

Installation Instructions for Precast Concrete Headwalls

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1. Scope

This document provides basic guidance on the installation of Stanton Bonna Precast Concrete Headwall units used to connect pipework discharging into open watercourses. Precast Concrete Headwalls are manufactured in the following sizes; small, medium,, large and extra large and can be installed pre-fitted with a range of flap valves. Other accessories such as penstocks, grates and handrails are also available (fitted by others). Table 1 below lists typical concrete pipe sizes compatible with our headwall range.

The hole will be sized to meet your requirements so please make sure you check the proposed hole size is compatible with your pipe's outer diameter.

Size of Headwall	Pipe
Extra Large DN1050 – DN1500	1050, 1200, 1350, 1500
Large DN525 – DN900	525, 600, 675, 750, 825, 900
Medium DN300 – DN450	300, 375, 450
Small DN150 – DN300	150, 200, 225, 300

Table 1: Summary of Headwall Pipe Sizes

2. Receipt of Goods

On receipt, the delivery should be checked for the following:

- The delivery note corresponds to the goods on the consignment.
- Inspect headwalls for any sign of damage which could compromise performance.
- Headwalls are stamped with the production date.

3. Handling and Storage

3,1 Handling

Unloading and handling on site must be undertaken with care to avoid damage to products.

Particular care must be taken to avoid damage to the toe end. Once off-loaded, headwalls should be placed evenly on timber beams.

Where possible, off-loading should occur at the location nearest to installation.

Small, Medium and Large Headwalls are to be off-loaded using 4No. lifting anchors cast into the units. Suitably checked and rated lifting loops will affix to cast in anchors; these will be used in conjunction with a suitably rated four-legged chainset to move and set the units in place.

The Extra Large Headwall is manufactured as a two piece unit. Each unit is to be off-loaded using 3No. lifting loops attached to a suitably rated three-legged chainset. The units will use these lifting anchors and corresponding lifting loops for off-loading, manoeuvring into position and to join both halves.

Under no circumstances should lifting loops be used to facilitate rotation of the units. If rotation is required, suitable rotating eyes must be used.

3.2 Lifting Points Design

The lifting points design has been carried out following the recommendations of the lifting systems suppliers. The calculation model is based on all the different situations the element is going to address during its life: from casting, demoulding, storage, transport loading, off-loading to final site installation.

The model starts using the weight of the element as the main parameter. Then it checks the demoulding process considering the adhesion forces to the mould, the number of lifting points predefined, the angle of the chain used to handle the element (always less than 30 degrees against the vertical) and finally, in order to reduce the dynamic effects, it is recommended to use a lifting speed of less than 90 m/s. After that it is checked the handling process where it is considered a lifting speed that can be greater than 90 m/s. In both cases it is used a dynamic factor to take into account the dynamic effects.

The final lifting point design picks out the maximum value of the previous calculations. The selected value defines the minimum required load capacity of the anchor to be used. This parameter and other aspects such as concrete strength, distance to the edges, depth of the unit, etc., determine the commercial unit to be employed.

The following table shows a summary of the number of lifting points of every unit and the minimum leg length of the chain to meet the 30 degrees rule.

Headwall type	No. lifting points per unit	Minimum chain leg length (mm)
Small	4	1300
Medium	4	1800
Large	4	2000
Extra large*	3	1850

* Extra large headwall is manufactured in two pieces. So the number of lifting point corresponds to one of the pieces.

3.3 Storage

Headwalls should be stored on firm, even ground with timber supports to avoid damage to the toe. Under no circumstances are units to be stacked.

4. Installation Procedure

4.1 Small, Medium & Large

- Install and cut the final section of pipe that will meet the headwall.
- Make sure the pipe is fully fitted, leaving the first (or end) section uncovered from backfill to install the headwall.
- Excavate to the required formation level and place a minimum 100mm thick bed of lean mix concrete (GEN1).
- Check headwall hole diameter and outside diameter of pipe are compatible. Use the case in lifting anchors and associated lifting loops with a suitably rated four legged chainset.
- Set the headwall onto the bedded surface, aligning the headwall to the centre of the hole. To ease positioning, use of a shim is recommended to ensure the correct central location.
- Install the headwall onto the end of the pipe.
- A hydrophilic sealant should be applied to the headwall opening and the end of the pipe section; this will ensure a tight seal. The pipe is to be sealed to the headwall opening by mortar, or similar, by others.

4.2 Extra Large

Stanton Bonna Extra Large Headwalls are constructed as a two-piece precast unit, which are then fixed together using an adhesive mortar on site.

- Install and cut the last section of pipe that will meet the headwall.
- Make sure the pipe is fully fitted, leaving the last section uncovered from backfill ready for installation.
- Excavate to the required formation. Place and compact a minimum of 250mm of 50mm drainage stone and then cover with a minimum 100mm thick bed of lean mix concrete (GEN1).
- Check headwall hole diameter and outside diameter of pipe are compatible. Use the cast in lifting anchors and associated lifting loops with a suitably-rated three-legged chainset to set the headwall onto the bedded surface.
- Check the headwall hole is positioned correctly and will align with the centre of the pipe. To ease positioning, use of a shim is recommended to ensure the correct central location.
- Ensure the join is clean and free of debris, then lay a nominal 10mm bed of 2-part Thixotropic Epoxy adhesive (or similar) to the join.
- Ensure equivalent join on second unit is clean and free of debris. Lift the unit into the correct position, making sure to remove excess adhesive.
- A hydrophilic sealant should be applied to the headwall opening and the end of the pipe section; this will ensure a tight seal. The pipe is to be sealed to the end of the headwall by mortar or similar (by others).

Table 2 – Headwall Dimensions

Headwall	Pipe Sizes	Max Pipe O.D. (mm)	Back Wall Height (external)	Front Wall Height (external)	Width at Back Wall	Width at Front Wall	Headwall Length	Wall Thickness	Approx. Weight (Kg)
Extra Large DN1050 – DN1500	1050, 1200, 1350, 1500	1800	2365	900	2027	2858	2010	200	7450
Large DN525 – DN900	900, 800, 750, 600, 525	1053	1650	940	1220	1950	2025	200	5300
Medium DN300 – DN450	450, 375, 300	590	1150	720	820	1680	1380	150	2400
Small DN150 – DN300	300, 225, 150	410	770	540	527	1320	1360	150	1390

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