NOAQ
Flood Protection AB

User instructions

NOAQ Boxwall BW50

For instructions in other languages, see www.noaq.com

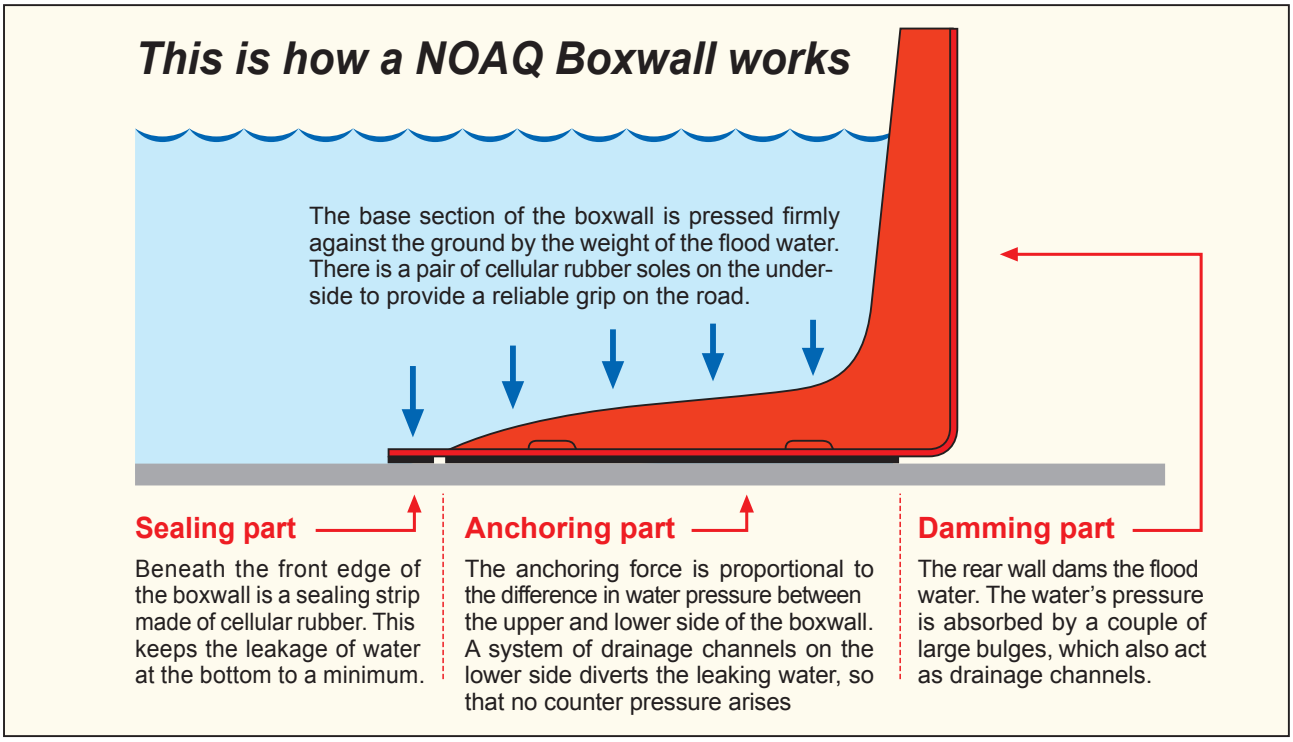
A NOAQ Boxwall is a mobile self-anchoring flood barrier. The NOAQ Boxwall BW50 creates a dam for water up to a height of 50 cm. The boxwall is so light that it can quickly be set up to protect buildings and other property against water damage, and also to keep roads open. A boxwall is designed for use on an even, firm surface, such as a paved street or a concrete floor. The boxwall is patented in a large number of countries.

A boxwall consists of sections (boxes) that are linked together by means of a simple manual operation. Each joint is then fixed using a special clamp.

Each box consists of a damming part (the rear wall), an anchor part (the horizontal section that rests on the ground) and a sealing part (the front edge of the horizontal section. Sealing strips of cellular plastic are fitted under the front and side edges. Each box is also fitted with a pair of cellular rubber soles to create a good grip on the road.

A boxwall is built up by snapping boxes one at a time onto the previous one. The easiest way is to work from left to right (viewed from the dry side). You should avoid working from two directions, as it is difficult to make the two wall sections meet at exactly the same point.

The boxes are easy to handle and move, and you can also adjust the setting of a constructed boxwall as long as the water has not started to press firmly against the base. But you must avoid dragging the boxes on the ground, as the sealing strips on the underside are vulnerable to wear.



Follow these instructions:

1. Inspect the area where the boxwall is to be constructed

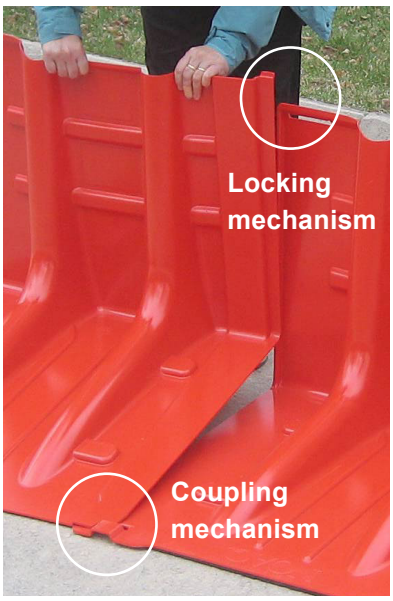
The boxwall has been specially designed for firm, even surfaces such as asphalt and concrete. It is therefore ideal for setting up on streets and paths, across car parks, in industrial areas, around shopping malls, in harbours and at airports. It must not be used on uneven surfaces or on ground that is prone to erosion. Inclinations of the ground of up to 1:10 is no problem, but sudden transitions from a surface with one inclination to an other need to be done perpendicularly. Holes or bumps should be avoided. The boxes are 705 mm long but overlap one another, which means each box adds 625 mm to the total barrier length. The boxwall requires a free width of 680 mm.

Loose sand and gravel must be brushed away from where the wall is to be erected. The soles attached beneath each box have just as good a grip as the rubber soles on your shoes. If there is sand on the road you run the risk of slipping, and the same applies for the boxwall.

The coupling between the individual boxes has a built-in flexibility of +/-3°, which means a boxwall can be drawn in curves. For abrupt changes in direction there are certain corner boxes. These have an angle of 30° and are available for both inward and outward corners.

The boxwall can be placed on land that is already flooded, but if the ground surface is difficult to see through the water, you must take particular care to make sure that the boxes are not placed on uneven surfaces, on the wrong side of surface water drains, etc

2. Lay out the boxes and connect them one by one



Start from the left (seen from the dry side) and connect the boxes one at a time to the previous one. The boxes have a **coupling mechanism** (at the front) and a **locking mechanism** (at the top). Tip the box slightly forwards and connect it with the previous box by inserting the protruding ”tongue” (on the far left) beneath the ”bridge” (on the right-hand side of the previous box).

Now lean the box a little to the side, press down its rear edge and insert the pin of the locking mechanism into the groove in the previous box. Turn the box so that the pin ends up in the middle of the groove. This is the normal position. Straight boxes are now connected in line and corner boxes in a 30° angle. However, the locking mechanism has a certain flexibility allowing the boxes to be turned +/-3° against one another.

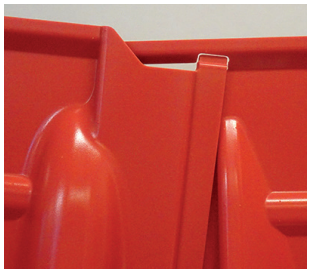
In February 2017 a modification of the locking mechanism was introduced, to facilitate assembly and disassembly. At the same time the height of the pin was somewhat increased. Boxes of newer and older type still fit together, but because of the increased height of the pin new boxes should be put to the left, and old ones to the right, to facilitate dismantling.

Secure the position of the boxes in relation to one another by placing a clamp over each joint. This is not absolutely necessary. The boxwall will still work, but in the event of high water levels and wave action the clamps will also help to secure the zone around the joints. Corner boxes have a slightly different design and do not need clamps.

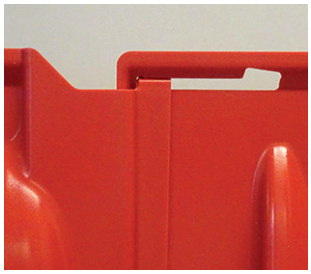
To help the sealing strip underneath create a tight seal against an uneven surface, you can place a weight on the front edge of each box, for example a sandbag. This has the best effect if it is placed on top of the joint zone (the “bridge”). It can also be necessary to ballast the boxes in this way if there is a strong wind, before the water arrives. The boxwall is not very susceptible to winds coming from the front, but winds from behind will try to lift it.

Also when deploying a boxwall in deep water the boxes need to be ballasted from start to prevent them from floating. A difference in levels between the water in front of the boxwall and behind it is necessary to achieve the pressure difference that keeps the barrier in place.

If you want to improve the seal, you can cover the boxwall and its connections with a specific thin plastic sheeting. The sheeting is 2.0 m wide and can be fixed with clamps along the upper edge and with a line of gravel or sandbags on the ground in front of the front edge.

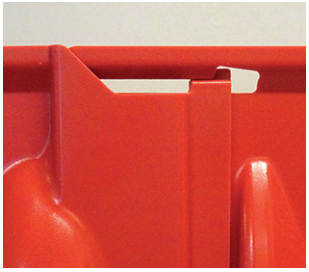


Assembly position



3° in one direction

Normal position



3° in the other direction

3. Corners

To create corners there are a couple of corner elements, one for outer corners and one for inner ones. Both have an angle of 30°, so three connected boxes make a 90° angle. Corner boxes can easily be connected to straight boxes as they share the same coupling mechanism.

Outward corner boxes may be used to protect a single object, like a detached building. To surround a rectangular area, 4 x 3 outward corner boxes for the corners can be combined with an appropriate number of straight boxes for the sides.

Inserting corner boxes at appropriate positions in a boxwall makes it possible to let it pass around different kinds of obstacles, turn in an intersection etc.

Inward corner boxes can also be used to build up temporary basins. 12 boxes are enough to build a circular pool, a ”NOAQ Boxpool” (se separate user instructions). By combining the corner boxes with a number of straight boxes a basin of any desired size can be deployed.

4. Connect to wall or façade

When a boxwall needs to end in deep water, like against a wall or a façade, the outermost box must be supported from the rear. If the boxwall is connected alongside a wall or at an oblique angle to it, it is provided with support by the wall itself.

If the boxwall approaches the wall in a right angle or in a sharp angle, one or more inward corner boxes can be used to let the boxwall make a turn up along the wall. See photo below.

An other possibility for connections in a right angle is to use a gable section (a section of the NOAQ Gablewall, see p. 5 below). A third alternative is bolting a plank to the façade, as support, or placing something heavy behind the last box.

Some kind of sealing strip must be placed between the box and the wall to reduce water leakage. A pair of cellular plastic strips are supplied with each order for this purpose. An other possibility is to cover the connection with some kind of thin plastic film.

5. Kerb stones

Kerb stones or minor steps can be passed using a couple of gables, i.e. a couple of sections of the NOAQ Gablewall. The passage must be made at a right angle. Two between themselves reversed gable sections are put together, side by side, one at the higher level, the other one at the lower level, and screwed together.

The lower and the higher boxwall parts are put against the corresponding gable sections. To reduce leakage sealing may need to be improved between boxwall and gable, and between gable and kerb stone.

6. Length adjustments

Gable sections can also be used to adjust the length of a boxwall. If the boxwall needs to have an exact length, like between the two opposite walls of an entrance, the length of the boxwall can be adjusted by putting a gable element in each end and let the boxwall overlap those to a smaller or larger extent. If this is not enough the length can be adjusted further by dividing the boxwall in two and inserting a pair of gables inbetween. Also in this case the two gable elements are reversed between themselves, and screwed together. And also in this case sealing may need to be improved.

7. Pump away leaking water

There will always be some leakage. If the ground is level or if it slopes towards the flood, this water must be pumped clear with a pump. If the ground slopes away from the flood (e.g. on the crown of permanent embankments), the water will run away without the need for pumps.

Be aware of any surface water drains. The boxwall should ideally be laid behind any of these. If there is a risk that surface water drains or culverts might divert the flood water under the wall and into the protected area, these channels must be plugged or blocked in a suitable way in order to reduce the need for pumping capacity

8. Combine boxwall and tubewall

A NOAQ Boxwall can be combined with a NOAQ Tubewall. The walls are laid so that they overlap by a metre or so, ideally with the tubewall closest to the flood and the boxwall beneath and behind the tubewall. One or a pair of the tubewall's joint covers are used to form a seal between the two wall sections. The joint covers are used in the same way as when the tubewall connects to a wall (see the user instructions for the tubewall).

9. Flash flooding

The boxwall can also be used in flash flooding, when water is running fast over the streets. When this happens the most obvious measure is to protect low entrances and vulnerable objects by redirecting the water flow toward areas where flooding will cause less damage. A similar situation can occur when snow is melting, and the water tries to take unacceptable routes. As for the use in calm water, the boxwall should only be used on firm and even surfaces, like paved roads.

If water is already running fast at the place of the intended action, the first measure would be to place a number of boxes in the water flow, to break down the speed of it and reduce its power. Put the boxes close to each other, facing upstream, but do not try to connect them. They will be anchored directly by the weight of the water entering upon them.

Behind this protective row of boxes a continuous boxwall is then assembled. When the boxwall is completed, the front row of boxes can be removed.

This way the boxwall can be used to lead away watermasses in a controlled manner down the streets, hereby reducing water levels and flood problems upstream. To divert the water off the street the boxwall may be deployed diagonally. The angle chosen, in relation to the direction of the current, depends on the amount of water and the speed of it.t.

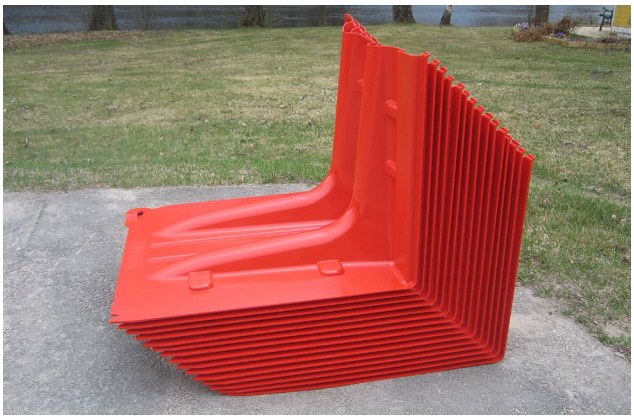
10. After use

Disconnect the boxes. By leaning one of the boxes (the one with the pin) against the other, they are easily disconnect

Rinse the boxes clean using a garden hose or by rinsing them in water, and stand them on their side to dry (when they are placed on the side the water runs off more quickly from the pores in the sealing strip). If there is a risk of temperatures falling below zero, the boxes must be taken indoors and stored in a heated area until all “soft parts” (soles and sealing strips) have dried out properly.

Inspect all soft parts. Damaged or worn sealing strips can be replaced, but if the soles have suffered big damage, the entire box should instead be replaced.

The boxes can be stacked to take up as little space as possible during transport and storage.



Important!

Floods result from a course of events controlled by forces of nature that can only be controlled to a limited degree. Furthermore, no two events are the same, which means that all protective equipment must be used not only with good knowledge of its function and limitations, but also with generally sound judgement. Those who provide the equipment, manufacturers, resellers, hirers, etc. can never accept liability for the actual use and any possible personal injury or damage to property that might arise.