

# Manhole installation instructions from D400 to F900



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# Installation process

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The instructions to follow for good, effective and long-lasting installation can be found below.

# A. Flattening and levelling the exterior formwork

## 0. Flattening

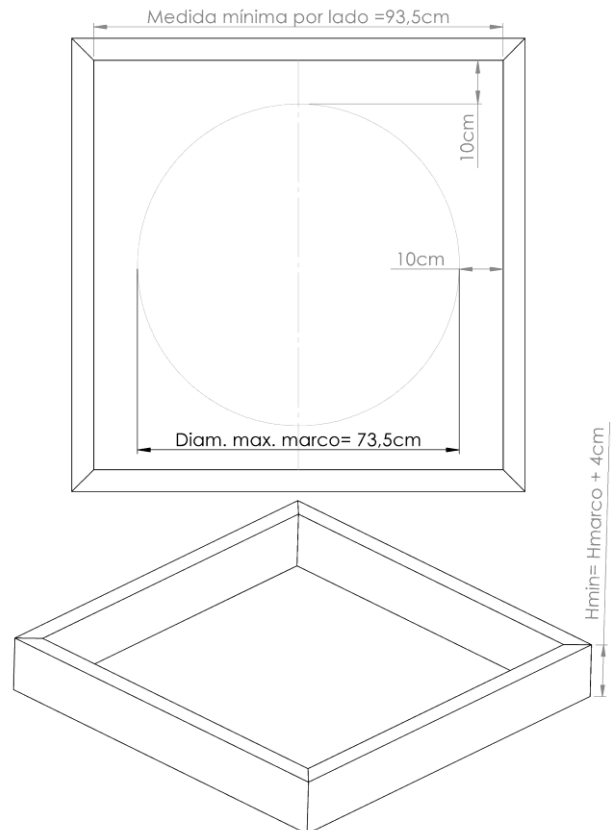
- It must be flattened to slightly below the maximum level of the pit where the manhole is to be installed.

## 1. Exterior formwork

- After flattening, the exterior formwork must be positioned.

### PROPERTIES:

- The formwork must be well secured to the roadbed, ensuring a good seal.
- The interior measurements of formwork will be at least **the maximum diameter of the frame + 10 cm on each side** and minimum depth must be **the maximum height of the frame + 4cm** to ensure the concrete slab is sufficiently consistent to properly absorb and distribute the loads upon the unit.



## 2. Levelling the exterior formwork

- Once the exterior formwork has been correctly installed and secured, it must be levelled to ensure that the result of the installation is aligned with the final asphalt of the road.

### PROPERTIES:

- Level the formwork using topographic tools, by measuring its four corners and ensuring they are at the corresponding elevations of the final asphalt.



The main objective of this instruction is to obtain a slab in which the frame is integrated.

This guarantees these components are joined correctly and work together, while favouring the distribution and absorption of the loads transmitted to the cast unit.



## B. Positioning, levelling and interior formwork of the frame

### 1. Positioning the manhole

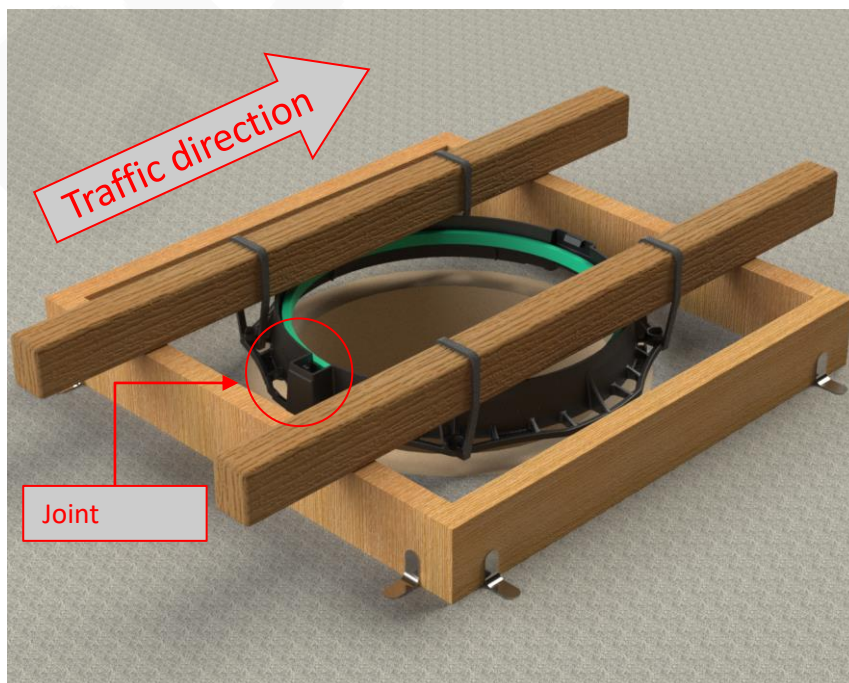
- Suspend the manhole cover frame **properly oriented** and centred over the gap using two levels tied to the base of frame with wire and resting on the road.

#### PROPERTIES:

- Orient the frame according to the traffic direction, as shown in the image.
- Ensure the levels are as long as possible, and tie them to the outer edge of the frame. Where possible, avoid tying them to the inner edges.
- Place the levels as far apart as possible, parallel to the traffic direction.
- DO NOT remove the gasket at any time during the installation.

#### **IMPORTANT:**

- ⚠ The positioning and levelling must be done with the cover removed.

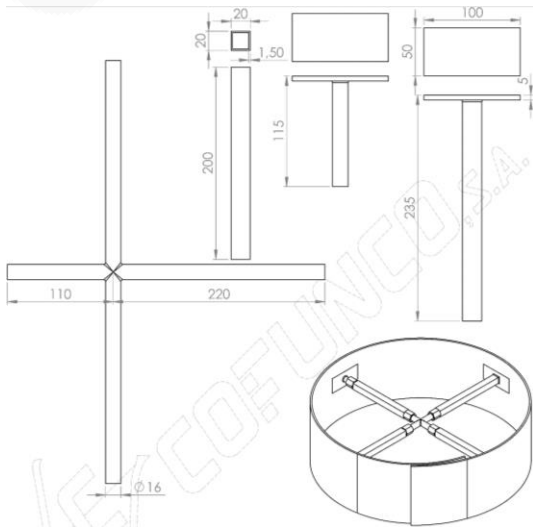
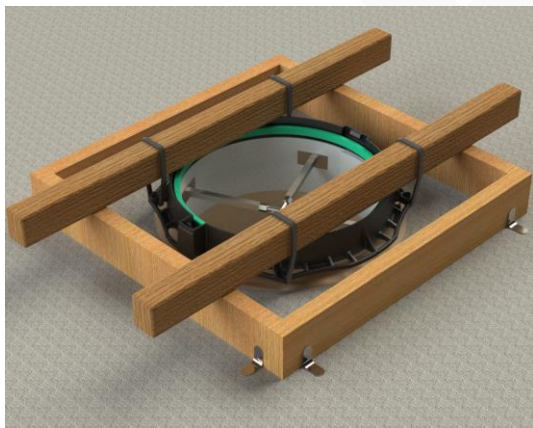


## 2. Interior formwork

- Once the frame has been correctly positioned, the interior formwork of the frame can be made.

### PROPERTIES:

- The formwork must be strong and continuous throughout the whole inner perimeter of the frame. It must provide a good seal and not allow material to leak into the pit.
- The formwork must leave the gasket free. Place it underneath to avoid waste concrete residue compromising the correct function and/or durability of the manhole cover. This would also hinder any future gasket changes.
- The construction drawing of a tool recommended for this task can be supplied upon request.
- Before placing and securing the formwork against the frame, impregnate the formwork with a demoulding agent so that it can be easily removed.



Nº DE ELEMENTO	Nº DE PIEZA	DESCRIPCIÓN	CANTIDAD
1	Varillas	Varillas roscadas a la derecha	1
2	Base fija	Base soldada a la chapa de encofrado y a una varilla roscada a izquierdas	1
3	Fija	Tubo de 200x20x20x1,5 con dos tuercas soldadas a los extremos	1
4	Móvil	Tubo de 200x20x20x1,5 con la base soldada	3
5	Tuerca M16	Tuerca de acoplamiento M16	5
6	Encofrado	Chapa de 4mm de grosor	1

INSTRUCCIONES DE REPARACIÓN Y SUSTITUCIÓN DE UN REGISTRO  
PP  
SP  
Útil de Encofrado

## C. Filling the installation concrete

### 1. Preparing the concrete

- Prepare/mix the concrete following the manufacturer's instructions, using the recommended ratio of water and concrete.

#### PROPERTIES:

- The concrete must be at least class R4. A high flowability fibre-modified micro concrete is recommended.
- Mix within the temperature range specified by the manufacturer.
- Standard reference values:
  - Mean mix ratio w/p  $\rightarrow$  0.12-0.15 (3-4L / 25kg).
  - Temperature range for pouring  $\rightarrow$   $5^{\circ} < T^{\circ} < 35^{\circ}$ .





## 2. Concreting

- Fill the box with the concrete previously prepared, with frame and formwork correctly in place.

### PROPERTIES:

- This must be done ensuring the structural continuity of the concrete used, thus controlling the dosage and pouring.
- Check all the hollows in the frame are properly filled to ensure a correct bond and satisfactory load distribution. To do so, compact, vibrate or tap the concrete against the formwork.

### IMPORTANT:

- ⚠ It is very important to concrete quickly and continuously, with at least two workers so that the concrete does not set in layers but does so evenly, forming the uniform slab required.

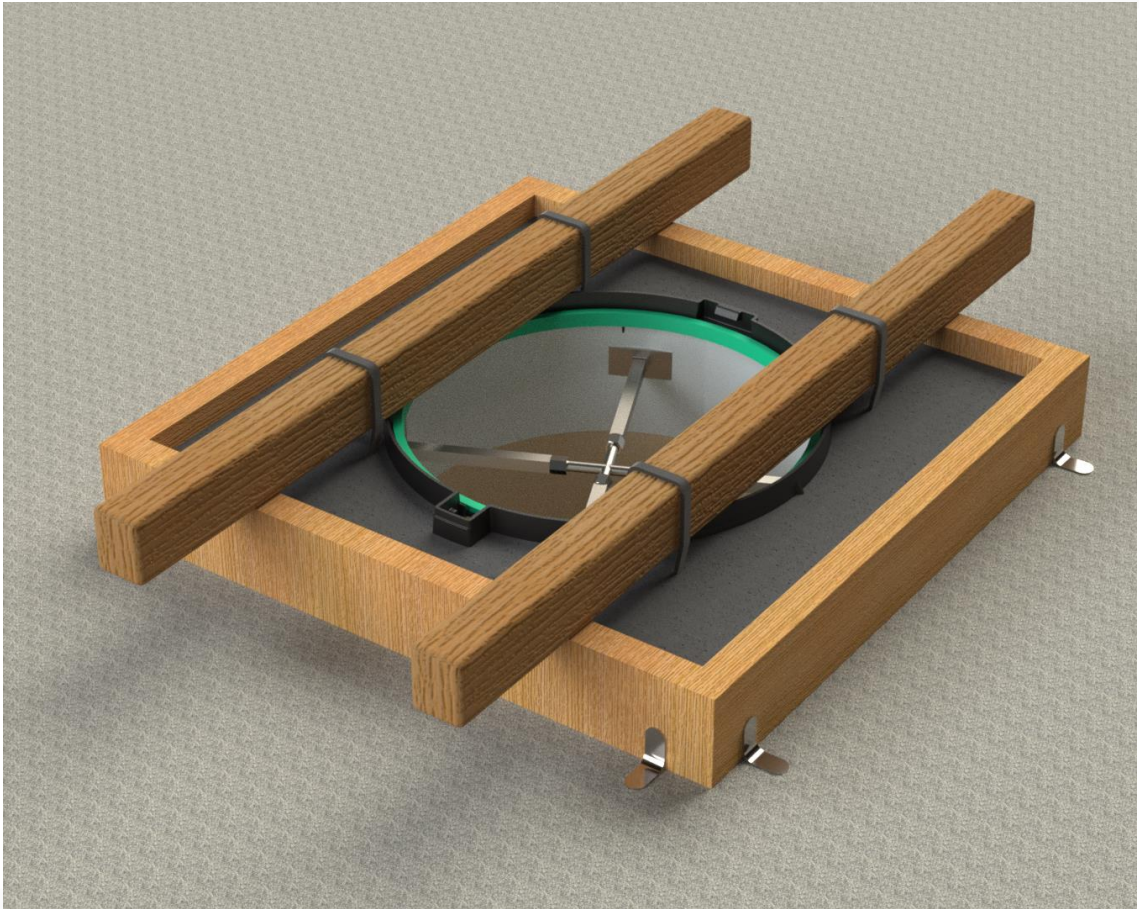


Real concreting taking great care to fill the hollows in the frame.



### 3. Concreting height

- Fill the formwork leaving the thickness required for the asphalt. This asphalt thickness will directly depend on the type of traffic on the road planned and must be calculated by the engineering company responsible for the project.

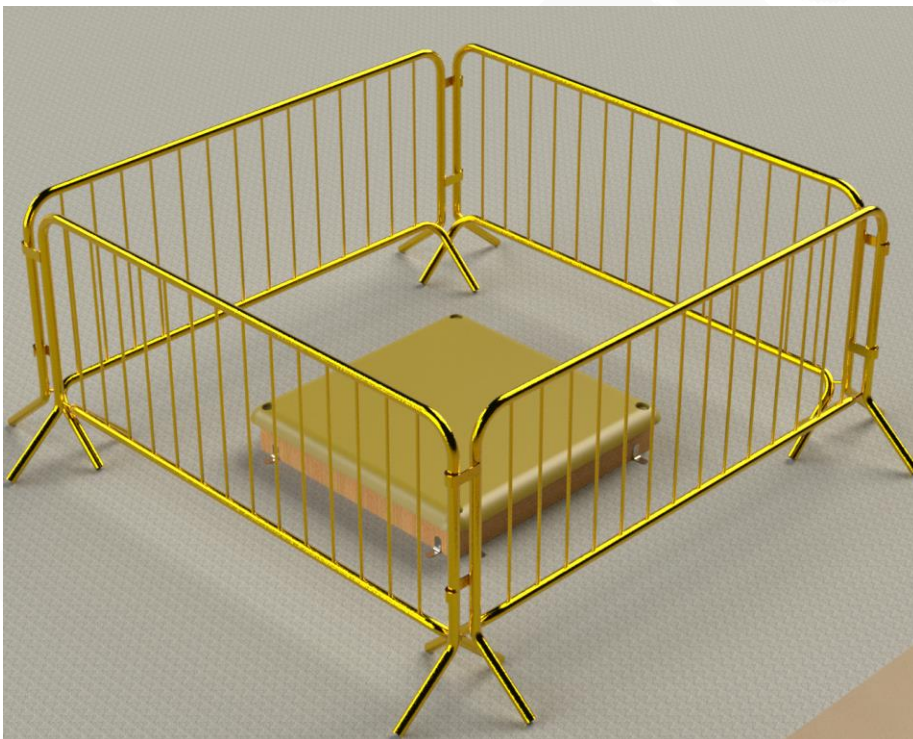


## 4. Setting time

- Once the exterior formwork has been filled with concrete, fit the manhole cover to prevent accidental falls, maintain the humidity throughout the setting period and wait the time necessary for this reaction to occur.

### PROPERTIES:

- Place suitably resistant protection for the time required. This is a minimum of 24 hours, although the recommended time is 7 days for the concrete to set correctly and without overloading before it reaches absolute resistance.



**Under no circumstances may traffic be allowed to pass until the installation of the product is complete.**





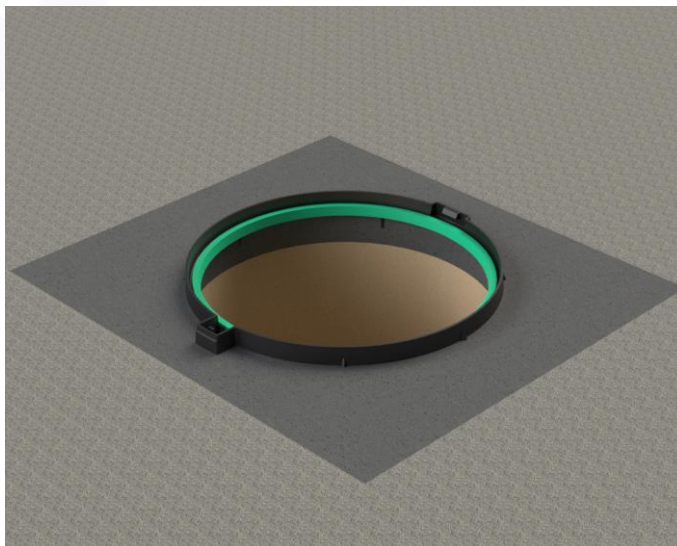
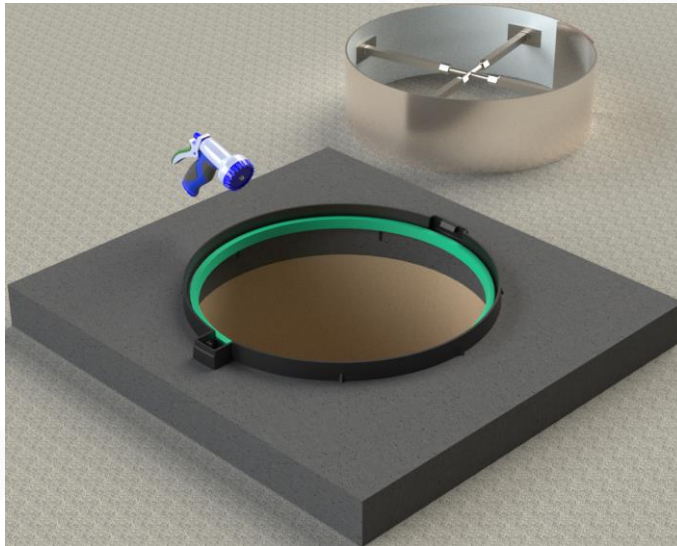
## D. Removing formwork, asphaltting and completing the work

### 1. Removing the formwork

- Once the setting time has passed, remove the formwork and immediately moisten all exposed sides with clean water.

### 2. Second filling of the roadbed

- Once the formwork has been removed, fill the surrounding perimeter up to the level of the correctly set mortar. The perimeter filling material shall be the same used for the filling and compaction of the road.





### 3. Asphaltting and compacting

- Prior to asphaltting, impregnate the upper surface of the manhole cover with an anti-adherent liquid to prevent the asphalt sticking.
- Once the bituminous mixture has been poured over the manhole cover, any mixture deposited on the cover must be removed.
- Once the roller has done its first sweep, any material remaining on the cover must be removed before the road roller passes a second time.

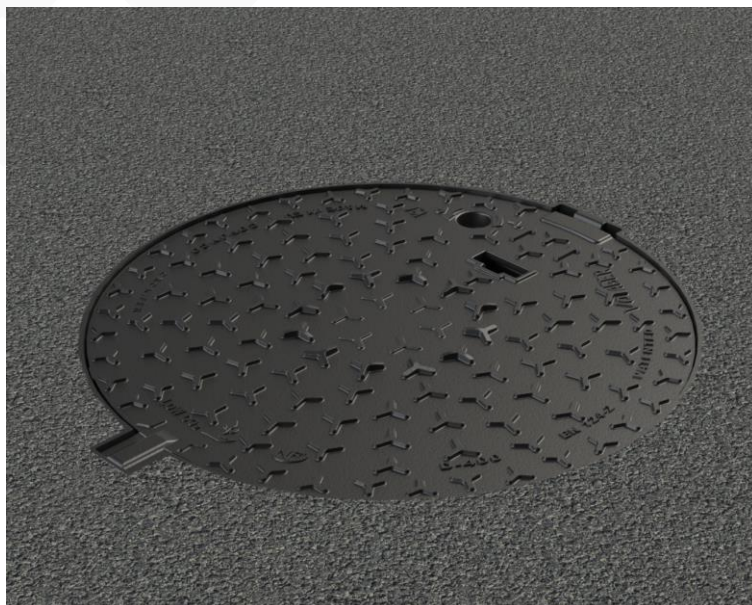
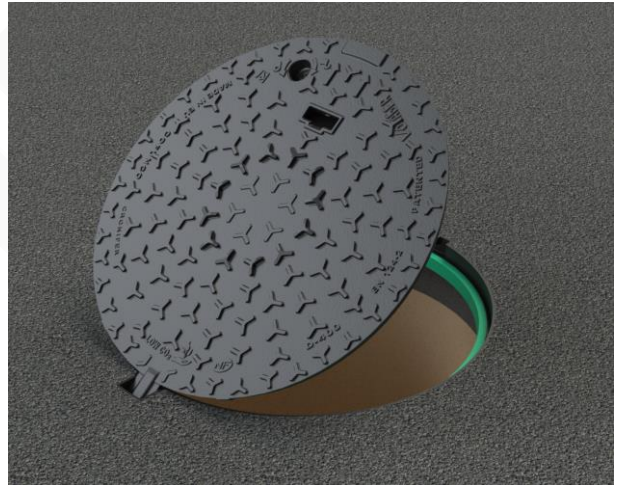
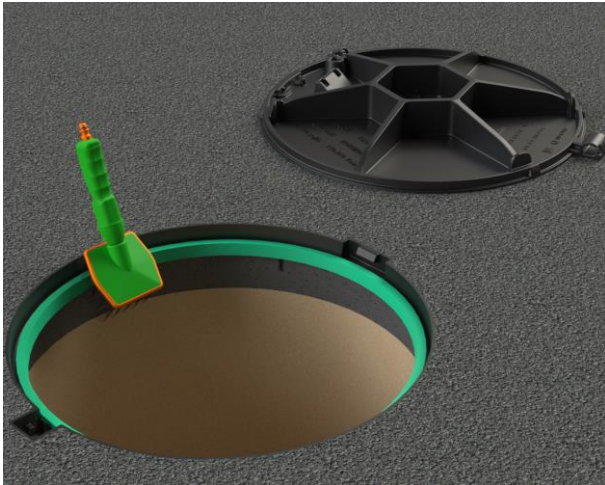
#### **IMPORTANT:**

- ⚠ The manhole cover frame must NEVER be above the surface of the asphalt; it must be fully flush or slightly below this surface.



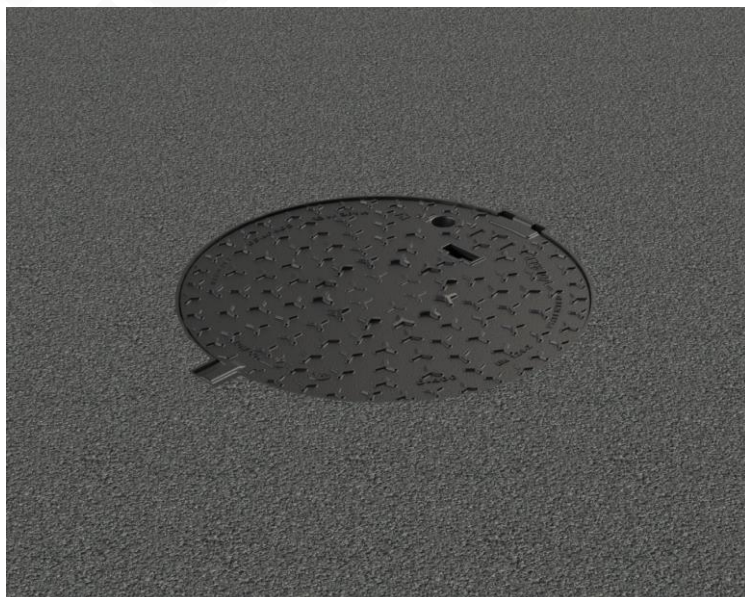
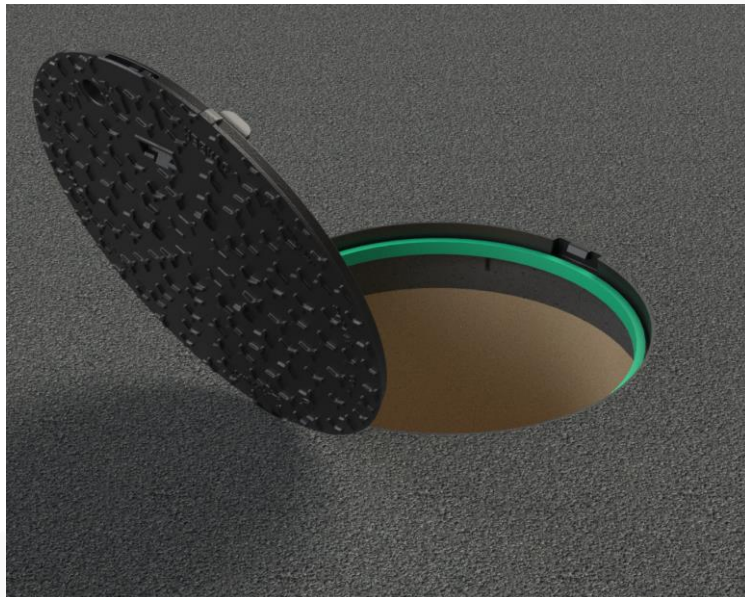
## 4. Cleaning and checks

- Once all the previous steps have been completed correctly, clean the whole gasket and frame, paying particular attention to the cover seating area, ensuring it is free from gravel, asphalt or any type of dirt that may affect the manhole cover.
- It is also important to ensure that there is no excess concrete and/or asphalt that will prevent the hinge and/or the manhole's elastic closure system from working properly (if it has one). If there is any excess, remove it meticulously before moving on to the next step.
- Check that the cover closes correctly, and fits well without rocking, noise or vibrations.



## 5. Checks and completion of the work

- Open the cover for another visual inspection of the components described above (gasket, hinge, closure, etc.) to check there is no asphalt and that the components work properly, with no hindrance at all. If they do not, remove the cover and clean the manhole cover again.
- Once you are sure the manhole cover is clean, with the gasket in good condition, and the hinge and closure working properly, you can close the cover and consider the installation complete.



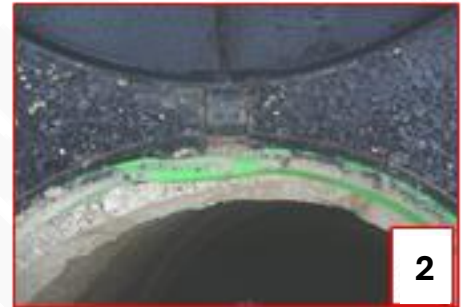




# Important notes



- Manhole covers must be handled gently, without denting.
- It is advisable, although not necessary, to remove the cover from the frame for installation.
- If you remove the cover, handle it with care and avoid knocking it which could deform the closure (fork).
- When installing the manhole cover, never remove the elastic gasket fitted in the frame due to the high risk of loss, subsequent incorrect assembly or interior soiling.
- Never apply mortar inside the frame and, in particular, in the area of the closure housing or hinge. Both areas must be kept free from waste mortar. See photo 1.
- Never apply mortar under the gasket. This may alter the correct position of the elastic gasket or hinder its replacement in future. See photo 2.
- Once the manhole cover and the final surrounding paving is in place, clean away any waste from the area where the cover rests on the gasket, the housing of the hinge and the closure using soft manual tools such as brushes. See photo 3
- In some areas where the street slopes excessively, technical consultation is advisable to ensure the manhole cover has the characteristics for optimum installation in these situations.
- To prevent the asphalt layer adhering to the surface of the cover, apply sand to the cover. Then remove the asphalt left on it.
- If any other waste material from the installation (concrete, asphalt, etc.) is left on it, it must be removed immediately before it solidifies, leaving the etching of the casting in good condition so as to ensure its non-slip function.







# Important notes



- It is prohibited to use any pneumatic or manual tools to remove any solidified material from the surface of the cover. In extreme cases, these actions can damage the cover or the support gasket.
- Never pave over the upper face of the cover, and in particular carry out any type of asphalt vibration over the assembly. This can prevent the frame being properly secured and cause internal structural damage to the assembly, limiting the functions of the manhole cover during its useful life. See photo 5-6.
- Excessive mechanical vibration of the assembly can even damage the manhole under the frame, forcing the contractor to replace all of the prefabricated sewerage and drainage components. See photo 7
- In any event, wherever possible, it is important to avoid any one manhole cover being affected by traffic in two directions at the same time. See photo 8.
- Never rest the frame on perforated or hollow bricks. When the asphalt compactor runs over it, they may break and start to damage the paving around the frame.
- It is strictly prohibited to throw and/or drop the cover+frame assembly from heights greater than 1.5m.
- It is forbidden to drive (especially with construction machinery) over manhole covers that are not yet fully installed, especially those that are above surface level during the construction stage. See image 9.

