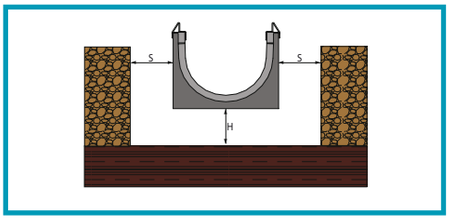
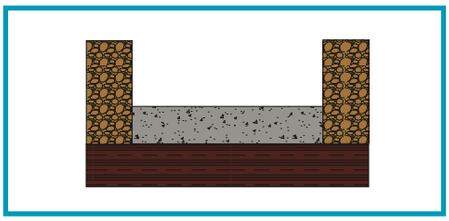
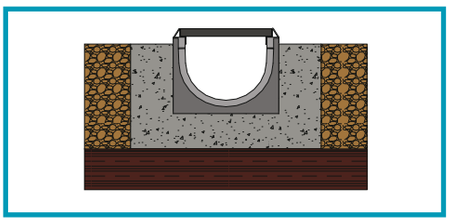
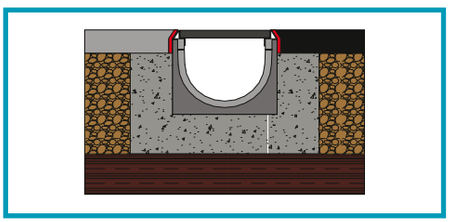
“For all the drainage channels the manufacturer shall supply written instructions for general installation” (Ref. § 7.17 EN 1433)

The installation instructions enclosed in the present technical section are given only as an example in order to supply the main guide lines to the final fitter.
Any particular installation must be evaluated/ agreed between MufleSystem srl and the project maker.
The correct installation is necessary to guarantee the proper loads resistance of the drainage system (channel and grating) to static and dynamical traffic which is subjected to.
The correct installation involves a longer operational length of the drainage system itself as well as its better hydraulic function.









NEW FEATURE: The channels can be installed with preassembled gratings

Step 1
HOLE SIZE
The hole needed to lay the MufleDrain channel must allow not only for the size of the channel and the drain piping but also for adequate space for the base H and the side concrete props S. The dimensions to be followed are shown in the Summary Table. In this step make sure the underlying layer is suitable to the load it is expected to support.

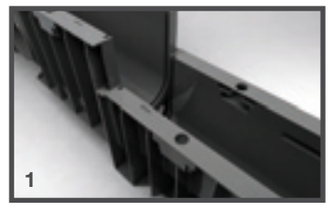
Step 2
CONCRETE BASE
Cast the concrete base H up to the height specified, allowing for any inclination in the drainage line. In case that cycles of loading and unloading are often (for example: periodic transit of vehicles) or the loads are particular heavy (E600 - F900), we recommended to reinforce the concrete base with a electro-welded net or with or beaded mouldings Ø 8 with mesh 15x15 cm. At this stage it is needed to arrange possible slopes of the drainage line.

Step 3
CHANNEL ARRANGEMENT
Lay the channels starting from the flow outlet and block them at basis in order to avoid any floating or misalignment during the concrete casting for the side prop.
Allow for the drains required and build the side prop S up to the maximum height allowed by the final coating. Shape it according to the needs based on the drawing. Introduce and fix the grating required beforehand in order to prevent any deformation of the channel due to the thrust of concrete and to speed up installation.
As well as the step 2, also for the side prop concrete arrange the reinforcement.

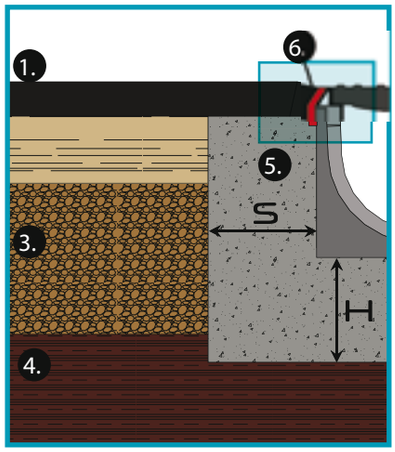
Step 4
FINAL COATING
When applying the final coating, make sure its upper profile reaches up to minimum 3/5 mm above the grating’s flow plane.

Recommendations for installation

1. In case that channels watertightness is requested, MufleSystem is purposely recommending the use of a bituminous silicone sealant “SHELL TIXOPHALTE”: after carrying out the side prop, apply a thin and homogeneous sealant strip on each slot between the channels and the following one (clean the eventual exceeding sealant). It is strongly advised not to apply the strips of “SHELL TIXOPHALTE” inside the slots in the female joint of the channels before coupling them. Eventually a through and long- lasting guarantees to avoid any leakages can be obtained by welding the joints; this requires welding machines and experienced technicians.
2. While carrying out the phase 2 and 3, protect the gratings with a PVC film so that no final cleaning must be carried out to remove any concrete residues.
3. In case the drainage line is subjected to horizontal loads (for example concrete casting for industrial paving, private car parks and parking decks), it is necessary to arrange effective expansion joints for both direction, parallel and perpendicular to the channels. These joints shall be placed according to the norm standards in force and shall not be placed close to drainage line.
4. In case the drainage line shall be installed on roofs or terraces, it is obligatory to arrange a waterproof sheet according to specific projects.

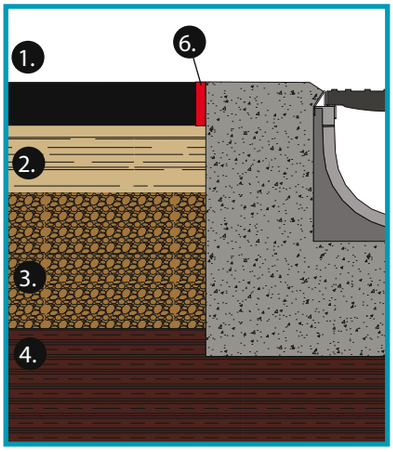


Case 1
Asphalt
(C250)



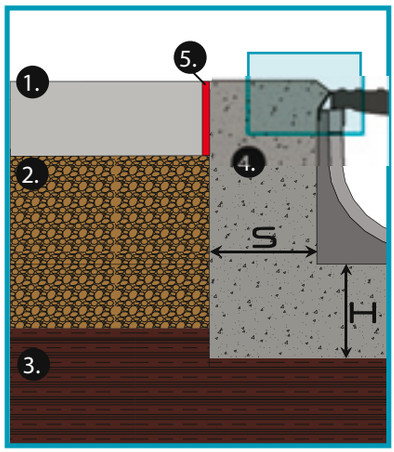
1. Sheet asphalt
2. Lower layer
3. Bearing layer
4. Subfloor
5. Concrete reinforcement layer
6. Bitumen joint

Case 2
Asphalt
(D400)



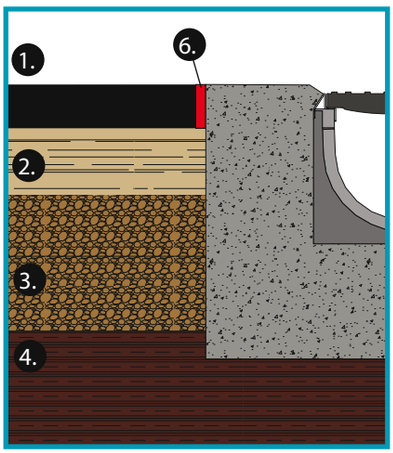
1. Sheet asphalt
2. Lower layer
3. Bearing layer
4. Subfloor
5. Concrete reinforcement layer
6. Bitumen joint

Case 3
Concrete screed for streets and roads
(da C250 a D400)



1. Concrete flooring
2. Bearing layer
3. Subfloor
4. Concrete reinforcement layer
5. Expanded joint

Case 4
Flooring
(C250)



1. Flooring
2. Lower layer
3. Bearing layer
4. Subfloor
5. Concrete reinforcement layer

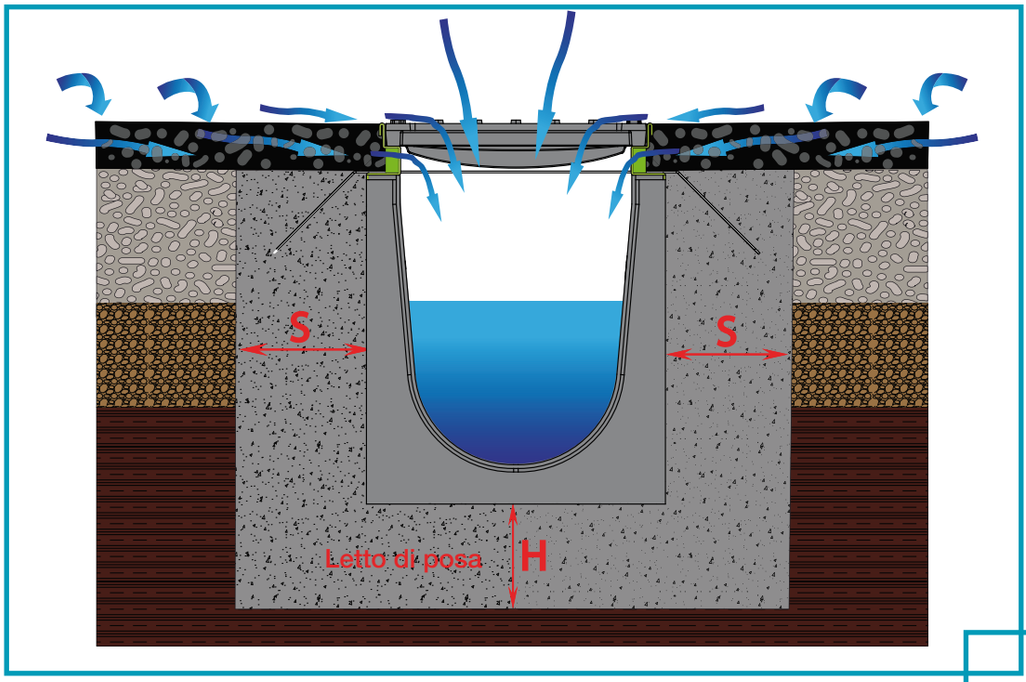
This Sheet is only aimed to give advice on the installation of channels mod. MufleDrain. In any case, always:
- check the carrying capacity characteristics of the underlying layer
- use class S4 (EN 206-1) and stone aggregate with maximum diameter 8mm.
- comply with the height of the installation surface and the thickness of the prop as specified according to the load classes.

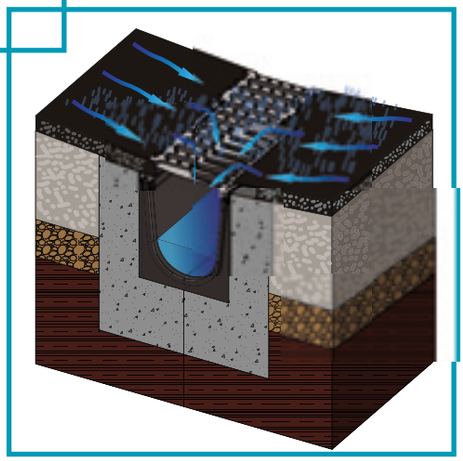
SUMMARY TABLE				
Load class (EN 1433)		C 250	D 400	E 600
Applicable load (EN 1433)	kN	250	400	600
Minimum height H of concrete laying bed	mm	150	200	200
Minimum thickness S of the concrete fl anking	mm	150	200	200
Concrete compression strength class (EN 206-1)		C 25/30	C 25/30	C 30/37
Concrete compression strength class[7] (EN 206-1)		C 30/37 XF4	C 30/37 XF4	C 35/45 XF4

7- If concrete can be affected by frost and thaw cycles.
N.B. Muflesystem reserves the right to modify the technical characteristics on this document without prior notice, these are only informative data that can be changed in the development of our products ramge.
N.B. Sizes and weights are subject to usual manufacturing tolerance values.

INSTALLATION
SLOPE FRAME FOR DRAINING ASPHALT

slope





This Sheet is only aimed to give advice on the installation of channels mod. MufleDrain. In any case, always:
- check the carrying capacity characteristics of the underlying layer
- use class S4 (EN 206-1) and stone aggregate with maximum diameter 8mm.
- comply with the height of the installation surface and the thickness of the prop as specified according to the load classes.

SUMMARY TABLE			
Load class (EN 1433)		C 250	D 400
Applicable load (EN 1433)	kN	250	400
Minimum height H of concrete laying bed	mm	150	200
Minimum thickness S of the concrete fl anking	mm	150	200
Concrete compression strength class (EN 206-1)		C 25/30	C 25/30[15]
Concrete compression strength class[7] (EN 206-1)		C 30/37 XF4	C 30/37 XF4

7- If concrete can be affected by frost and thaw cycles.
15- If installation is in road crossings subject to heavy traffic (especially trucks), Class C30/37 concrete should be used.
N.B. MufleSystem srl reserves the right to change the technical characteristics herein specified without prior notice. Said technical characteristics are given for information purposes only and are subject to changes as our products are developed.
N.B. Sizes and weights are subject to usual manufacturing tolerance values.

SPECIFICATIONS

slope

1. Supply and installation of MufleDrain SLOPE type HD-PE drainage channel with external stiffening ribs and male-female coupling system allowing the assembly between one channel and the next with the relevant pre-assembled gratings. The channel will have 3/4 drainage diaphragms at pre-determined points. Galvanised (stainless) steel upper profile, 4 mm-thick drive-over edge, 2 mm-thick contact surface with height not smaller than 20 mm, connection through prearranged coupling to the channel structure. The channel surface will be perfectly smooth and have a low roughness coefficient to allow the best water flow. Il will also be perfectly water-tight and devoid of any connection points with the outside. The channel will have the following dimensions: length 1,000 mm, internal net gap ___mm, internal height ___ mm

2. Supply and installation of MufleDrain SLOPE type HD-PE drainage channel with external stiffening ribs and male-female coupling system allowing the assembly between one channel and the next with the relevant pre-assembled gratings. The channel will have 2 side drain diaphragms at pre-determined points and it will be designed to house a HD-PE drain gate (diameter 100 mm - 110 mm) on the bottom through 4 screws. Galvanised (stainless) steel upper profile, 4 mm-thick drive-over edge, 2 mm-thick contact surface with height not smaller than 20 mm, connection through prearranged coupling to the channel structure. The channel surface will be perfectly smooth and have a low roughness coefficient to allow the best water flow. Il will also be perfectly water-tight and devoid of any connection points with the outside. The channel will have the following dimensions: length 1,000mm, internal net gap 100 mm, internal height ___ mm.

3. Supply and installation of MufleDrain SLOPE type HD-PE drainage channel with external stiffening ribs and male- female coupling system allowing the assembly between one channel and the next with the relevant pre- assembled gratings. The channel will have 3/4 drainage diaphragms at pre- determined points. Galvanized (stainless) steel upper profile, 4 mm-thick drive-over edge, 2 mm-thick contact surface with height not lower than 20 mm, connection through prearranged coupling to the channel structure. The channel is equipped with 8 hooks for the fixing system hook – lock that are pre-installed and cannot be dismantled. The channel surface will be perfectly smooth and have a low roughness coefficient to allow the best water flow. It will also be perfectly water-tight and devoid of any connection points with the outside. The channel will have the following dimensions: length 1000 mm, internal net gap _____ mm, internal height _____ mm.

4. Supply and installation of MufleDrain SLOPE type HD-PE drainage channel with external stiffening ribs and male- female coupling system allowing the assembly between one channel and the next with the relevant pre- assembled gratings. The channel will have 2 side drainage diaphragms at pre- determined points and a prearranged 100 (110) mm diameter bottom outlet that can be fixed through 4 screws. Galvanized (stainless) steel upper profile, 4 mm-thick drive-over edge, 2 mm-thick contact surface with height not lower than 20 mm, connection through prearranged coupling to the channel structure. The channel is equipped with 8 hooks for the fixing system hook – lock that are pre-installed and cannot be dismantled. The channel surface will be perfectly smooth and have a low roughness coefficient to allow the best water flow. It will also be perfectly water-tight and devoid of any connection points with the outside. The channel will have the following dimensions: length 1000 mm, internal net gap 100 mm, internal height _____ mm.

5. Supply and installation of MufleDrain SLOPE type HD-PE drainage channel that is characterized by a special geometry on the external surface consisting in wall with stiffening ribs. There are 21 equidistant primary ribs meeting on a flat surface and 12 shorter secondary ribs, all of them perpendicular to the upper edge. The male-female coupling system allows the assembly between one channel and the next with the relevant pre- assembled gratings. The channel surface will be perfectly smooth and have a low roughness coefficient to allow the best water flow. It will also be perfectly water-tight and devoid of any connection points with the outside. Galvanized (stainless) steel upper profile, 4 mm-thick drive-over edge, 2 mm-thick contact surface with height not lower than 45 mm. The profile will be shaped in order to let the grating fit in and its flat wall, that, duly drilled, allows the water absorbed by the drainage wearing surface of road asphalt to flow into the channel. This drainage wall shall be high not lower than 25 mm and shall be properly flanked in order to avoid crushing under loads. Every channel will be equipped with 2 profiles as above- described, one per each side, while the drainage section assured by side holes of frames shall be not lower than 86 cm2. The frames shall be fixed to the channel through 4 tie-rods, 4 nuts and 4 lock washers to avoid unscrewing and make the whole system “channel + frame” solid and monolithic. The channel shall be equipped with 8 clamps, that, once made the concrete side flanking, will serve as reinforcement for the whole system. The channel complies with the essential requirements specified by the EN 1433-2008 and is applied with the CE- mark. The channel dimensions will be the following: length 1.000 mm, internal net gap 200 mm, internal height 250 mm.

6. Supply and installation of ductile with mesh GJS 500/7 covering gratings according to EN 1563-2004 for MufleDrain SLOPE drainage channels with "hook-lock" fixing system, load class C250 (D400) according to EN 1433-2008, slit width 20 mm, length 498 mm, width 125 mm.

7. Supply and installation of ductile with mesh GJS 500/7 covering gratings according to EN 1563-2004 for MufleDrain SLOPE drainage channels with "hook-lock" fixing system, load class C250 (D400) according to EN 1433-2008, with mesh, length 498 mm, width 125 mm.

8. Supply and installation of ductile iron GJS 500/7 covering gratings according to EN 1563-2004 for MufleDrain SLOPE drainage channels with "hook-lock" fixing system + bar, load class E 600 according to EN 1433-2008, slit width 20 mm, length 498 mm, width ___mm.

9. Supply and installation of HD-PE open cap with drainage hole diameter ___mm for MufleDrain drainage channel with coupling system into the special channel housing.

10. Supply and installation of HD-PE open cap with drainage hole diameter ___mm for MufleDrain drainage channel with coupling system into the special channel housing.

11. Supply and installation of HD-PE boxes with siphon for MufleDrain SLOPE drainage channels with external stiffening ribs and coupling system. Galvanised (stainless) steel upper profile, 4 mm-thick drive-over edge, 2 mm-thick contact surface with height not smaller than 20 mm, connection through prearranged coupling to the gully structure. The upper section of the siphon built in the gully may be removed in order to allow inspection and cleaning work. The gully will have preformed drains on both sides with diameter up to 200 mm. The gully dimensions will be as follows: length 534 mm, net gap ___ mm, internal height 400 mm.