
AIRPORT
OUTLET
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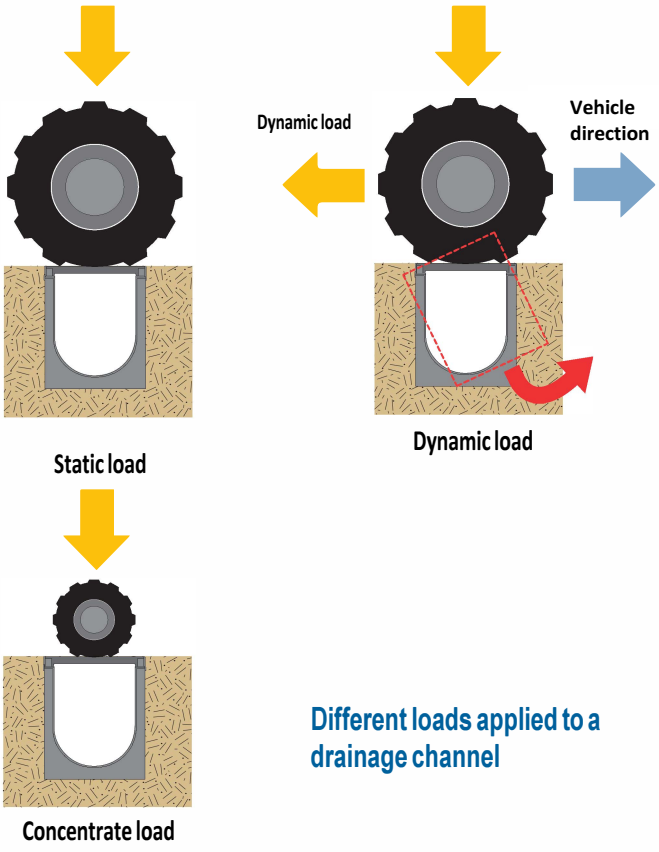
TECHNODRAIN SYSTEM

RECOMMENDATIONS FOR THE INSTALLATION OF THE TECHNODRAIN SYSTEM (EN 1433 TYPE M)

Step 1 Requested load class

The first step of the design of the drainage system starts from an undertanding of which cover/grating and channel characteristics are necessary to use. Before commencing works ensure that the correct products have been chosen in terms of loading class, design elements specified in the architectural and technical project (e.g. anti heel gratings, stainless steel gratings) and surface drainage requirements in relation to hydraulic sizing. Load classes identified in the Standard EN 1433 show the technical characteristics of the drains in relation to the loads, (e.g. presence and thickness of metallic edges). In the case of vehicle traffic it is important to consider the speed the linear drainage can support and to choose the appropriate type of grating and fastenings for the operating environment (e.g.vehicles travelling at high speed or ones that turn and brake on the gratings will apply a dynamic load much greater than a simple static load). A common case is where the channel is located on an access ramp or in a multi story car park. It is also necessary to pay attention to possible future uses of the project site. An area that is sometimes subjected to, or in specific cases, heavy and dynamic loads (e.g passing of Fire Engine, goods unloading, forklift trucks) has to be installed with the appropriate channels and gratings for the most sustainable demanding use, e.g. the solid tyre of a forklift applies a high concentrated wheel load relative to other vehicles of the same weight. The diagram below shows the location of each load class A15 - F900.



Different loads applied to a drainage channel

Loading Class with recommended channels (EN1433)

A 15 • Pedestrian areas and cycle paths (Recommended NEO/EVO)

B 125 • Pavements and residential-parking areas (Recommended NEOMAX/EVOMAX)

C 250 • Car parks (Recommended EVOMAX/EXEL/PRO MAGNUMCITY)

D 400 • Carriageways and commercial areas for heavy vehicle parking (Recommended EXELPRO/PROMAX/MAGNUMTRAFFIC)

E 600 / F 900 • Port and airport areas, industrial areas with traffic of forklift trucks (Recommended PROMAX/MAGNUMTRAFFIC)

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Step 2 – Hydraulic sizing of the drainage system

The water collection and disposal system (channel + outflow pipes) should be sized according to:

- The pluviometric and meteorological characteristics of the site;

- form and sloping on the collection area;

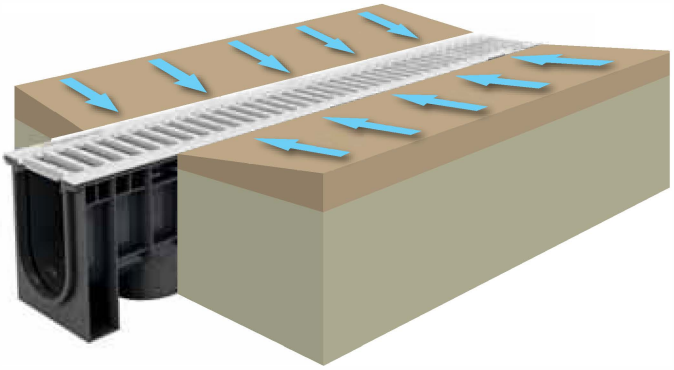
- type of paving used (asphalt, concrete, paving stones, etc;

- and possible aggressive characteristics of disposable liquid.

Attention must be paid to access roads that can pour water directly into the drainage area. In this case, the area considered tor drainage must be the sum of all these components (open-area, possible access routes, coverings). It will also be necessary to consider recent climate change that entails frequency of rain of short duration but high intensity, capable of saturating the existing drainage networks in a short time.

For this reason, an appropriate security coefficient will have to be considered, to be applied to the maximum drainage capacity of the system chosen.

Our technical office is always available for a correct and rapid sizing of the drainage system and for all advice on Technodrain channels and gratings to be installed, you can contact us by telephone on 01733 765317 or by e-mail: sales@clark-drain.com



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Step 3- Installation

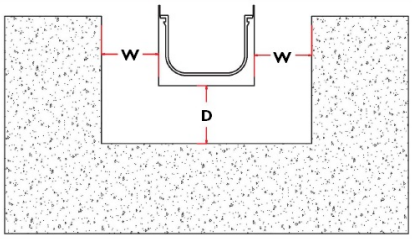
The Technodrain is a type M (EN 1433) channel, therefore it needs a concrete support with adequate depth to distribute the vertical and horizontal loads.

A. Preparation of the installation area, measuring of the excavation area:

The excavation/trench for the installation of a Technodrain drainage system, should be measured considering the external blocking of the channel and the necessary depths of concrete for the support and foundation described in Table 1 and illustrated below as width W and depth of foundation D. The excavation must foresee the size of possible out-flow pipes.

The installation area must have a load-bearing capacity that is in line with the appropriate load classes. This can be increased by compacting the installation surface using appropriate methods or reinforcing the foundation or concrete support with electro-welded net or steel reinforcing rods. Reinforcement is highly recommended in cases of high speed, high volume vehicular traffic or high concentrated loads (E600-F900).

Tab. 1. Recommended depth for foundation and concrete support in relation to the loading class



Loading Class EN 1433	A15	B125	C250	D400	E600	F900
Applicable load EN 1433 (kN)	15	125	250	400	600	900
D - Depth of foundation	100	100	150	200	250	250
W - Width of support	100	100	150	200	250	250
Resistance class concrete (EN 206-1)	C 20/25 C 30/37 XF4*	C 25/30 C 30/37 XF4*	C 25/30 C 30/37 XF4*	C 30/37 C 35/45 XF4 *	C 30/37 C 35/45 XF4 *	C 35/45 C 40/50 XF4 *

**To be used in cases where concrete is exposed to cycles of freezing and thaw*

B. Concrete foundation

The installation area must be have a concrete foundation of D depth. The concrete used for the foundation and the support of the Technodrain units must possess fluid characteristics capable of encouraging the filling of all- the cavities formed by the reinforcement structure of the channel (BS EN 206-01). For this reason, the size of stone aggregates in the concrete must not go over a 15-18mm diameter. The minimum resistance class of concrete for the foundation must be compatible with the foreseen loading class. It is strongly recommended to use a pre-mixed mortar that can be found on the market such as those offered in the Instarmac range. These types of mortars, guarantee low volumetric shrinkage of the concrete and reduce the curing time in circumstances that require the immediate passage of vehicular activity on completion of the installation. Possible sloping of the drainage line may have to be carried out.

C. Channel installation

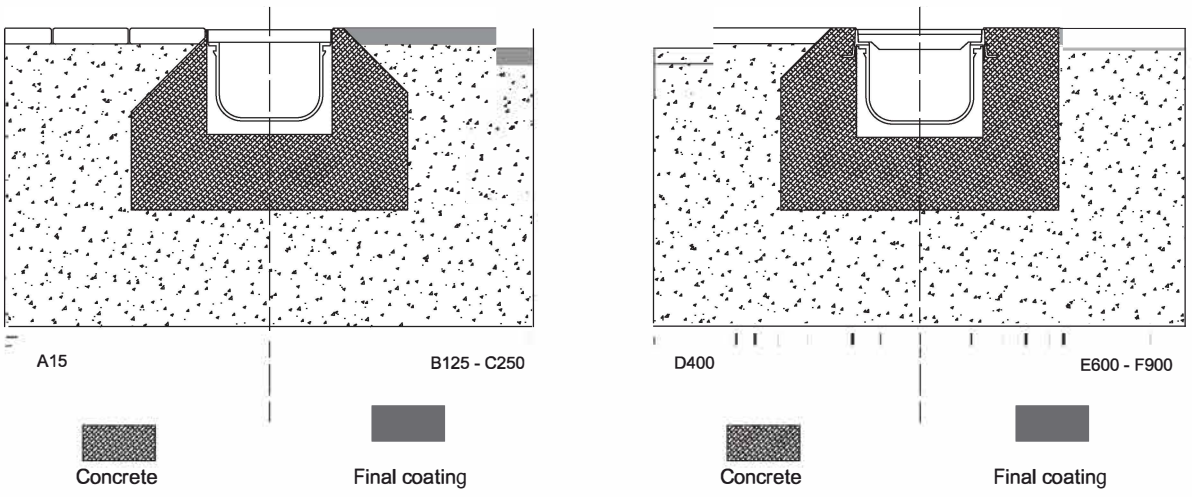
To correctly install the Technodrain unit begin installation from the out-flow point (sump}, connecting the sewage exit or the rainwater treatment system. For a perfect hydraulic hold of Technodrain unit groove and tongue joint you can use a bituminous based thixothropic sealant (Shell Tixophalte).

The Technodrain units can be installed with pre-mounted gratings, therefore it is recommended to carry out this procedure prior to the final installation, taking special precautions on the positioning of the gratings and tightening of the screws/bolts (fixing elements). In every case it is extremely important to insert the gratings prior to applying the concrete support so as to avoid deformation on thesides of the channel which can lead to difficulties in the installation of the gratings. During installation avoid possible damage to the gratings and/or the side of the channel caused by the movement of mechanical vehicles adopting the appropriate precautions.

D. Final coating

The Technodrain unit will be supported by concrete with a W width of support up to the height foreseen for final coating and the specific project. It is important that the finished surface of the coating remains 3-5 mm above the out-flow surface of the grating. The concrete coating should protect the sides of the finished grating surface with an appropriate depth. In the case of pavements subject to horizontal forces, it is necessary to arrange adequate dilation joints laterally to the drainage line, according to the design and at a minimum distance of 100 cm.
It is important that the concrete reach the required resistance before subjecting the channel to the expected loads.
It is important to protect the grating from the residual concrete during casting by covering it with a plastic film or by applying concrete anti-stick liquid with the appropriate brush.
A correct installation increases the life and the hydraulic functionality of the system avoiding potential breakages and bedding failure that can cause accidents and disputes.

Installation of the Technodrain unit with final coating



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Technodrain