COFUNCO S.A.
By Funosa

Manhole repair and replacement instructions from D400 to F900

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Repair and/or replacement process

The instructions to follow for good, effective and long-lasting repair and/or replacement can be found below.

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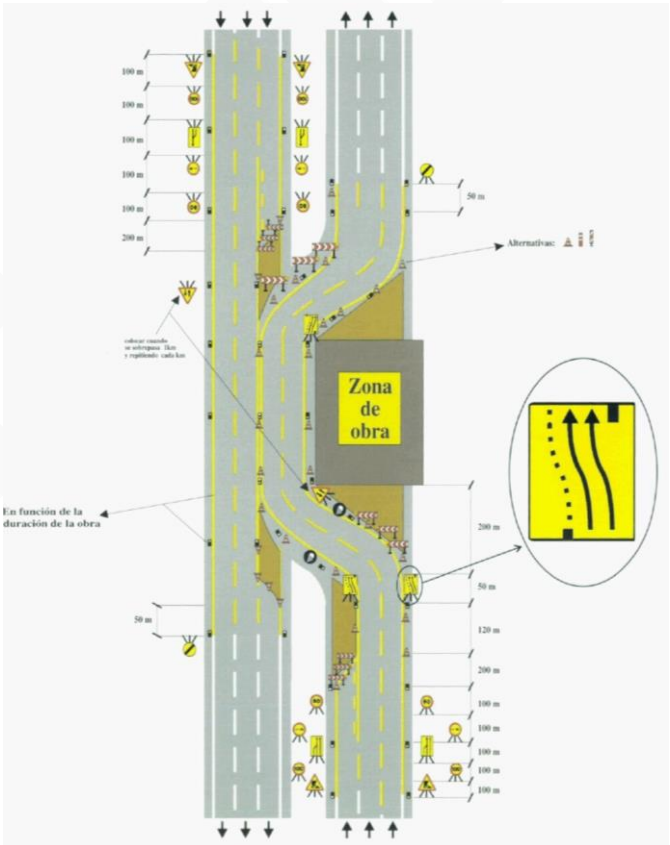
A. Extraction and preparation of the seating

0.Prior to installation.

- Take into account that, if the pit is round, the manhole cover frame to be replaced must be round, if the pit is square, the frame must be square.

- Ensure you have all tools and materials necessary to complete the process.

- If you have to stop or divert the traffic, make sure you have a complete, approved plan that ensures a safe environment for the workers.

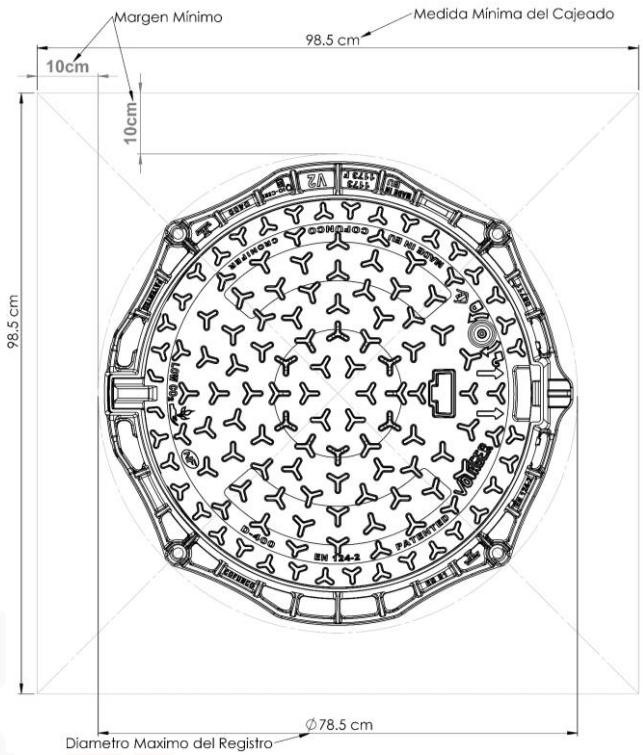


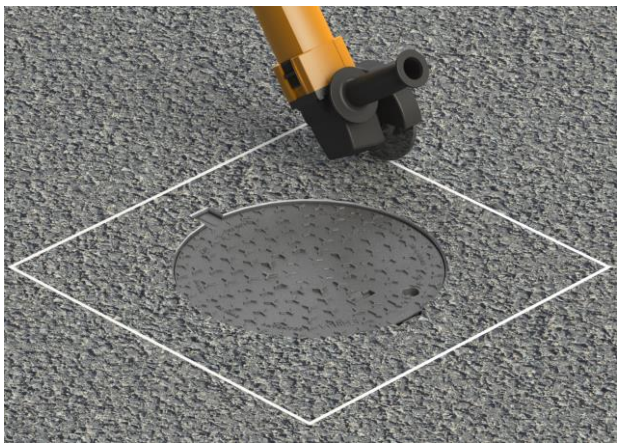
1. Cutting and/or demolition of the surrounding paving.

- Measure the dimensions of the base of the new frame (maximum diameter).
- After marking the lines on the surface, cut, break up and extract the paving.

PROPERTIES:

- ALWAYS cut in a square or rectangle, regardless of the shape of the frame to install.
- Leave a minimum margin of **10cm** throughout the whole perimeter of the frame, so the dimensions of the box will be → Max. Diam. + 20cm (10cm each side).





2. Preparing the concrete

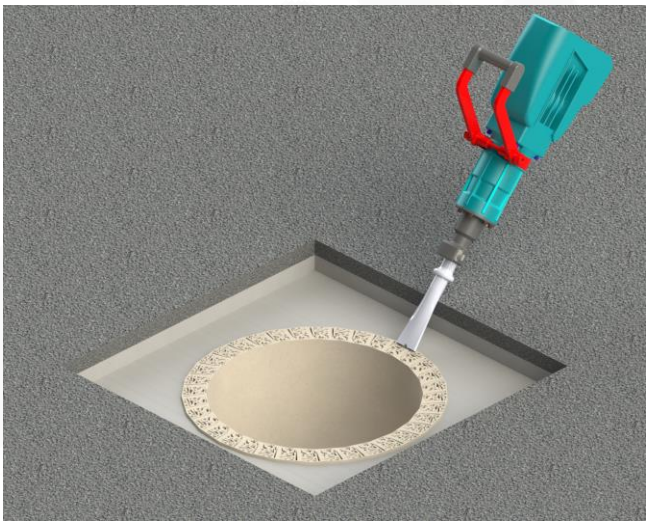
- Once the paving has been removed, the solid concrete base must be prepared to ensure a strong, solid base on which to seat the new frame. During the whole the task, as far as possible, avoid gravel and/or rubble falling into the pit.

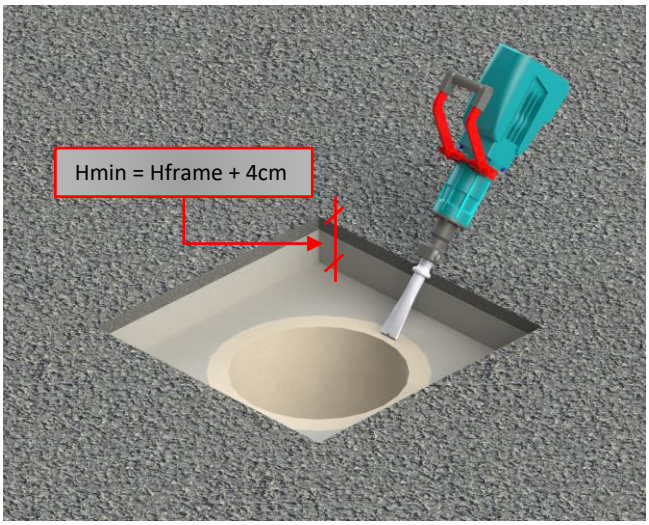
PROPERTIES:

- The depth of this part will be until you find a solid support base with no cracks. In any event, this depth shall be always greater than the sum of the frame height plus 4cm. This depth will guarantee the thickness and resistance of the concrete slab for the correct grip and installation of the manhole cover.

IMPORTANT:

⚠ Try to ensure that the cut is made vertically, with rough surfaces to guarantee a good adhesion to the support. Check that the cut edge of the box and the support surface of the pit are in good condition and not cracked. Otherwise, remove the weak parts and clean the surface.





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3. Cleaning the seating

- Once the concrete has been prepared, remove the rubble and thoroughly clean the seating, carefully removing any remaining dust and dirt, and any grease and/or lubricant.

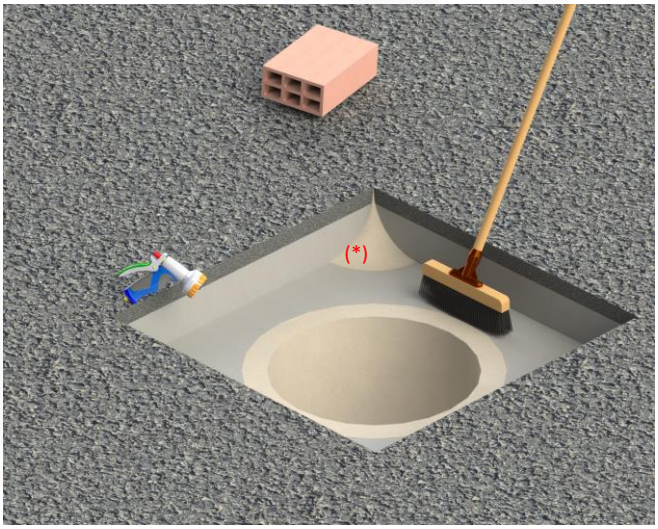
PROPERTIES:

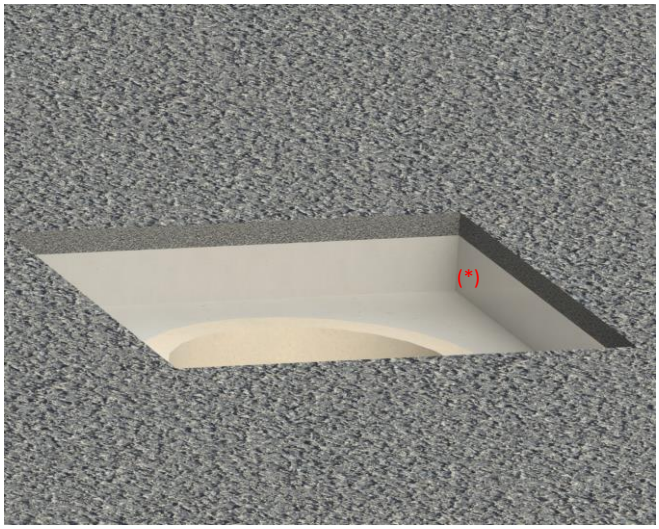
- In no case may this cleaning be carried out using pneumatic tools. Manual cleaning is recommended, using less aggressive tools on the seating structure (brushes, pallet knives, trowels, etc.).

IMPORTANT:

⚠ Pay attention to the corners of the box (*) where rubble often accumulates that could very negatively affect the concrete's efficacy, as it needs rough edges for proper grip.

⚠ Do not under any circumstances use perforated or hollow bricks for the frame seating as this could be dangerous.





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B. Positioning, levelling and formwork of the frame

1. Positioning the manhole

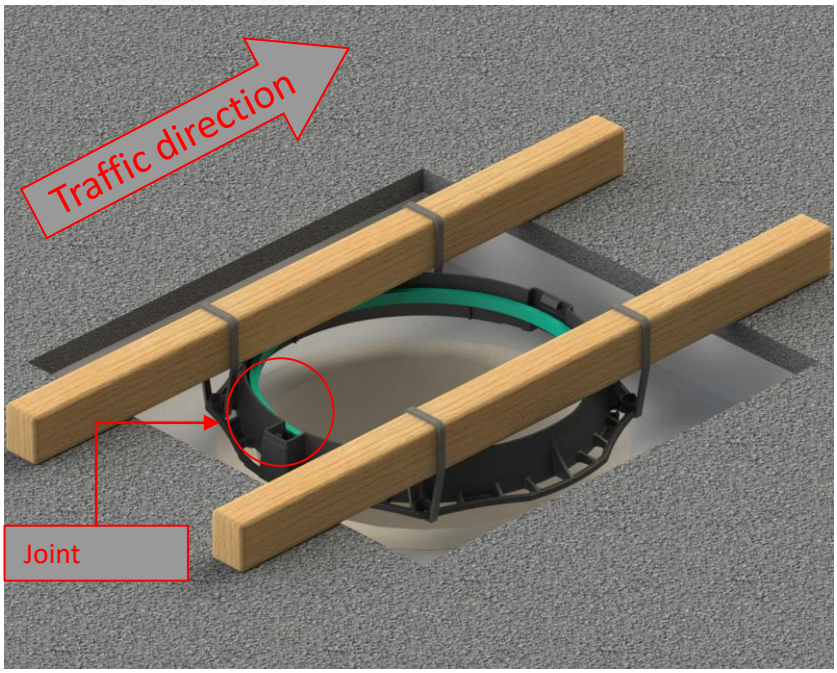
- Suspend the manhole cover frame **properly oriented**and centred over the gap using two levels tied to the base of frame with wire and resting on the road.

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.



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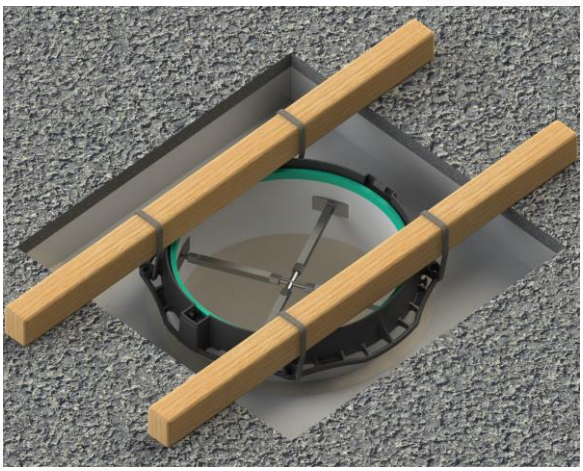
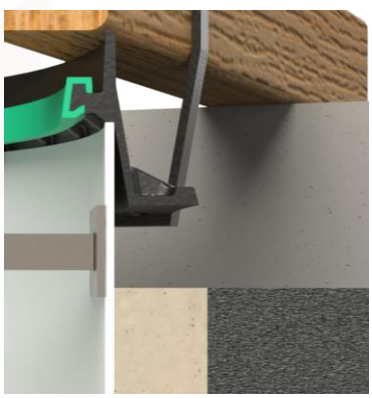
2. Formwork

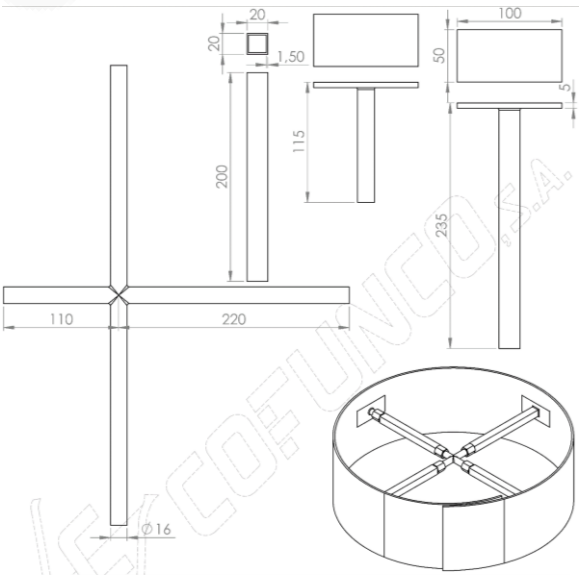
- Once the frame has been correctly positioned, the interior formwork of the frame can be made.

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.







N.º DE ELEMENTO	N.º 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 SUBSTITUCIÓN DE UN REGISTRO

COFUNCO S.A.

PP
SP

Útil de Encofrado

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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 → 0.12-0.15 (3-4L / 25kg).
    - Temperature range for pouring → 5°< Tº <35º.

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2. Concreting

- Fill the box with the concrete prepared previously, 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.

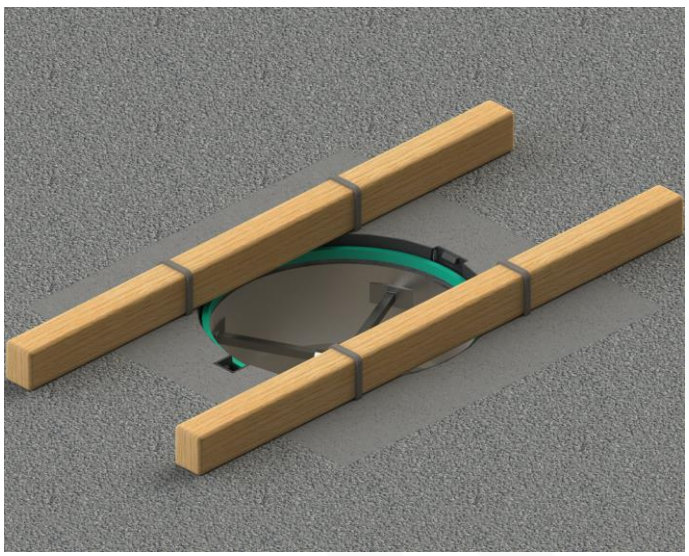
Real concreting taking great care to fill the hollows in the frame.

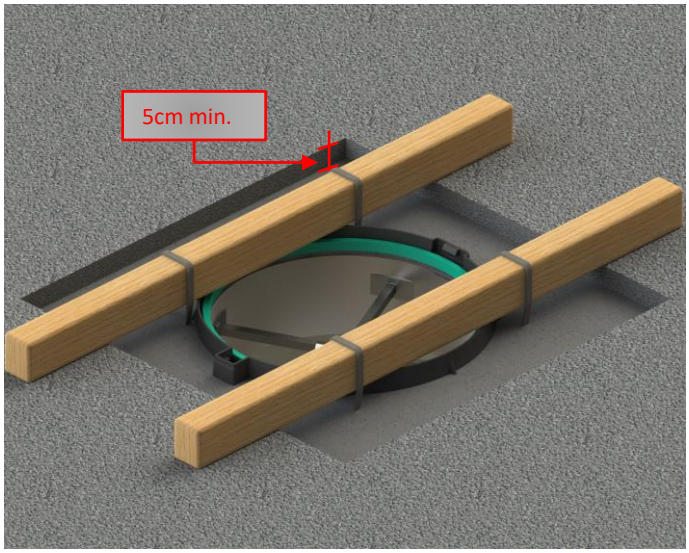
2.1. General concreting.

- Fill the box with concrete up to the paving level.

2.2. Asphalt finish

- If an asphalt surface finish is required, leave a **minimum height of 5cm** between the concrete and the paving.





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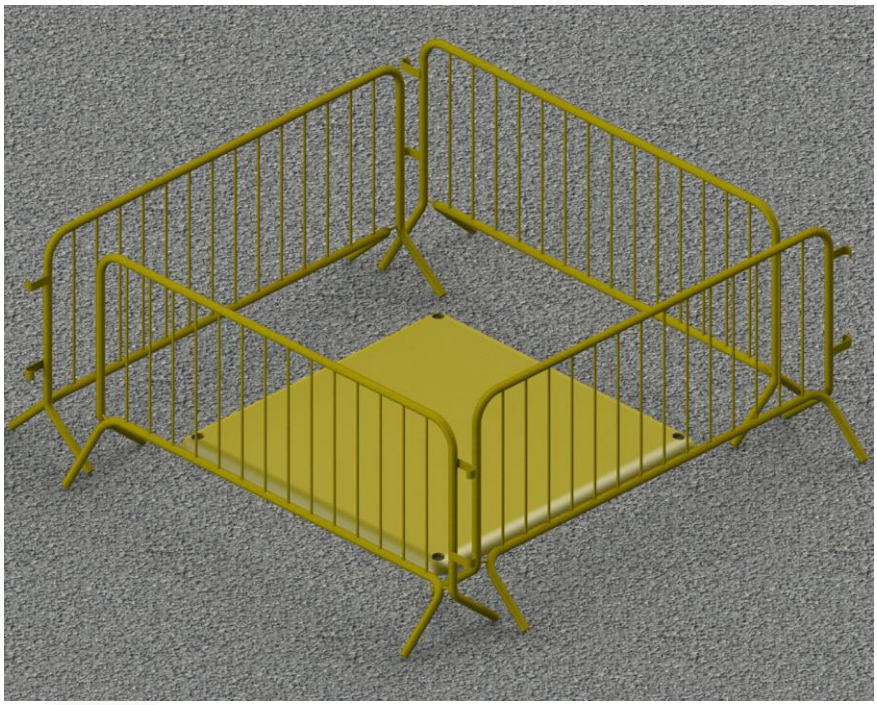
3. Setting time

- Once the box 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.

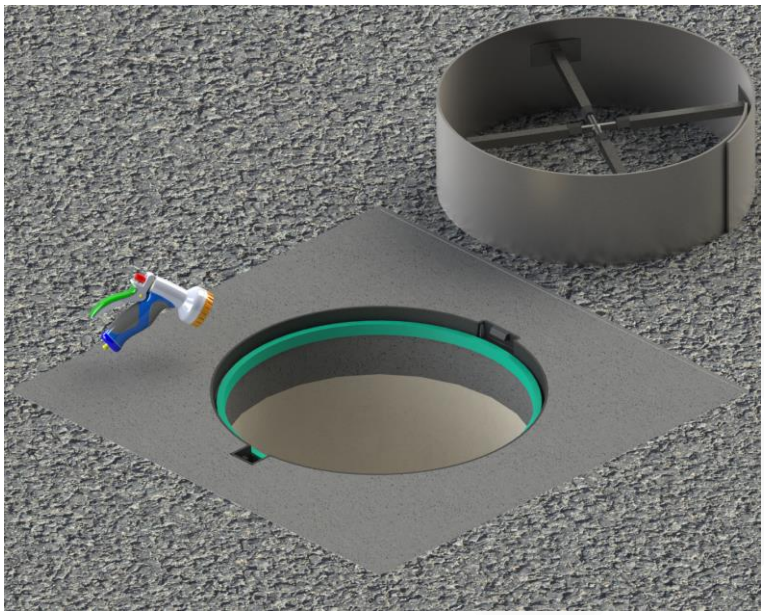


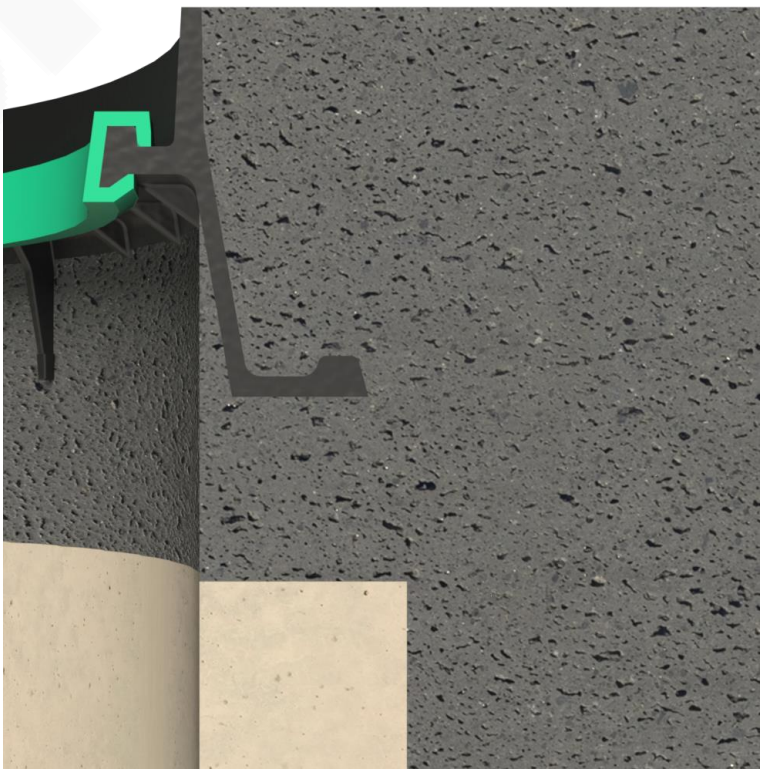
Under no circumstances may traffic be allowed to pass until the repair and/or replacement of the product is complete.

D. Finalisation and use in traffic

1. Removing the formwork

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





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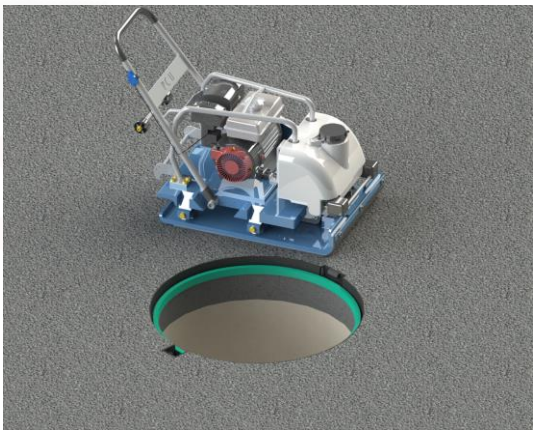
2. Asphalting and compacting

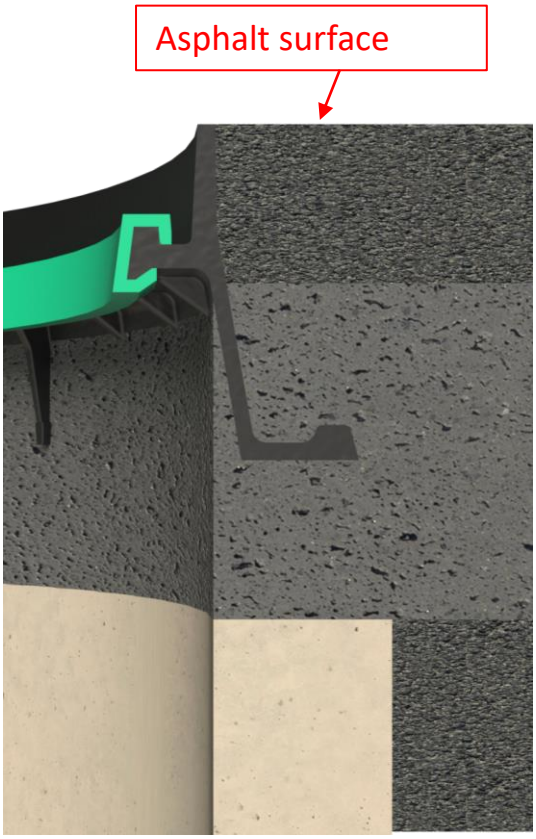
- If asphalt is required, you must impregnate the whole the concrete surface that will be in contact with the asphalt with asphalt emulsion before applying the asphalt to it.
- Then pour the cold asphalt continuously.
- Once the asphalt has been applied, ensure there is no gravel or stones on the manhole cover that could damage it during compacting.
- Once compacted, the frame must be flush with the surrounding concrete.

IMPORTANT:

⚠ The compactor should NEVER pass directly over the frame. This could damage the manhole cover, its gasket and the seating slab. It could even cause the prefabricated components of the pit to break.

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





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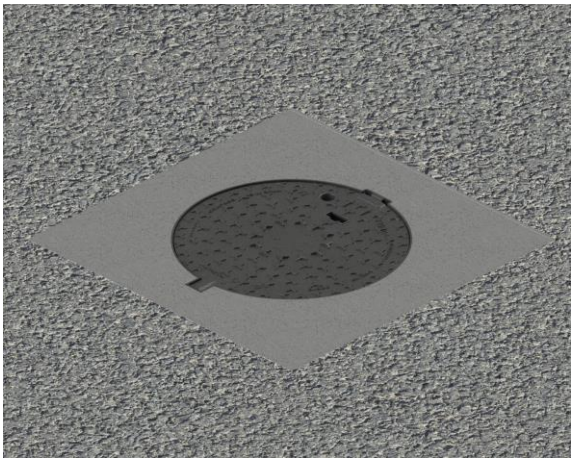
3. Cleaning, checks and use in traffic.

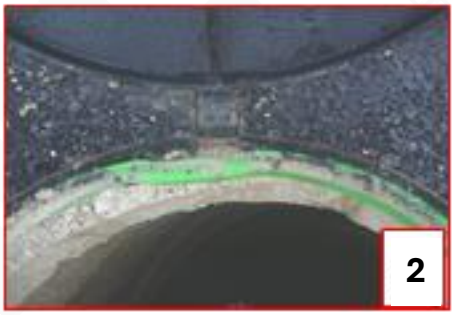
- Once all the previous steps have been completed correctly, clean the whole gasket and frame, paying particular attention to the cover seating area, ensuring it is free from gravel, asphalt or any type of dirt that may affect the manhole cover.
- It is also important to ensure that there is no excess 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.
- Finally clean the work site and reinstate the traffic, thus deeming the work finalised.



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 wich 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.


1


2


3


4

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.

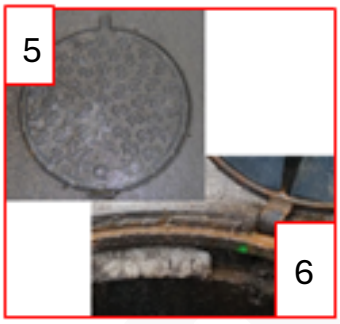
- Excessive mechanical vibration of the assembly can even damage the manhole under the frame, forcing the contractor to replace all of the prefabricated sewerage and drainage components. See photo 7

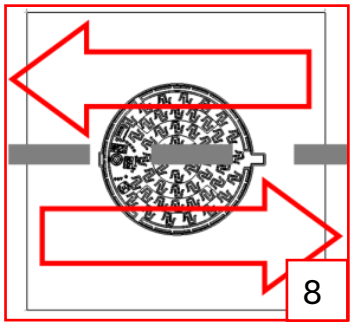
- In any event, wherever possible, it is important to avoid any one manhole cover being affected by traffic in two directions at the same time. See photo 8.

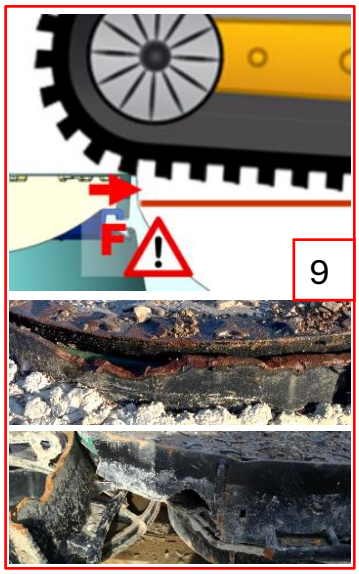
- Never rest the frame on perforated or hollow bricks. When the asphalt compactor runs over it, they may break and start to damage the paving around the frame.

- It is strictly prohibited to throw and/or drop the cover+frame assembly from heights greater than 1.5m.

- It is forbidden to use heavy machinery over manhole covers that are not yet fully installed, especially those that are above surface level during the construction stage. See image 9.







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