Installation instructions

Reinforced concrete slot channel

Applicable Bodies of Rules:

DIN EN 1433 »Drainage channels for vehicular and pedestrian areas«
DIN 19580 »Drainage channels for vehicular and pedestrian areas«

The following laying instructions are general in nature with no reference to any specific installation situation. In each case therefore any and all additional specifications resulting from e.g. tender documents, structural analysis etc. for those particular cases must be complied with.

These laying instructions do not apply to the installation of the City Drain 100 or to the Pfuhler-slot drainage channel system Z with general technical approval Z-74.4-46 of February 1st, 2012. We can supply the laying instructions applicable in these cases.

Places of Installation

The appropriate load class of drainage channel to choose depends upon where the channel is to be installed. Typical places of installation have been divided as per DIN EN 1433 into groups numbered 1 to 6 as listed below. The figure shows the location of some of these groups in a highway environment. An indication as to which minimum load class of drainage channel should be selected is shown in parenthesis for each group. The selection of the appropriate load class is the responsibility of the designer. Where there is any doubt, a higher load class should be selected.

Groups of Installation:

**Group 1 (min. class A 15)**
Areas which can only be used by pedestrians and pedal cyclists.

**Group 2 (min. class B 125)**
Footways, pedestrian areas and comparable areas, private car parks or car parking decks.

**Group 3 (min. class C 250)**
Kerb sides (figure 10) and non-trafficked areas of hard shoulders and similar; Kerb units are always group 3.

**Group 4 (min. class D 400)**
Carriageways of roads (including pedestrian streets), hard shoulders (figure 10 and 11) and parking areas, for all types of road vehicles.

**Group 5 (min. class E 600)**
Areas subjected to high wheel loads.

**Group 6 (min. class F 900)**
Areas subjected to especially high wheel loads e.g. aircraft pavements.
Acceptance upon Delivery
Each delivery must be checked by the recipient for completeness and correctness against the delivery note before unloading. Furthermore, the condition and dimensions of the slot drainage channels and accessories must be verified. The delivery note must be signed to confirm that the delivery was received in an orderly condition. Note on the delivery receipt any transport damages that may have occurred and inform us in writing without delay. Posterior complaints cannot be accepted.

Unloading and Storage
Lifting appliances capable of precision lifting must be used to unload reinforced concrete slot drainage channels. Impact loading (e.g., lifting or lowering jerkily, setting down suddenly or dropping) and dragging are not permissible.

Reinforced steel slot drainage channels must be unloaded from the delivery vehicle using unloading and laying apparatuses – slot drainage channel loading devices – available from us together with an on-site spreader bar (minimum load-bearing capacity 3 tons, minimum distance between suspension points ≥ 1.00 m); refer to the drawing. Ensure that the elements are hung centrally. The slot drainage channel loading devices must be attached to the spreader bar so that the minimum distance of 1.0 m is maintained as shown on the drawing. Once inserted into the slot, the loading device is rotated at a 90° vertical angle to the slot and locked in that position. Do not hang a slot drainage channel from one loading device only. Ensure if using a forklift for the unloading that the edges and corners of the reinforced steel slot drainage channels do not become damaged.

The reinforced steel slot drainage channels must be stored in a manner that ensures that they will not be damaged. Use squared timbers between layers if they will be stored in a stack.

Bedding
The slot drainage channels require different kinds of support depending on the composition of the subsurface and the projected traffic loads. All slot channels conform to DIN EN 1433 type I, i.e., they do not require additional support to accommodate the vertical and horizontal loads in service.

Channels in places of installation of groups 1 to 4 must be laid on a carefully compacted bed of grit-sand or gravel (anti-frost layer) and a frost-proof, permanently stable equalizing layer preferably made of concrete.

Channels in installation locations of group 6 must be laid on a statically determined reinforced concrete foundation in order to guarantee sufficient load dissipation into the subsoil and therefore compliance with the permissible soil pressure. A minimum concrete quality of C 25/30 air-entrained XC 2, XF 2, XA 1 or C 30/37 XC 2, XF 2, XA 1 must be used if exposure of the foundation to moisture and deicers cannot be ruled out. A minimum concrete quality of C 25/30 XC 2, XF 1, XA 1 is to be used in cases of water containing deicers cannot reach the foundation.

Further considerations must be made that take account of the maximum permissible soil pressures and settlements for installation locations of group 5 and for loads that exceed traffic loads by aircraft (for example container-handling vehicles such as Reach Stackers).

The characteristic values for the plane beneath the foundation or the blinding layer and, if applicable, the minimum dimensions and the minimum reinforcement of the foundation that form the basis of the static calculations are taken from the guide drawings for installation and support in each respective installation situation. It is imperative that these specifications be complied with. If positioned on a foundation the connection between the channel and the foundation must be made with a suitable, volume-stable assembly or compound mortar. The mortar joint must have the strength properties of a C 25/30 at minimum and of a C 50/60 at maximum. The frost resistance and resistance to deicers of the mortar must be taken into consideration if it cannot be ruled out that this joint may at a later date be exposed to moisture. If the substructure for gullies in installation locations of group 6 is fabricated from concrete parts for road gullies in accordance with DIN 4052, the foundation in this area must be widened and the reinforcement must be laid around the gully substructure. A guide drawing can be provided upon request.

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Dated 05/13
Reinforced concrete slot channel installation location groups 1 to 4, Installation and Bedding

Joint sealant
(applied as per the manufacturer’s guidelines)

Concrete road surface
For rigid paved areas always make running joints such that no damaging horizontal forces can be transmitted from the base into the drainage channel

Foundation of the equalizing layer on frostproof floor (F1)
Subsoil bedding factor $C \geq 10 \text{ MN/m}^3$, required permissible soil pressure $250 \text{ kN/m}^2$ and subsoil compacting values as per ZTVE-SiB or ZTVT-SiB according to the construction class of the vehicular or pedestrian area

Reinforced concrete slot drainage channel installation location group 6, Installation and Bedding

Joint sealant
(applied as per the manufacturer’s guidelines)

Concrete road surface
For rigid paved areas always make running joints such that no damaging horizontal forces can be transmitted from the base into the drainage channel

Foundation of the equalizing layer on frostproof floor (F1)
Subsoil bedding factor $C \geq 20 \text{ MN/m}^3$, required permissible soil pressure $350 \text{ kN/m}^2$ and subsoil compacting values as per ZTVE-SiB or ZTVT-SiB according to „Instructions for the construction of concrete road surfaces on airfields“, FGSV
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Laying

Reinforced concrete slot drainage channels must be laid using suitable lifting appliances capable of raising and lowering smoothly and precisely (e.g. truck-mounted crane or a suitable hydraulic excavator). Always use the loading devices supplied (drawing) as described in item 3.

Channels in installation locations of groups 1 to 4 are laid in the already-prepared mortar bedding and straightened with shims if necessary. The ground beneath the channel cannot subsequently be packed tightly due to the necessity of a continuous support for the channel. This also applies to the arrangement of a foundation beneath the channel elements and the use of a prepared mortar bedding of assembly mortar on the foundation. If a compound mortar is used the channels must be placed and aligned on suitable spacers. Fill the gap between the channel and the foundation with the compound mortar described above so that the channel is fully supported across its lower surface.

Clean the collar and the sealing ring and apply to the sealing surface a thick coat of the supplied lubricant before connecting the elements. Then bring the slot channel hanging from the loading devices up to the already-laid drainage channel until the sealing ring is uniformly covered and press the parts together. Once the drainage channel elements have been joined check to ensure that the sealing ring has not been displaced. Separate the channels if this is the case, pull the sealing ring back on correctly and rejoin the parts. Align the surfaces by placing shims beneath the channels if necessary. Ensure that the width of the butt joints is approx. 10 mm; the minimum distance is 5 mm, the maximum 15 mm. To simplify laying there are elastomer spacers attached to the front of the spigot end that maintain this clearance. The channels must be joined so that the spacers lie against both component parts. The correct clearance can be set if there are no spacers by e.g. inserting wooden slats of appropriate size into the joint on each side of the collar while pressing the two parts together. Under no circumstances should the channels be joined with a press joint.

No forces such as thermal exposure may be transmitted to the slot drainage channels from the connecting vehicular and pedestrian areas. If the surfaces have been manufactured from stiff materials such as e.g. concrete then this must be taken into account at the planning stage. Adequately dimensioned expansion joints (not concealed joints) must therefore be implemented in the pavers along the reinforced steel slot drainage channels. Continuous EPS (rigid foam slabs) of EPS EN 13163 CS(10)150 or equivalent must be installed into the gap between the channel element and the vehicular and pedestrian surface for the entire height of the channel to facilitate the transfer of braking forces from the channels to the neighboring elements. These slabs may never become so compacted by expansion of the neighboring paved areas that they transfer damaging horizontal forces to the channel elements.

The longitudinal and transverse joints may if necessary be filled with a suitable joint sealant once laying has been completed and the neighboring surfaces have been finalized. Take care that the transverse joints must be formed durably in order that slight longitudinal movements of the slot drainage channels resulting from, for example, temperature expansions can be absorbed. No frictional connection may occur between the channel elements to avoid spalling resulting from this. This means that the joint may not be filled with inflexible materials such as mortar or concrete.
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Reinforced slot drainage channels may not be run over during installation before the neighboring vehicular and pedestrian surfaces have been finalized to avoid spalling at edges and corners. If compacting machines or paver-finishers are used ensure that they are not used in too close to the reinforced steel slot drainage channels.

Arrangement of unloading and laying tools

Foundation reinforcement and concrete quality

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<tr>
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* ø 16 for 20R profile / bending roller diameter $d_{br} = 4$ cm

Concrete cover $c_{nom} = 55$ mm

If there is potential exposure to frost and deicers C25/30 air-entrained XC2, XF2, XA1 or C30/37 XC2, XF2, XA1

No potential exposure to frost and deicers C25/30 XC2, XF1, XA1

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