

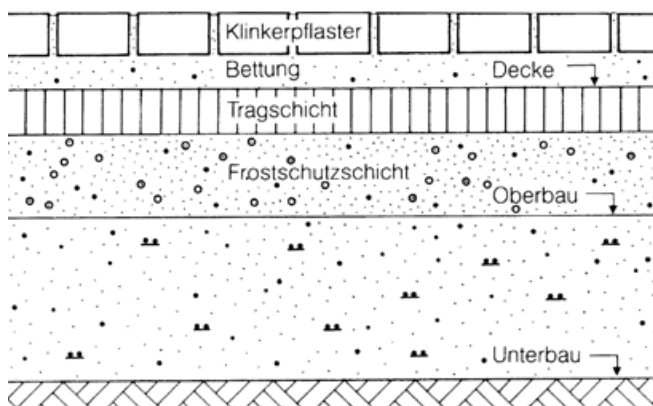
Laying clinker paving bricks safely and securely

Clinker paving bricks meet the quality requirements of the standards DIN 18 503/DIN EN 1344. They are also subject to a quality management system (QMS) in accordance with EN ISO 9001:2000. Our clinker paving bricks are extremely stable, acid-resistant and do not weather.

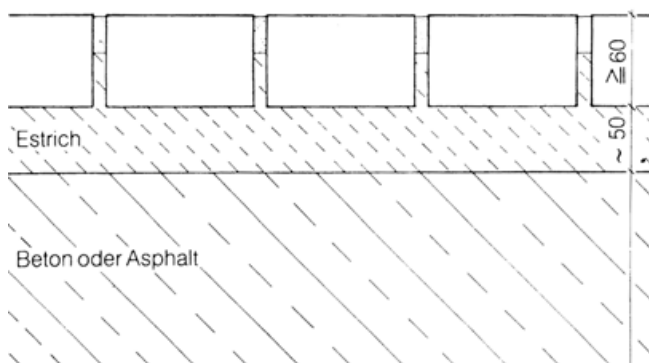
We offer clinker paving bricks in categories **F** and **E**: Category F bricks are laid with joints with a width of between approx. 8 mm to 10 mm (in exceptional cases).

Category E bricks are laid with a narrow joint that is approx. 3 mm wide and designed to hold joint material with a grain size of 0–2 mm.

The structural stability of the clinker paving bricks depends on the quality of the base courses.



The courses of a clinker paving structure (M 1:10). From top to bottom: clinker bricks, foundation, surface, base course, frost protection course, sub-base, substratum



Clinker paving on concrete. Case 2 (M 1: 5). From top to bottom: screed, concrete or asphalt. (When the bricks are laid in mortar, 10 mm-wide mortared joints can be chosen.)

The foundation:

3 cm to a maximum of 5 cm thick and comprised of compacted sand with a grain size of 0–4 or 0–5 mm, fine-grained gravel or high-grade crushed chippings with a grain size of 1–3 mm or a mixture of high-grade crushed chippings with a grain size of 1–3 mm

or a mixture of high-grade crushed chippings and crushed sand with a grain size of 0–5 mm. The oversize grain size should not exceed 8 mm. To ensure structural stability, it is important to have good grading of the grain sizes.

Please note:

Protect the clinker brick surfaces against soiling caused by binding agents.

The substratum:

Depending on requirements, there should be one or more base courses that are permeable to water under the foundation. This so-called sub-base forms the substratum for the foundation and the clinker paving bricks. The thickness and layering of the substratum must be dimensioned in accordance with the German Guidelines for the Standardisation of Pavement Structures of Traffic Areas (RStO) or equivalent. The courses should be formed in layers and must be compacted.

Granular mixtures with a large number of hollow spaces in the substratum must be given a closed surface by means of vibration filling or slurring with sand before the sand foundation is laid!

Only use foundation material that contains no efflorescent substances. Before industrial by-products (slag, recycling material) are used, their chemical suitability must be checked with regard to efflorescence caused by chemical reactions and hardening.

For more detailed information on the substratum, please refer to:

- German Additional Technical Conditions of Contract and Directives for Earthworks in Road Construction (ZTVE-StB)
- German Additional Technical Conditions of Contract and Directives for the Construction of Base Courses in Road Construction (ZTVT-StB)
- German Guidelines for the Standardisation of Pavement Structures of Traffic Areas (RStO)
- German Construction Contract Procedures (VOB), Part C, General Technical Specifications in Construction Contracts (ATV), DIN 18 299
- German Construction Contract Procedures (VOB), Part C, General Technical Specifications in Construction Contracts (ATV), DIN 18 318
- Information sheet on paved areas with paving stones and slabs

Drainage:

Surface drainage must be ensured by means of sufficient inclination of the clinker brick surface, namely at least 2.5 % (2.5 cm/m). The slope, which should usually be 3 % and no more than 6 %, should already be formed by the substratum and foundation.

The water flowing from the surface must be drained off reliably. The final clinker paved area must be approx. 1 cm higher than the water drainage level. Drainage

channels or water inlets should be incorporated into the area in accordance with the size of the area, as stipulated in the "Drainage" section of the German Guidelines for the Construction of Roads (RAS-Entwässerung).

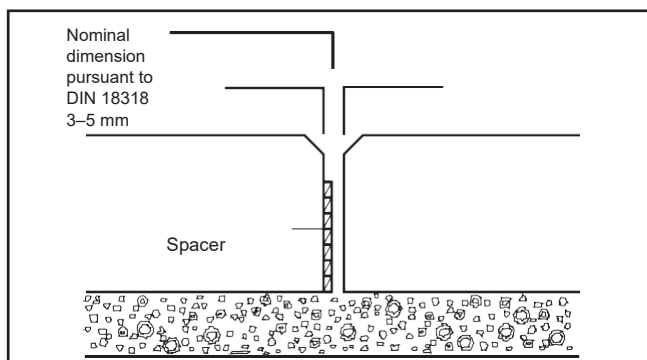
Laying paving:

Lay mixed clinker paving bricks from several different pallets on the pre-compacted sand foundation that has been levelled to the desired height based on your layout plan. Be sure to follow the planned brick bond and work inwards from edges that have already been fixed in place. Observe the joint width as stipulated by the standard DIN 18318, in the case of Category E clinker paving bricks approx. 3 mm to contain sand with a grain size of 0–2 mm. Simple tools can be used to make it easier to lay the bricks with precise joint distances: aluminium paving rail, string.

To secure the installed condition of areas that have already been paved, immediately sprinkle them with sand. Before compacting the paving by means of vibration, sprinkle the area with sand with a grain size of 0–2 mm, sweep it into the gaps and slurry. Use a surface vibrator with a rubber pad or a neoprene protective plate for compacting. Operate the surface vibrator with slight imbalance, always working from the edge that has been fixed in place towards the middle. The sand foundation must be earth-moist.

Joint:

The bond strength of the paving is achieved by filling the joints, so sand with the best possible cohesive properties should be used. For narrow joints (3 mm), use a grain size of 0–2 mm. Fill the joints completely and slurry. Use the same procedure for clinker paving bricks laid on a mortar foundation with a wide joint of approx. 8–10 mm. In the case of a strong load on the paving due to water, fuels and oils, the joints must be pointed. Before pointing the joints, blow them out to a depth of at least 30 mm and adjust the pointing mixtures to suit the installation conditions and intended use of the paving (mortar with a fluid consistency, joint sealing compound, fuel-resistant jointing compound).



Correct joint formation: even when using spaces, the clinker bricks should not touch.

Clinker paving bricks in track areas:

Please refer to the Provisional Information Sheet for the Construction of Tram Tracks in Road Surfaces

("Vorläufiges Merkblatt für den Einbau von Straßenbahngleisen in Straßenfahrbahnen") and the Technical Terms of Delivery for Bituminous Joint Sealing Compounds (TLbit Fug).

Clinker paving on a concrete base course/asphalt:

Case 1 – Lay the bricks on a sand foundation with a thickness of 3–5 cm, ensuring that water inlets are provided in the base course to guarantee rapid and reliable water drainage, then treat as described above.

Case 2 – Always lay both Category E and Category F clinker paving bricks with a joint that is approx. 8–10 mm wide. Where necessary, vibrate them into the still-fresh, earth-moist layer of screed while carefully adding water to ensure that the foundation mortar touches the sides of the clinker bricks. Strictly observe the height of the individually laid clinker bricks by constantly checking it with a level and paying attention to the inclination! Before the concrete has hardened, only walk on the paving bricks with planks in order to better distribute the load. Use a jointer to fill the approx. 8–10 mm-wide joints with suitable mortar. Place the expansion joints!

General information:

Once they have been fully compacted, the finished paved areas should be sprinkled with sand several times in order to completely fill the joint system and ensure the ultimate load-bearing capacity of the clinker paving. We recommend leaving the paved area to rest for several days before use. The recommended joint widths must be observed in order to avoid chipped edges. Clinker paving bricks should not be slurried with dealing agents containing cement or lime. Risk of staining or soiling!

Clinker brick paving that has been pointed with mortar or laid in mortar should only be approved for use after an appropriate hardening period. When pointing with mortar, the paved area should be kept damp for a sufficient amount of time. To avoid staining or soiling of the clinker paving at a later point in time, you should ensure that the sand used for the paving foundation, the sub-base and the pointing contains no efflorescent substances. Only clean sand should be used.

Further reference:

All regulations, guidelines and information sheets quoted above can be obtained (in German) from the German Road and Transportation Research Association (FGSV), Alfred-Schütte-Allee 10, 50679 Cologne, Germany.

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