Stormwater retention and infiltration tanks – Dry wells – Fire supplies

Implementation instructions

www.nidaplast.com
1. WORKING PRINCIPLE OF THE AZBOX basin

The AZbox product can provide 3 distinct functionalities:

- Rainwater regulation
- Rainwater storage (watering, fire supplies etc.)
- Rainwater infiltration

### RAINWATER REGULATION

Cross-section for a regulation basin (without storage)

### RAINWATER STORAGE

Cross-section for a storage basin (watering, fire supplies etc.)

### RAINWATER INFILTRATION

Cross-section for an infiltration basin

Legend:

1. Water inlet channel
2. Concrete buffer
3. Upstream inspection hole (DN 800 – 1000)
4. Nidadrain® distribution channel DN 300
5. Geotextiles
6. AZbox modules
7. Ventilation/Inspection (grid, extension tube)
8. Downstream inspection hole (DN 800 - 1000)
9. Nidavortex excess flow valve
10. Overflow
11. Outlet channel

- **Infiltration**
- **Drainage**
- **Geomembrane**
2. The AZbox MODULE

- Optimisation of lateral compressive strength: 140 kPa
- Optimisation of vertical compressive strength: 300 and 380 kPa
- Optimisation of bulk density
- Recyclability
- 95% of water storage volume
- Possibility to inspect the structure by remote-controlled camera between the blocks and in the distribution channel
- Possibility to clean the structure using high pressure at all levels and in the distribution channel
- Quick and easy Installation thanks to the lightness of the AZbox module
3. IMPLEMENTATION OF AN AZbox basin

3.1 EXCAVATION AND COMPACTION OF THE SUBGRADE

- Minimum clearance around the basin on the bottom of the excavation: 0.5 m
- Horizontal distance: Minimum 5 m vis-à-vis the closest building for infiltration works
- Presence of water:Groundwater lowering device required

If it is not possible to satisfy these conditions, alternative solutions that satisfy the implementation conditions may be examined by Nidaplast on request.

<table>
<thead>
<tr>
<th>Minimum load-bearing capacity of the bottom of the excavation</th>
<th>under green spaces</th>
<th>35 MPa</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>under roadway in use</td>
<td>50 MPa</td>
</tr>
</tbody>
</table>

If, taking into account the envisaged traffic, the ground is not sufficiently stable, the provision of natural materials must take place. These materials will be compacted at the bottom of the basin so as to reach the necessary level of resistance. In all cases, the bottom of the excavation will be compacted to preserve soil stability and avoid differential settlements.

<table>
<thead>
<tr>
<th>Minimum thickness of the subgrade</th>
<th>0.10 m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diameter of the largest aggregate</td>
<td>20 mm</td>
</tr>
<tr>
<td>Material recommendations</td>
<td>Free of fine particles and adapted so as to allow for adjustment without deflection</td>
</tr>
</tbody>
</table>

It is very important to ensure the flatness of the subgrade in order to guarantee the stability of the works and to facilitate their implementation. The excavated materials may be used if their particle sizes are suitable.

3.2 INSTALLATION OF UPSTREAM/DOWNSTREAM INSPECTION HOLES

Adapt the diameter of the inspection hole based on the number and diameter of the pieces of upstream channels. Allow for decanting in the upstream inspection hole.

To allow for inspection and high-pressure cleaning for the entire drainage network, the distance between two consecutive inspection holes or connection or inspection chambers may not exceed:

- 80 m for channels of nominal diameter exceeding 200 mm
- 35 m for channels of nominal diameter strictly lower than 200 mm

3.3 IMPLEMENTATION OF GEOTEXTILE AND/OR GEOMEMBRANE

- Infiltration basin
  - In the absence of a seal, it is indispensable to position a geotextile over the whole surface located between the soil and the basin. This makes it possible to retain the fine soil particles located around the works and consequently to avoid clogging of the ultra lightweight honeycomb structures. In addition to serving as a filter and anti-contaminating barrier, it also constitutes protection against puncture during the installation of the backfill.

- Watertight basin
  - Use a geomembrane protected on 2 sides by a geotextile to ensure double sealing: prevent rainwater infiltration in the soil and also the penetration of secondary water into the works.

The geotextile or seal will be arranged on the bedding and reassembled on the sides of the basin. The strips will overlap by at least 50 cm or will be sewed together. You should carry out the angles and connections with care in order to achieve perfect waterproofing.

Recommendation documents

- Booklet no. 10-1991: Recommandations générales pour la réalisation d'étanchéité par géomembranes (General recommendations for the implementation of sealing using geomembranes)
- Guide Etanchéité par géomembranes des ouvrages pour les eaux de ruissellement routier (Sealing using geomembranes of works for roadway run-off water)
3.4 INSTALLATION OF THE LOW PART OF THE FIRST ROW OF MODULES

AZbox modules are installed in accordance with the layout plan established previously in the site preparation phase. The first layer determines the quality of the entire works; for this reason a great deal of attention should be paid to its straightness and flatness. Install the first demi-modules (plates with 4 blocks pre-assembled on site) in the central row, from the upstream inspection hole to the downstream inspection hole. Do not forget to link the demi-modules to one another using clips (4 clips on the 1200 mm sides and 2 clips on the 600 mm sides).

3.5 BASIN / MANHOLE JUNCTION AND INSTALLATION OF INTEGRATED INSPECTABLE DISTRIBUTION CHANNEL

Cut a hole in a side-plate and insert a Ø315mm PVC pipe between the basin and the manhole.
Optional: A distribution channel may be installed between the blocks of the first row of AZbox demi-modules. This provides hydraulic continuity from upstream to downstream for works via inspection holes.
In order to comply with our studies, we recommend the use of the Nidadrain DN300 SN8 distribution channel, whose absorbing surface is greater than 240 cm²/ml.
Install the Nidadrain in the prerequisite space of the middle row by directing the perforations towards the top.
In the event of a connection to a network downstream of the basin, allow for the installation of a by-pass system in the downstream inspection hole of the basin to benefit infiltration.

3.6 INSTALLATION OF THE HIGH PART OF THE FIRST ROW OF MODULES

Install pre-assembled plates above the low part of the first layer to create the first level of AZbox® modules.
Clip the modules together again

3.7 INSTALLATION OF BLOCKS ON THE LOW PART OF THE SECOND ROW OF MODULES

If the design of the tank includes an inspection and cleaning well, cut a Ø315mm circle between the 4 pilars on the top plate of each level.
If the basin is made up of several layers, clip the blocks to the high part so as to form a new layer of demi-modules in the low part. Ensure you place them in the right direction. To do this, you should use the coded pins provided for this purpose. These are marked by arrows on the top of the block.
Repeat step 3.6 to assemble the high part of the second layer. Use the clips again to connect it all together.

3.8 INSTALLATION OF SIDE PLATES AND COVERS

Attach the side plates to the whole of the area around the basin and all module layers. On the last layer, place the covers so as to close the upper part of the basin. 4 covers per AZbox® module. An arrow on the cover indicates the direction in which it should be installed.

3.9 VENTILATION AND CLOSING WITH GEOTEXTILE AND/OR GEOMEMBRANE

Cut Ø315 mm circle between 4 pilars and install and extension connector associated with a Ø300 mm twin wall corrugated pipe (cleaning and inspection access).
Once the air removal system is in place, envelop the basin with the 300 g/m² geotextile installed in step 2 to reseal the structure.
3. IMPLEMENTATION OF AN AZbox basin

3.10 BACKFILLING

<table>
<thead>
<tr>
<th>Backfilling materials</th>
<th>All non-clay materials of the GTR classification with diameters of less than 60 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Use of debris to be favoured after screening</td>
</tr>
<tr>
<td>Recommendations</td>
<td>Booklet 70</td>
</tr>
<tr>
<td></td>
<td>Standard NF P98-331</td>
</tr>
</tbody>
</table>

**Lateral backfill:**
In accordance with the technical guide “Les structures alvéolaires ultra-légères pour la gestion des eaux pluviales” (ultra lightweight honeycomb structures for rainwater management), backfilling and then compaction should be carried out by successive and alternate layers on both sides of the works so as to avoid creating dissymmetrical constraints.

<table>
<thead>
<tr>
<th>Equipment to be used based on the width to be compacted</th>
<th>&lt; 0.5 m</th>
<th>0.5 m &lt; X &lt; 1 m</th>
<th>&gt; 1 m</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rammer</td>
<td>Vibrating plate</td>
<td>Roller</td>
</tr>
</tbody>
</table>

**Upper backfill:**
A first non-compacted layer of minimum 0.15 m will be installed on the geotextile. Next, the backfilling will take place per successive compacted layer of 0.25 m to 0.40 m. Brown warning mesh will be placed at least 0.30 m above the works to warn of the presence of a wastewater facility.

<table>
<thead>
<tr>
<th>Minimum covering height</th>
<th>under the roadway</th>
<th>Heavy traffic</th>
<th>Light traffic</th>
<th>under green spaces</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AZbox black</td>
<td>0.8 m</td>
<td>0.6 m</td>
<td>0.3 m</td>
</tr>
<tr>
<td></td>
<td>AZbox blue</td>
<td>2.6 m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum covering height (value for a basin composed of 1, 2 or 3 layer)</td>
<td>1.8 m</td>
<td>2.6 m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum block implementation depth</td>
<td>3.68 m</td>
<td>4.48 m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum admissible vertical compressive strength</td>
<td>36 kPa</td>
<td>52 kPa</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. INSPECTABILITY, INSPECTION AND HIGH-PRESSURE CLEANING

4.1 INSPECTABILITY, INSPECTION AND HIGH-PRESSURE CLEANING

Our modules are designed to be inspectable and allow for high-pressure cleaning at all levels. This makes it possible to maintain the installation in order to prevent the risk of clogging. However, taking into account the current equipment, a number of different access points may be created for remote-controlled cameras and flushers. This way our system can be adapted to your needs and presents a number of different design strategies.
Basic available forms of access:

1. Access to the distribution channel via the manholes:
   It is possible to access the distribution channel using manholes upstream and downstream of the works. This access makes it possible to insert a camera or sewage flusher for its inspection and maintenance.

2. Creation of additional access points around the side of the basin:
   Additional access points may be made using additional inspection holes solely dedicated to inspection instruments. The goal is to cover all or a part of the basin modules.

3. Creation of access points via the top of the basin:
   Access points may be created in order to facilitate inspection and high-pressure cleaning of the AZbox basin by making openings in the basin. One opening per row of modules is sufficient.
   In order to do this, saw discs with a 300 mm diameter on all superimposed plates, then place a DN300 adjustment sleeve on the upper plate. Next place an extension tube vertically. (See the following diagrams).

For more information, view our videos at www.nidaplast.com or on our YouTube channel: Nidaplast TV