slide promotion surfaces of ABRESIST ensure good material flow. The surface of the tiles and cylinders are always smooth. Even after remaining stationary in a wet transport system, it is practically impossible for bulk materials to clog or stick. The sliding properties are comparable to those of polyethylene (PE) plastics. Unlike plastic, however, this mineral material is a natural product, which is therefore also fully recyclable and sustainably protects nature. ABRESIST does not rust and is chemically resistant against acids and bases.*

TYPES AVAILABLE

Custom, precision-made cylinders for lining pipes and pipe bends. Thin-walled, pressure-resistant construction as thin as 12.5 mm can be used to achieve significantly higher efficiency and throughput than with previous linings. Available as specially shaped elements or tiles for plant components in dimensions of up to 600 mm (length) x 500 mm (width) and 17 mm (thickness).



FIXING AND INSTALLATION

The light weight of ABRESIST tiles, specially shaped elements, and cylinders for pipe systems significantly lowers transportation and installation costs. Though generally installed as specially shaped elements in special adhesives (KALFIX), mechanical fixing or joining methods (screwing and welding) are also possible.



COMBINED LININGS

More Economical due to Good Material Flow and Similar Lifetimes for all Plant Components



High conveying speeds and abrasive materials cause wear in the systems. However, wear is often of varying intensity in the different areas. On the other hand good slide promoting properties are also required.

This is where a combination of the different Kalenborn linings proves successful.

Being designed on the basis of the necessary experience, all components reach similar lifetimes without one of them failing prematurely or another one having been excessively protected.

SLIDE PROMOTION LININGS FOR VARIOUS INDUSTRIES, MATERIALS AND PLANT COMPONENTS

Werkstoffe	Slide Promotion	Temperature Resistance	Wear Resistance	Remarks
KALEN	+++++	80 °C	+	Corrosion-free, smooth surface and good abrasion resistance
ABRESIST	+++	350 °C	++++	Slide promotion wherever abrasion and sticking constitute a twofold problem
KALCERAM	+++	350 °C	+++	Corrosion-free, smooth surface and good abrasion resistance

Industries	Materials	Plant Components
Cement industry	Fine coal, marl, limestone, cement, raw materials	Bunkers Chutes Discharge hoods
Coal industry	Lignite, hard coal (fines)	Dump trucks
Coke plants	Fine coal	Front loader shovels
Foundries	Molding sand	Hoppers
Glass industry	China clay	Silos
Gypsum plants	Gypsum	Transfer Sections
Lime plants	Limestone, marl, sand	Troughs
Pet food plants	Pet food, animal powder, grain	Vessels
Potassium & salt industry	Salt	Vibrating Troughs

