

Instructions for Preparing KALCRET Wear-Protecting Compound

KALCRET Hard Compound

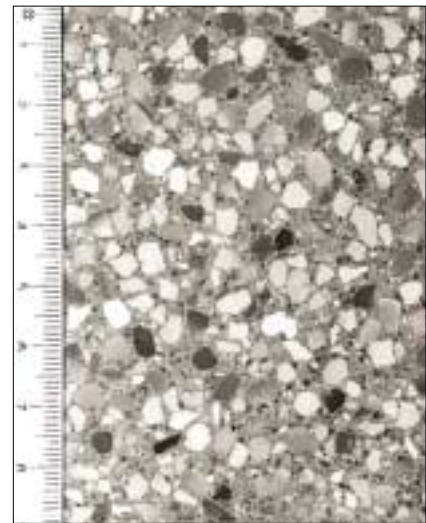
KALCRET hard compound is the general term for cement-bonded wear-protective materials. These are based on inorganic materials of high compressive strength and good wear resistance.

The mixture which includes defined additives is made up of:

- hard aggregate materials
- cement binder
- micro silica

KALCRET is offered as a compound that can be cast or trowelled. It can be worked either at the Kalenborn works or by the customer's installation experts at the site.

Make sure the specific working instructions for the particular KALCRET material are exactly observed. Brief information has been printed on each KALCRET bag.



Crystalline structure of KALCRET: high-strength cement matrix, hard compounds 0 ... 4 mm, maximum packing density

KALCRET Products

	KALCRET BN	KALCRET CN	KALCRET SN	KALCRET BT	KALCRET CT	KALCRET ST
Hard Aggregate	Bauxite	Corundum	SiC	Bauxite	Corundum	SiC
particle size mm	0...4	0 ... 4	0 ... 4	0 ... 4	0 ... 4	0 ...4
density g/cm ³	2.8	2.9	2.8	2.8	2.9	2.8
compressive strength - 28 days N/mm ²	190	185	150	180	175	140
bending tensile strength - 28 days N/mm ²	26	26	20	25	25	18
max. application temperature °C	400	400	400	1.200	1.200	1.200
hard aggregate percentage	70%	70%	70%	70%	70%	70%

All compounds can be installed either by trowelling (X) or casting (Y).

Packing and Storage

Normally, KALCRET is packed in 25 kg plastic bags. The material has been protected against moisture. The steel fibres are delivered in 1 kg paper bags.

Provided KALCRET is stored in a dry environment, it can be kept at the site up to 12 months after production.

Working Temperature

KALCRET can best be worked at temperatures between 10°C and 30°C. Working at temperatures below 5°C requires heating of the system to be lined.

When large surfaces have to be lined at temperatures below 5°C we recommend the use of prefabricated KALCRET shapes.

Preparing the Surface to be Lined

- The use of KALCRET hard compound necessitates careful preliminary treatment of the surfaces to be lined:
 - A suitable metal wire mesh is fastened with corresponding accessories at a distance of approximately 5 mm from the wall to be lined. The fastening points should have a spacing of 250 mm. The wire mesh shall be fastened stiff and firm. Linings of more than 40 mm thickness require the use of spacers.
 - Steel surfaces shall be cleaned. Sandblasting is not necessary.

- Concrete surfaces shall be cleaned as well (they shall be free of any oil or grease and loose particles) and be wetted prior to application (identical to the method adopted when applying cement-bonded materials).

Setting Time

The final strength of KALCRET linings is achieved at temperatures of approximately 20°C after some 28 days. After 48 hours the strength has already reached 80%. The minimum setting time, e.g. for repairs, is 24 hours.

Longer setting times will have to be expected for temperatures of less than 20°C.



KALCRET is wear protection in the bag.



Welding of metal wire mesh: spacing approx. 250 mm.

Check List

- sufficient quantities of KALCRET and steel fibres
- clean water: potable water
- correct electrical supply for the mixer and vibrating trowel
- clean forced circulation mixer
- plastic bucket (20 liters) and glass measures (1 liter and 2 liters)
- precise working scale (5 kg)
- timer
- working tools
- protected mixer zone
- no direct sunlight
- surface sealing system
- personal protection (gloves, helmet, goggles, mask)
- observe safety data sheet precautions
- adhere to working instructions



Stiff and firm fastening, distance to surface to be lined approx. 5 mm.

Kalenborn has recommended tools approved for the working of KALCRET.

They have been widely applied and tested in practice. Various tools have been modified for this particular purpose and are not available from commercial dealers.

Check List

- Medium-sized forced circulation mixer, mixing capacity 50 liters with 1.5 kW motor, 33 rpm (other mixers on request)
- forced circulation mixer with wear-protected mixing tank
- mason's trowel, large
- mason's trowel, small
- smoothing trowel
- spatula, 40 mm or 80 mm
- vibrating trowel, approx. 23.5 x 13.5 cm
- internal vibrator
- external vibrator
- measuring flask with graduation – 1 liter or 2 liters
- plastic bucket – 10 liters or 20 liters
- mortar bucket – 85 liters
- pre-profiled metal wire mesh (material to be chosen with due regard to specific requirements)
- tools for fastening the metal wire mesh as required
- rubber mallet for mounting the metal wire mesh
- device for deforming the metal wire mesh
- steel fibres (matched to the specific requirements)
- surface sealing spray (curing liquid)
- PE sheeting



Working tools for KALCRET.



KALCRET forced circulation mixer.



Wear-protected mixing tank.

Preparing the KALCRET Compound

- Place required KALCRET quantity in a forced circulation mixer. 1 bag of KALCRET (25 kg) yields about 9 liters of compound.
- Have hard compound mixed dry for about 30 seconds.
- The specified water/hard compound ratio must be observed.
- Carefully measure the required water quantity (either by measuring flask or by weighing) and slowly add it during mixing. Make sure only clean potable water of a maximum temperature of 25°C and a minimum temperature of 15°C is used.

Caution:

Follow working instructions on the KALCRET bag.

- **Be patient!**

The mixing time shall at least be 10 minutes.

- We always recommend adding steel fibres at a rate of 1 kg/bag of KALCRET.
- The steel fibres should be added towards the end of the mixing time (after 8 to 9 minutes) making sure that no lumps are formed. Mixing time approximately 2 minutes.
- The working temperature range is 10 to 30°C; direct sunlight should be avoided.
- The mixture can be worked for up to 1 hour at a temperature of 20°C.
- The minimum setting time is 24 hours.



KALCRET and water to be mixed as specified in the working instructions.



Mix for 5 minutes as specified; check result.



Mixture too dry: gradually add up to 30 ml of water per 25 kg of KALCRET.



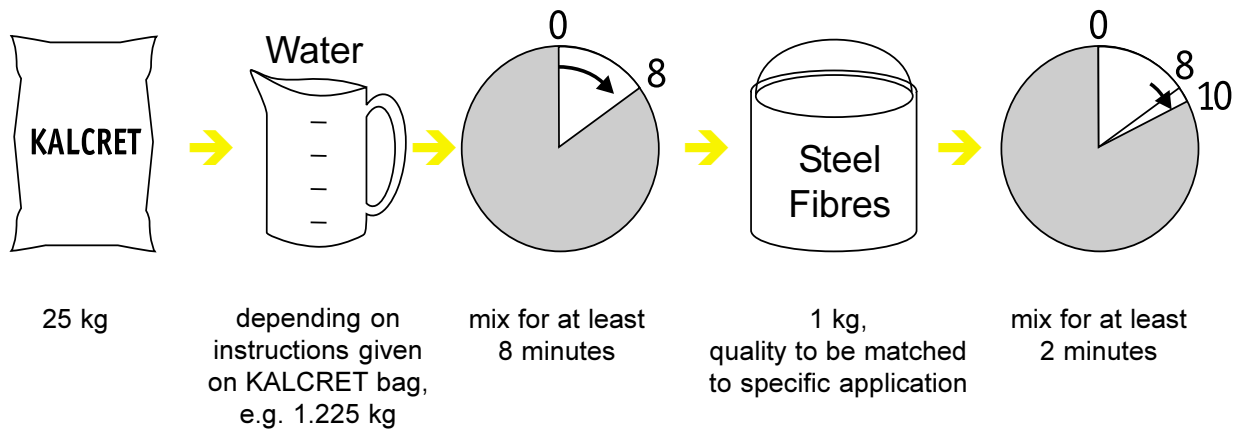
Continue mixing: for at least 3 minutes. Check result.



Add steel fibres.



Continue mixing: for at least 2 minutes. Check result.



Mixing of KALCRET



KALCRET compound must be sticky and allow plastic deformation.

Check List

- mixer and water shall be clean
- use moderately warm water (15 to 25°C)
- make sure the materials are free of lumps
- precisely measure water to be added
- mix for at least 10 minutes in the forced circulation mixer
- if the KALCRET compound is too dry: gradually add up to 30 ml of water each per 25 kg of KALCRET
- the KALCRET compound is ready for use when it is sticky and allows plastic deformation
- do not use the compound at temperatures below 5°C

Use of Steel Fibres



Kalenborn always recommends adding steel fibres.

Check List

- 1 kg of steel fibres per bag of KALCRET
- carefully mix steel fibres and KALCRET in a forced circulation mixer: after 8 to 9 minutes for approximately 2 minutes
- steel fibres must not form lumps, therefore add them selectively and slowly

This compound allows protection on vertical, inclined and curved surfaces. KALCRET is homogeneously mixed, applied to the properly prepared sub-surface with suitable tools, compacted either manually or by means of vibrating trowels and smoothed. Standard thickness ranges between 20 and 80 mm.

A pre-profiled metal wire mesh has to be mounted on steel and/or concrete surfaces to ensure good adhesion.

The minimum setting time at an ambient temperature of 20°C is at least 24 hours.

The surfaces shall be protected against excessive evaporation of residual moisture. This can be done either by a suitable surface sealing spray or by covering with PE sheeting.

The use at temperatures above 50°C requires selective provision of expansion joints. Moreover, when used at temperatures above 100°C specific heat-up curves have to be observed.

We recommend the use of prefabricated KALCRET shapes for overhead linings.

Check List

- prepare KALCRET compound that can be easily trowelled
- make sure the correct quantity of water is added
- mix for at least 10 minutes
- make sure no lumps are formed; provide for additional mixing, if necessary
- add steel fibres (after 8 - 9 minutes)
- make sure the surfaces are clean
- make sure the metal wire mesh has been properly fastened
- apply sufficient KALCRET and compact it
- use external vibrator
- provide for complete backfilling of the metal wire mesh
- check thickness
- produce smooth KALCRET surface
- have surface sealed
- or have surface covered by PE sheeting for 2 days

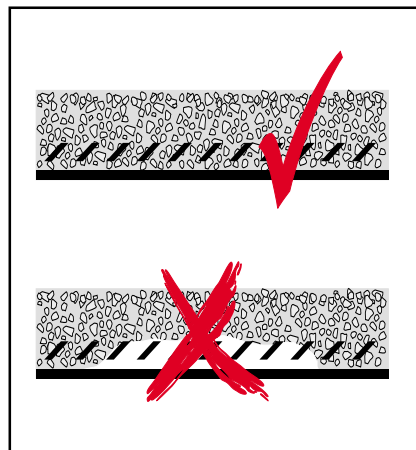


Prepare compound to be trowelled as specified.



Working temperature: 10 - 30°C

Apply sufficient KALCRET and compact it.



Ensure complete backfilling of the metal wire mesh.



Working time: 1 hour

Check thickness and make it uniform, if necessary.

This material will be particularly useful for wear protection of surfaces for which internal and external formwork can be made. Normally, simple formwork that is as smooth as possible on the KALCRET side will be adequate.

The casting compound is mixed as specified, cast into the prepared formwork and compacted with a vibrator. Slow casting and compaction of smaller quantities at a time result in uniform wear protection.

The formwork can be stripped after approximately 24 hours at 20°C ambient temperature. The surfaces should be safeguarded against excessive evaporation of residual water. This can be ensured by a suitable surface sealing spray or by covering with PE sheeting.

The use of KALCRET at temperatures above 50°C requires the selective provision of expansion joints. When used at temperatures of more than 100°C specific heat-up curves have to be observed.

Check List

- prepare castable KALCRET compound
- make sure the correct quantity of water is added
- mix for at least 10 minutes
- make sure no lumps are formed; provide for additional mixing, if necessary
- add steel fibres (after 8 - 9 minutes)
- carefully prepare the formwork
- make sure the surfaces are clean
- check correct placement of metal wire mesh
- cast and compact KALCRET
- use external vibrator
- check filling
- produce smooth KALCRET surface
- have surface sealed when stripping the formwork after 24 hours
- or have surface covered by PE sheeting for 2 days



Prepare formwork.



Prepare cast compound as specified.



Carefully fill formwork.



Use external vibrator for compacting.



Pipes and Pipe Bends

Pipes and pipe bends lined with KALCRET are normally produced with an inside diameter of more than 40 mm. Inside diameters up to 600 mm are lined with castable KALCRET whereas the use of trowelled in KALCRET is more economical for inside diameters beyond 600 mm.

Benefits:

- inside diameter of more than 40 mm
- radii of more than 500 mm (variable)
- pipe lengths up to 5 000 mm
- jointless linings feasible for thicknesses of more than 20 mm
- asymmetric cross section
- connections as defined in standard specification Rd 6a
- wear monitored by KALDETECT



Shaped Elements

Prefabricated KALCRET shapes have passed the test in practice. Tiles and shaped elements are prefabricated from the cast compound and equipped with well-known attachment hardware, such as steel corner inserts. Dimensions up to 300 x 1000 x 30 mm are feasible.

Benefits:

- minimized number of different shapes
- high wear resistance at constant quality
- no „man“ factor
- drastically reduced installation times
- lining can be used immediately after installation
- can be used even at temperatures below 5°C
- simple overhead installation

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