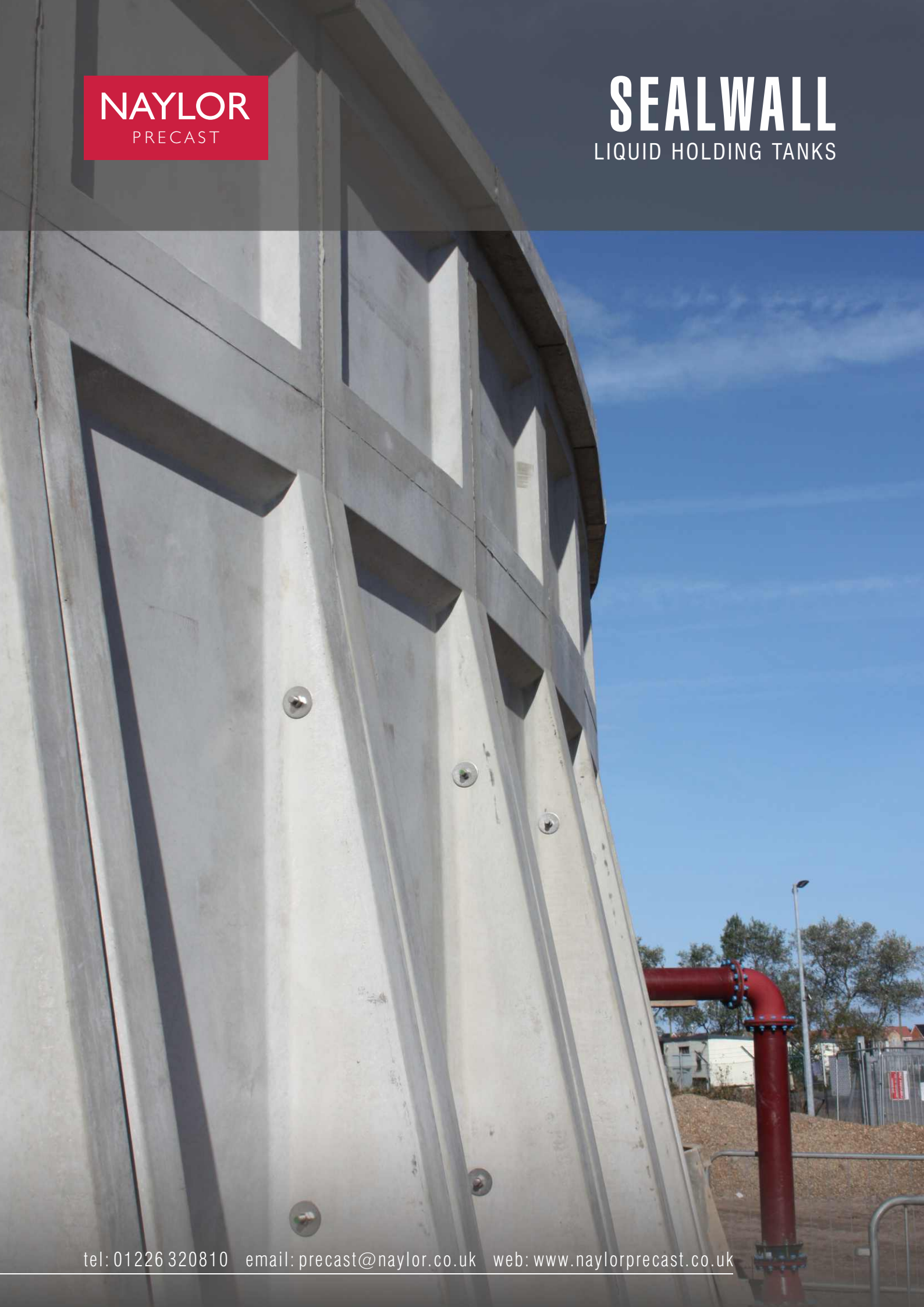
NAYLOR
PRECAST

SEALWALL

LIQUID HOLDING TANKS



tel: 01226 320810 email: precast@naylor.co.uk web: www.naylorprecast.co.uk

NAYLOR
PRECAST

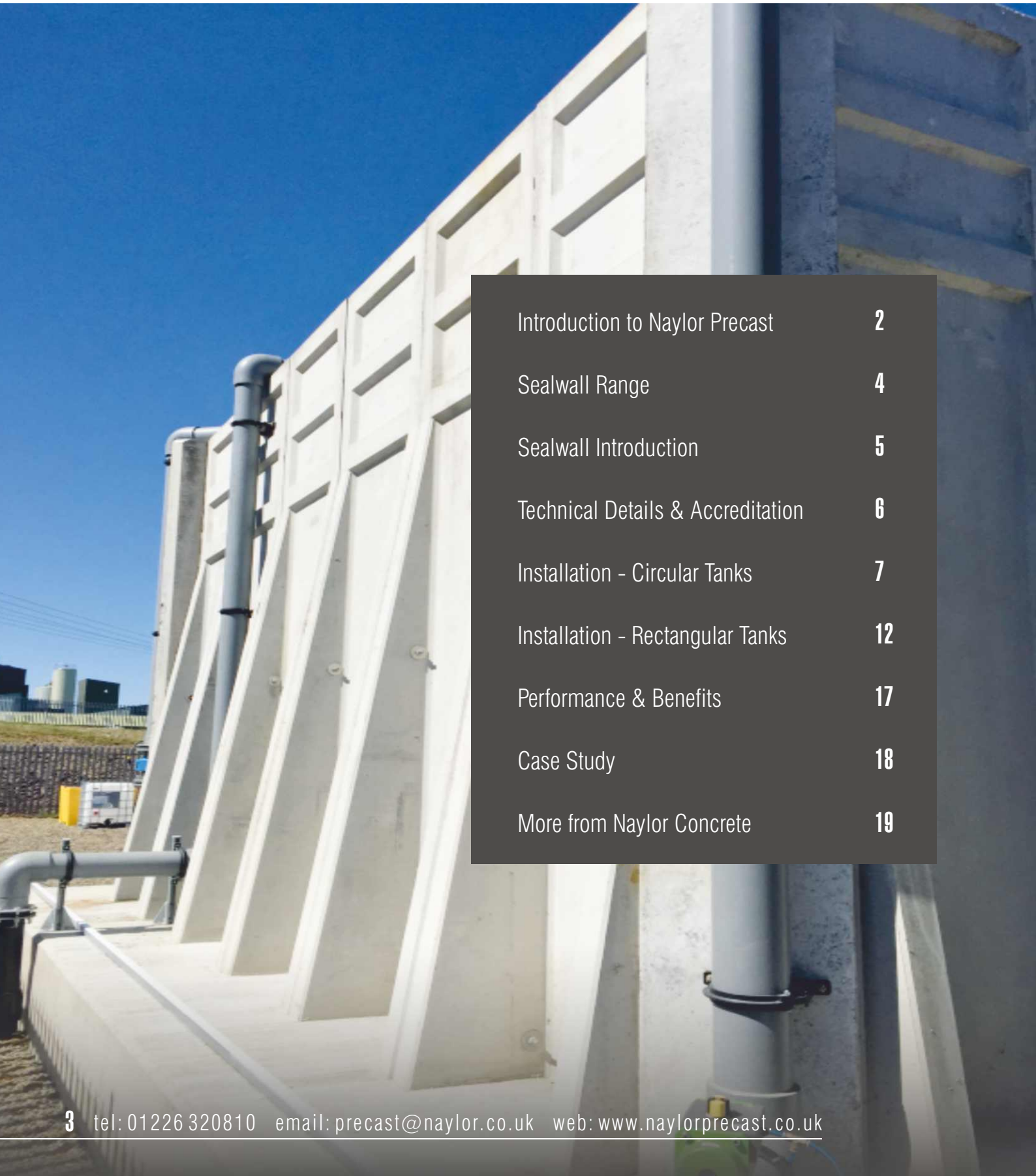
We are Naylor Concrete. For over 80 years, we have been manufacturing concrete lintels, fencing posts, precast retaining walls and liquid holding tanks. Naylor Concrete was originally established in Yorkshire, in 1943, as Dalestone Ltd, before joining the well-known Naylor Industries family in 1979, a company with over 130 years' experience in the construction industry. Since then, Naylor Concrete has continued to grow and now has two key divisions, Naylor Precast and Naylor Lintels.

Naylor Precast products are used extensively in the treatment and processing of waste liquids, storage of bulk materials and retaining walls. We also manufacture concrete bollards for security and concrete fencing posts.

Naylor Lintels are an unrivalled range of prestressed concrete lintels, one of the most trusted and widely specified lintel ranges in the UK. We offer a range of lintels to suit various building requirements, from our standard Economy range, to our premium XtraFire™ range. We work with Nationwide stockists to offer local supply facilities throughout the UK.

We know that finding the right product for your project is key, that's why our team of structural engineers, designers and CAD technicians will advise on all aspects of your project, from first concept through to final design details.

Contents



Sealwall Range

LIQUID HOLDING TANKS - ABOVE GROUND
LIQUID HOLDING TANKS - BELOW GROUND
UTILITIES APPLICATIONS | SETTLEMENT TANKS
WASTE WATER TREATMENT TANKS | SEPARATION TANKS

Sealwall

AN INTRODUCTION





Naylor Sealwall Liquid Holding Tanks are a robust, precast solution to liquid storage, with the need for minimal in situ concrete pours. These tanks are cast in individual units up to a storage height of 6m. Available in circular, square and rectangular designs, Naylor Sealwall offers a wide range of design options to suit your needs.

Being one of our specialised products, Sealwall units have undergone years of research and development. Cast in segmental units, Sealwall tanks can be situated above or below ground. The units have a unique joining system that ensures a watertight and secure connection between adjacent panels.







Technical Details & Accreditation

Scope of Manufacture

Available in standard heights only of 3.30m, 3.80m, and 4.30m. With holding limits of 3m, 3.5m, and 4m. Each panel is only available in a width of 1.00m.

Pipe penetrations can be formed in the units if required.

Certification

Our Sealwall product has been designed in accordance with BS EN 1992-1-1:2023 Eurocode 2 – Design of concrete structures – General rules and rules for buildings, bridges and civil engineering structures.

Quality

Quality standards are maintained by Naylor quality inspectors and are audited by external certification bodies. Our precast facilities meet the requirements of ISO 9001. All units are manufactured under factory control and designed in accordance with the relevant British Standards and Eurocodes and are UKCA marked.

Regulations

All Naylor precast units comply with BS EN 13369: 2018 – Common rules for precast units. All Naylor precast units have a concrete strength of 50N/mm^2 and comply with BS8500 and BS EN 206.

Delivery

Prior to delivery, a member of the Naylor Concrete team will be in contact with your site representative to confirm all details for delivery. This will include checking access, obstructions and bearings.

Installation

Upon ordering, your team will be provided with a detailed installation plan for your specific Sealwall unit. With its all weather construction capability, a standard 10m diameter Sealwall tank can be installed in 3 days, with 10 units installed per day. An additional 2-3 days will be required for the minimal in situ concrete pour and sealing.

Tank Sizes

No. of Sealwall Units	Inside Diameter (mid point)	Inside Radius (mid point)	Wheel line Radius (centre of coping)
18	5849	2925	3024
30	9886	4943	5018
45	14910	7455	7530
60	19930	9965	10040
75	24946	12473	12548

Typical sizes listed, other sizes available.

Installation Diagrams

Circular Tanks

Stages 1, 2 & 3 - Site Preparation/Formation of Foundations & Hardcore Layer

Site Excavation

Set out working drawing from setting out drawing.

Remove site of top soil and vegetation and compact to leave a firm base of bearing capacity 110kN/m^2 (1ton/ft^2).

Remove any stones from site where plinths will lay.

Plinth Construction

Set out plinth formers from setting out drawing.

Lay 2 layers A393 mesh in plinth (1 top and 1 bottom face) allowing 50mm of cover to each face.

Perimeter plinth to be 2100mm wide x 200mm thick.

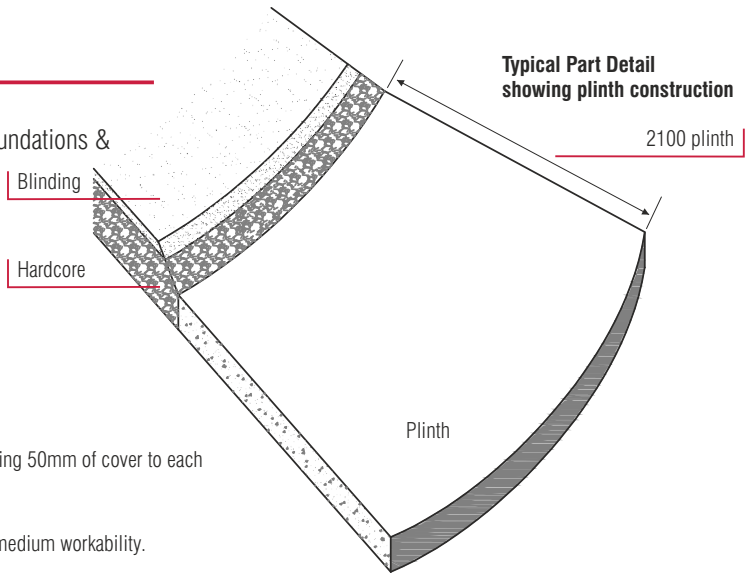
Concrete grade to be C40 or RC40 using 20mm max. aggregate medium workability.

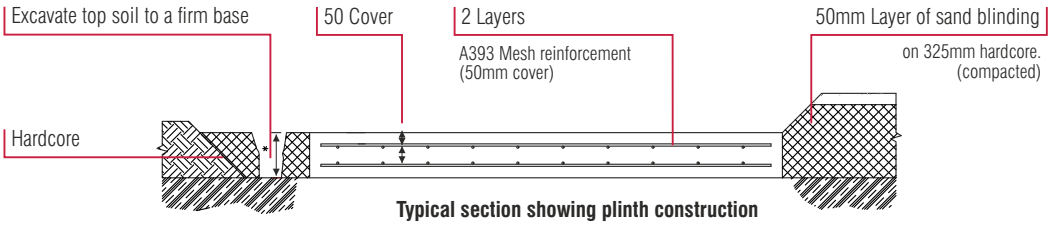
Hardcore Base

Site area between foundation plinths to be covered with min. 325mm deep compacted hardcore then 50mm compacted fines using light roller or plate vibrator.

More hardcore may be required if additional excavation is needed to find a good firm base.

NB. Hardcore/blinding to be 175mm higher than plinth level (as detail).





Typical section showing plinth construction

Stage 4 - Setting Out

Setting out of panels (internal Ø)

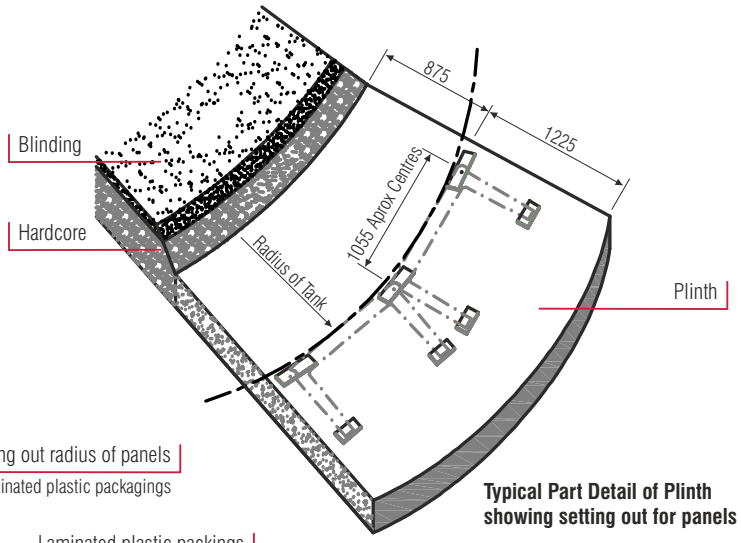
Working from a central pin mark out the radius/diameter of the tank on the plinth (refer to technical detail chart).

Working from start point mark 1042 joint lines around the perimeter.

Check plinth levels at several points to establish highest spots.

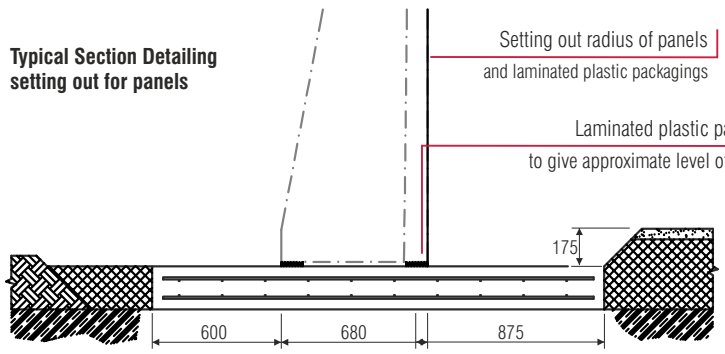
Use a 20mm Nylon Packing and confirm this point as datum.

Position packings at 1042mm Lines of Joints making level with datum using appropriate thickness of shims.



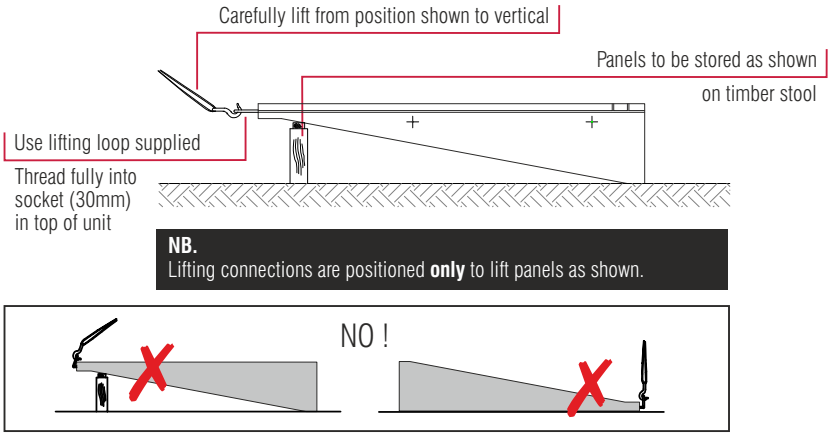
Typical Part Detail of Plinth showing setting out for panels

Typical Section Detailing setting out for panels

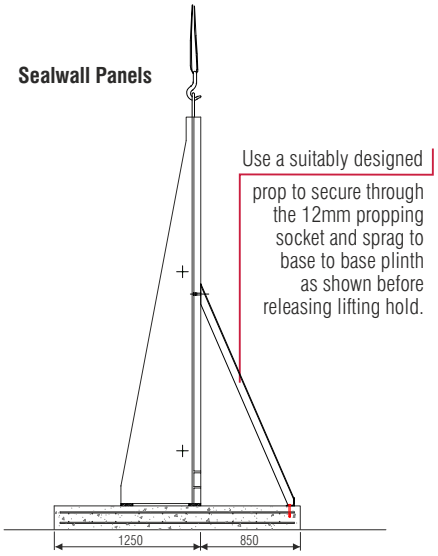


Circular Tanks

Stage 4A - Lifting and Positioning Units



Sealwall Panels



Stage 5 - Installation of Panels - **(To be done in suitable conditions - adhesive not to be applied in wet conditions)**

Installation of First Unit

At a defined point install first panel ensuring level and plumb.

Secure with prop brace as shown in stage 4A.

Fix Hydrotite (CJ0725-3K) into rebate within female connecting edge using adhesive supplied **(do not use offcuts).**

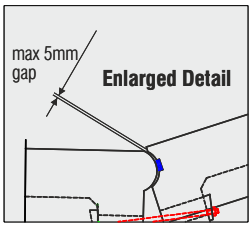
Continuation

Erect second panel 25-50mm free of previous unit, line and level before sliding on packers to close male edge into female prepared with Hydrotite in rebate.

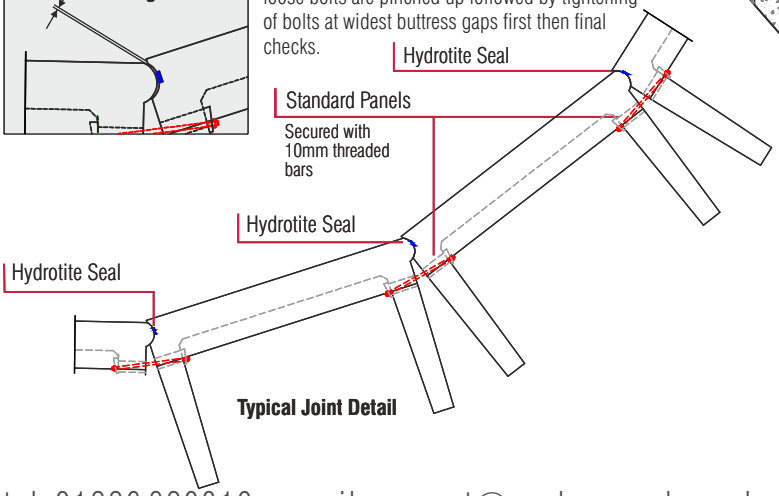
Pass threaded rods through connecting holes in ribs, apply the nuts to rods and close the joint.

Install remaining panels in sequence, as above, placing packings to each joint line at levels required.

Install final panel by easing the adjacent units before closing the joints together.

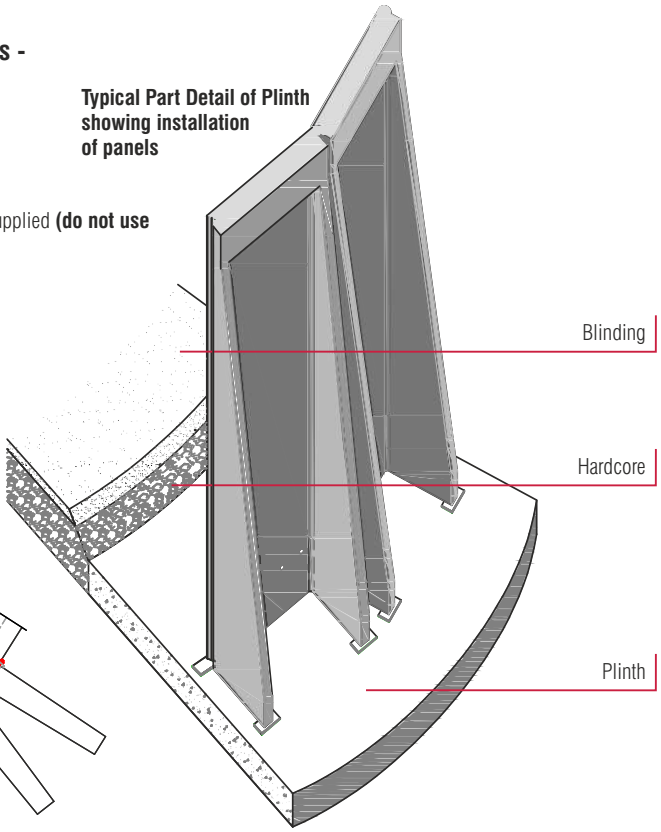


N.B. - The assembly bolts need to be tightened in sequence. Over tightening initially will change the angle they sit at. Once full circle is complete, loose bolts are pinched up followed by tightening of bolts at widest buttress gaps first then final checks.



Typical Joint Detail

Typical Part Detail of Plinth showing installation of panels



Circular Tanks

Stage 6 - Sealing of Panels

After completion of erecting, lining and leveling of all P.C.C. elements the following sealing procedure is to be followed.

1. Inject Leakmaster carefully into 2No. horizontal grooves (250mm up from base of units).

2. Using application gun supplied apply Sikaflex Pro-3 to full vertical inner joint. 'Tool' the sealant to a smooth continuous finish using a spatula lubricated with water/detergent.

3. Once the Sikaflex is set, use it as a shutter to pour non-shrink grout in the gap between the Sikaflex and Hydrotite.

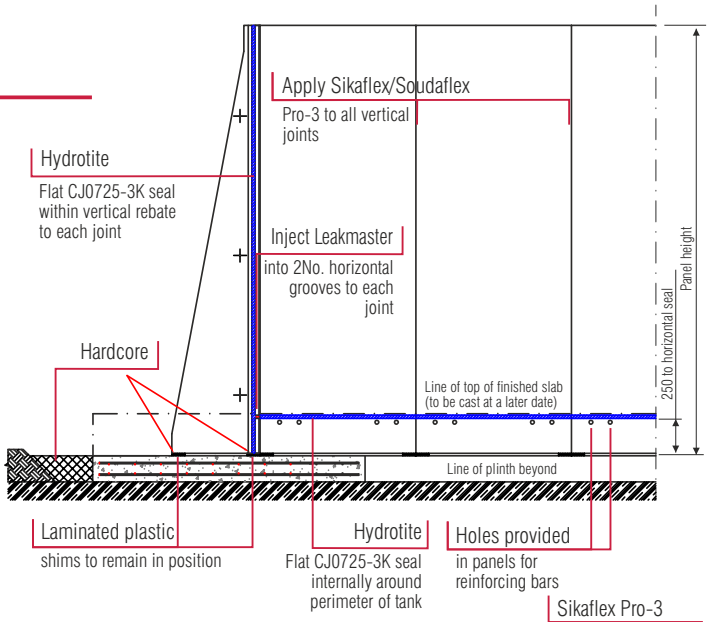
4. Prior to casting inner slab using the contact adhesive supplied fix Hydrotite CJ0725-3K horizontally to precast units (250mm up from base as shown).

It is important to have continuity, so avoid acute changes in direction by splay cutting and jointing.

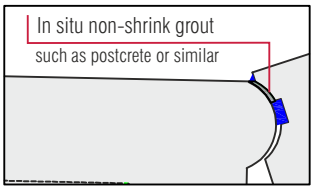
Make end of run joints by splay cutting and dress all joints fully with Leakmaster.

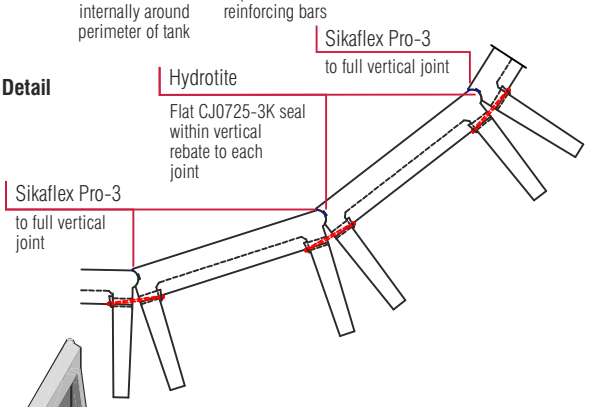
N.B. To assist placement of horizontal Hydrotite, it can be seated on the projecting T16 bars if these have been secured. (See page 7)

Note:
A 'hot work permit' may be required in damp conditions in order to ensure that sealants adhere to concrete.



Typical Joint Detail





Stage 7 - Construction of Ring Beam

Set up reinforcement by threading H16 straight bars through holes cast in wall panels (4 per panel and 850mm Projection to Inside of Tank).

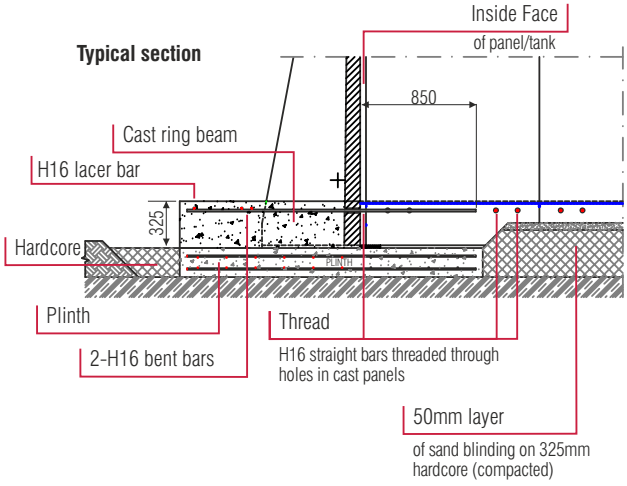
Position 2 No. H16 bent bars around outer ends of panels and position H16 lacer bar around perimeter (bars supplied in 6m lengths - cut to suit on site).

Ensure the bars are stable and horizontal before casting the ring beam.

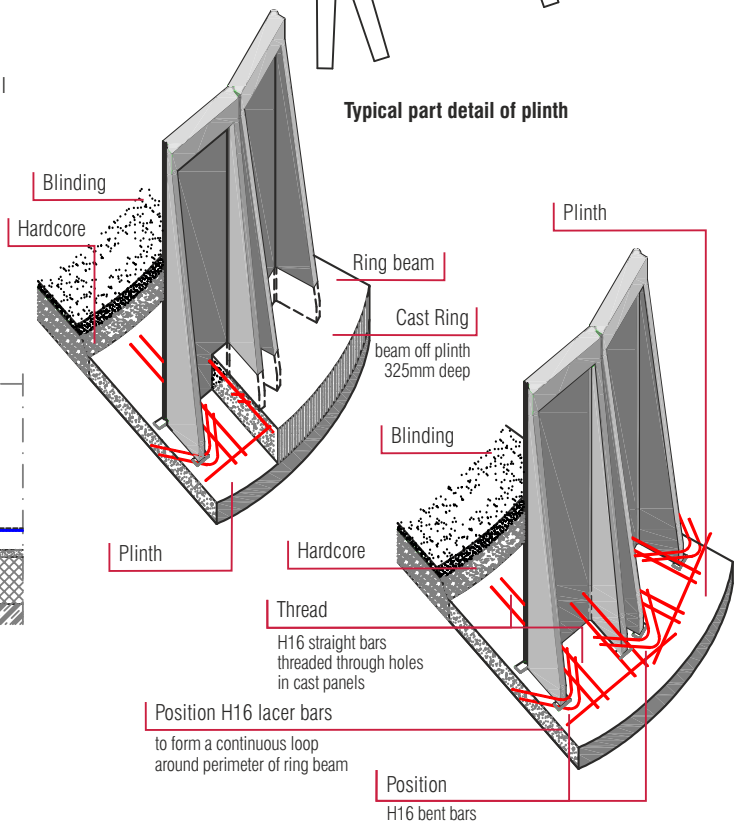
Set out formers in order to cast a ring beam 325mm deep off plinth.

Concrete to be C40 or RC40 using 20mm max aggregate with medium workability.

Typical section

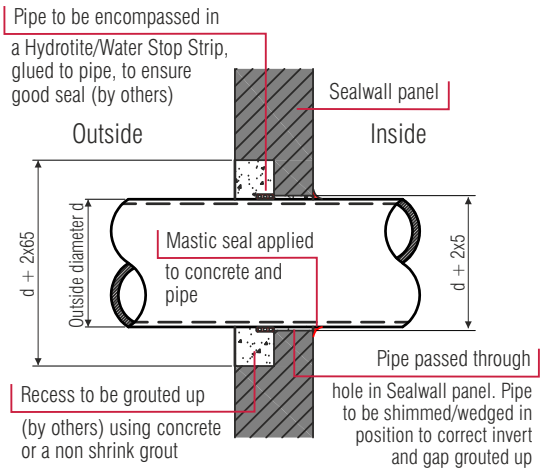


Typical part detail of plinth



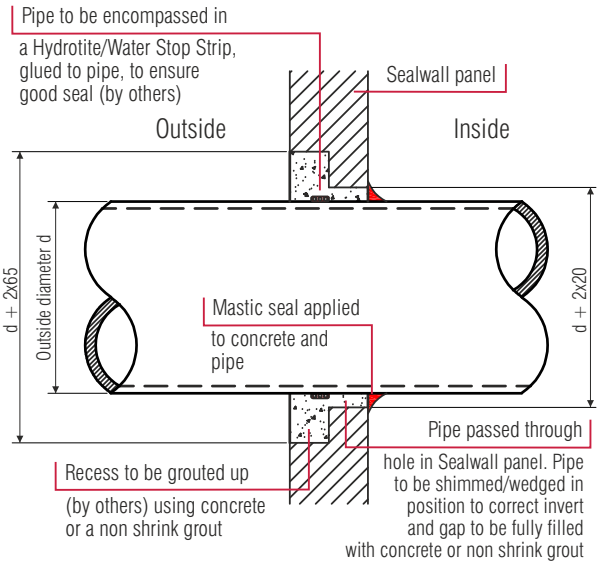
Circular Tanks

Stage 7A - Pipe Protrusion Details (Plastic)



Pipe protrusion through Sealwall units - Plastic Pipe

Stage 7B - Pipe Protrusion Details (Clay)



Pipe protrusion through Sealwall units - Clay Pipe

Stage 8 - Construction of Floor Slab

Ring Beam: 325mm thick, Floor Slab: 150mm thick

Replace and compact any disturbed hardcore/blinding during erection of panels.

Lay damp proof membrane. Visqueen 1000, or similar over fines ready for the concrete floor slab.

Lay A393 reinforcing mesh over the projecting bars from the wall units ensuring an overlap of 300mm.

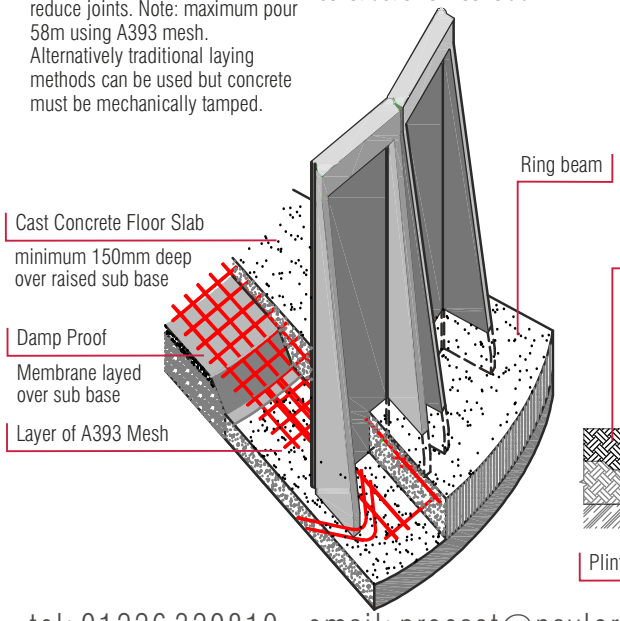
Use wire chair spacers to support the mesh and provide 50mm minimum cover to top of finished slab.

Concrete may be pump/poured to reduce joints. Note: maximum pour 58m using A393 mesh. Alternatively traditional laying methods can be used but concrete must be mechanically tamped.

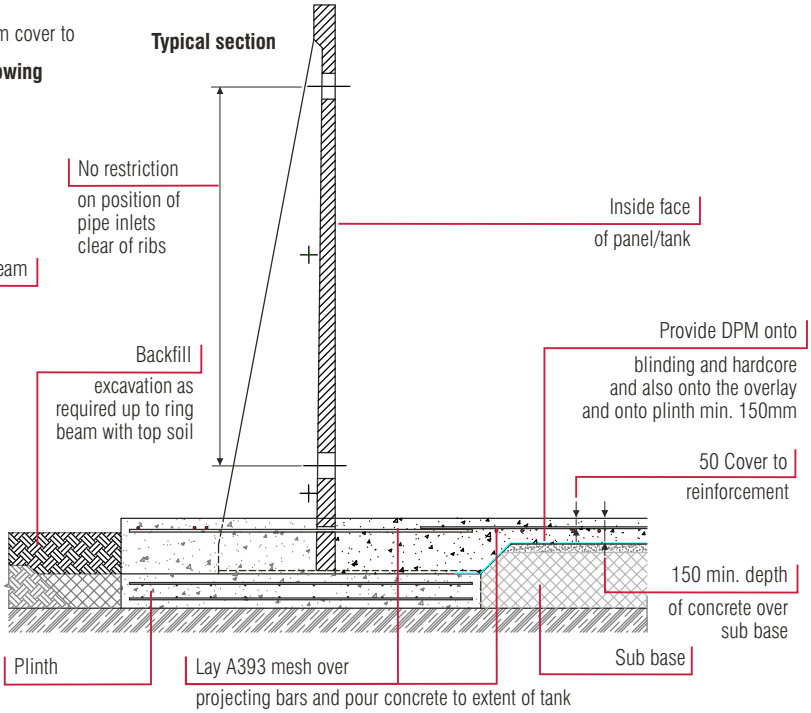
Concrete can be C40 or RC40 using 20mm maximum aggregate with medium workability and compacted by a vibrating beam.

Seek guidance on additives or other variation from ready mix companies or from Naylor Concrete.

Typical part detail of plinth showing construction of floor slab



Typical section



Circular Tanks

Stage 9 - Sealing and Jointing of Floor Slab

DAY JOINT

Cast concrete slab ensuring A252 mesh projects 300mm from outside edge.

Affix Hydrotite (or similar approved) Water Stop to side of slab.

Lay A252 mesh over projecting mesh and continue concreting main slab.

Form 10mm x 10mm rebate during construction.

When concrete is set fill rebate with 'Soudaflex' polyurethane sealer.

CONTRACTION JOINT

Fix securely into position steel formers.

Lay A252 mesh to provide 50mm cover to top of slab and 100mm away from former.

Cast concrete and position dowels through the former into slab.

When concrete is set remove formers.

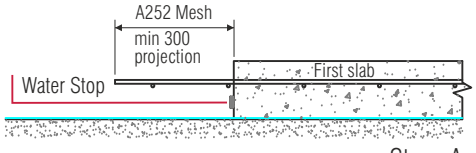
Treat dowels with debonding paint.

Affix Hydrotite (or similar approved) Water Stop to side of slab below dowels.

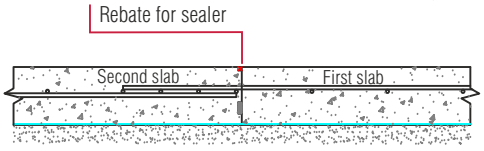
Prepare mesh as before described and continue to concrete main slab.

Form 10mm x 10mm rebate during construction.

When concrete is set remove bead and fill rebate with 'Soudaflex' polyurethane sealer.

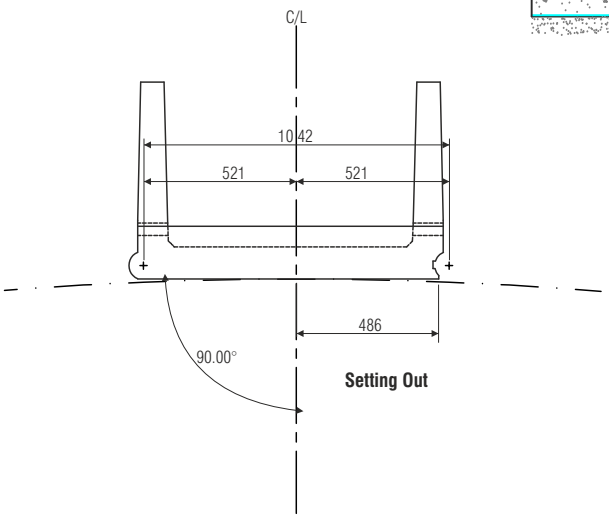


Stage A

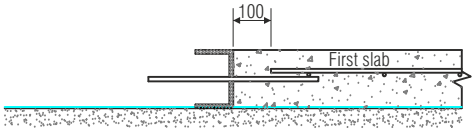


Stage B

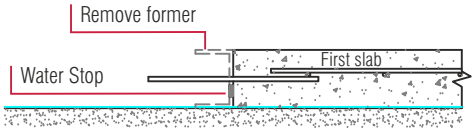
Used as an end of work joint to suit construction methods



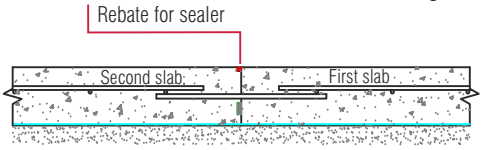
Setting Out



Stage A



Stage B



Stage C

Used when slab exceeds 37 metres in either direction

BELOW GROUND STRUCTURES

Excavations for construction of underground tanks should be considered special projects. Ground conditions play a major part in the work and if there are any doubts, obtain specialist advice.

There is a risk of flotation if the tanks are constructed in ground with a high a water table or if surface water is allowed to flow into the ground surrounding the tanks.

Consult Naylor Concrete, or obtain specialist advice if ground water level is above the base of the tank (e.g. If pumping is required to keep the excavation dry).

Modifications to the design of the tank base and floor slab, or permanent underground drainage may be required if the ground water level is above the base of the tank.

Surface water interceptor drains may be required if the tanks are being constructed in impervious clay ground to prevent a build up of ground water around the tanks.

SPECIFICATION FOR BACKFILLING

Backfilling material must be carefully selected. Materials excavated from the site of the tank may not be suitable if it is clay, or consists of large boulders or large pieces of rubble.

Suitable materials are general rubble (which should not include large pieces), crushed rock, sand, sandy clay, loam or topsoil. Materials which consist predominantly of clay (i.e. more than 50%) must not be used.

The backfill materials should be placed in horizontal layers with a maximum thickness of 300mm.

Each layer must be lightly compacted by using a vibrating plate, or by a method of similar means.

Heavy plant or rollers must not be used near to the back of the wall.

If the excavated face is battered back at an angle less than 75 degrees, 'benching' will need to be formed before backfilling.

Finished ground levels must not be higher than the top of the tank wall for a distance of 3 metres from the back of the wall.

No heavy plant or vehicles must approach within 3 metres from the back wall.

Consult Naylor Concrete if there is any doubt about site or material suitability.

Notes:

1. It is main contractors responsibility to detail the provision of: expansion/contraction/construction joints as required.
2. Where sealants are applied by contractors other than Naylor Concrete, then it is the main contractors responsibility to ensure compliance with all Health & Safety requirements and appropriate COSHH regulations.

Installation Diagrams

Rectangular Tanks

Stages 1, 2 & 3 - Site Preparation/Formation of Foundations and Hardcore Layer

Site Excavation

Set out working area from setting out drawing.

Remove site of top soil and vegetation and compact to leave a firm base of bearing capacity 110kN/m^2 (1 ton/ft^2).

Remove any stones from site where plinths will lay.

Plinth Construction

Set out plinth formers from setting out drawing.

Lay 1 layer A393 mesh in plinth top and 2 layers A252 mesh bottom face allowing 50mm of cover to each face.

Perimeter plinth to be 2100mm wide x 200mm thick.

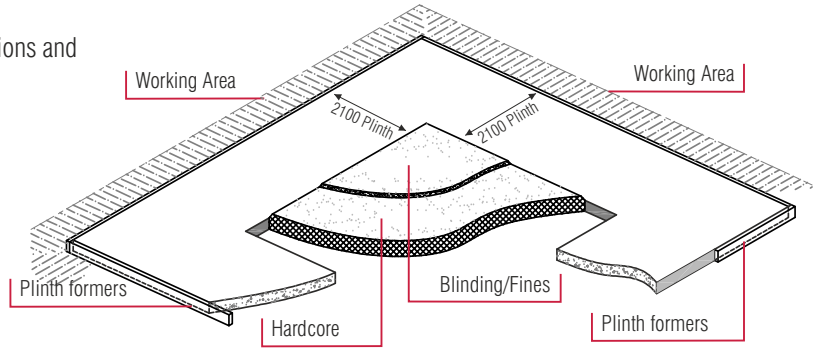
Concrete grade to be C40 or RC40 using 20mm max. aggregate medium workability.

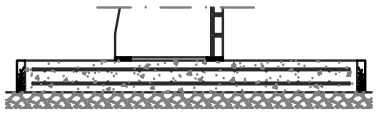
Hardcore Base

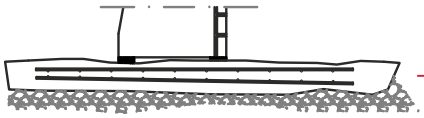
Site area between foundation plinths to be covered with min. 325mm deep compacted hardcore then 50mm compacted fines using light roller or plate vibrator.

More hardcore may be required if additional excavation is needed to find a good firm base.

NB. Hardcore/blinding to be 175mm higher than plinth level (as detail).

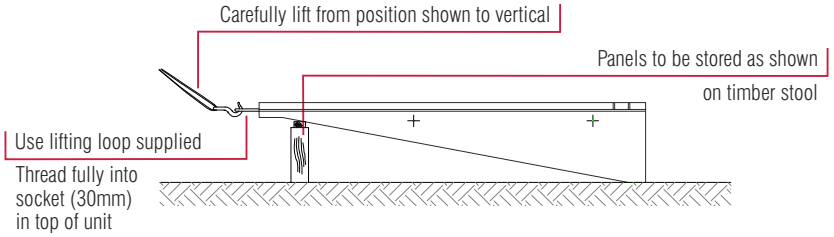




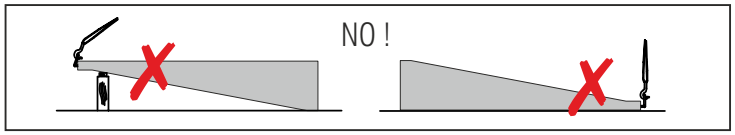


Note:
It is important that effort is taken to construct the plinth to structural concreting standards and ensure that the finished plinth is flat and to same level overall.

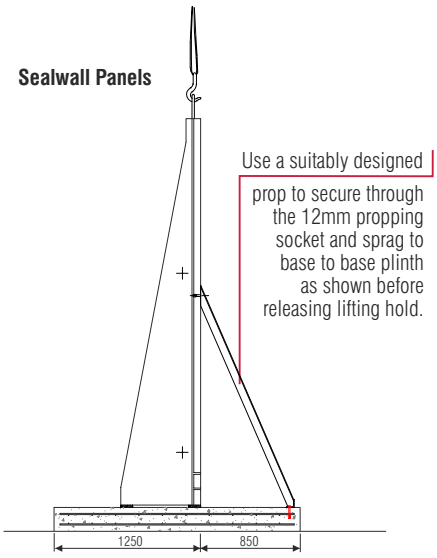
Stage 4A - Lifting and Positioning Units



NB.
Lifting connections are positioned **only** to lift panels as shown.



Sealwall Panels



Note:
All panels must be securely proped/braced before lifting load is released.

Rectangular Tanks

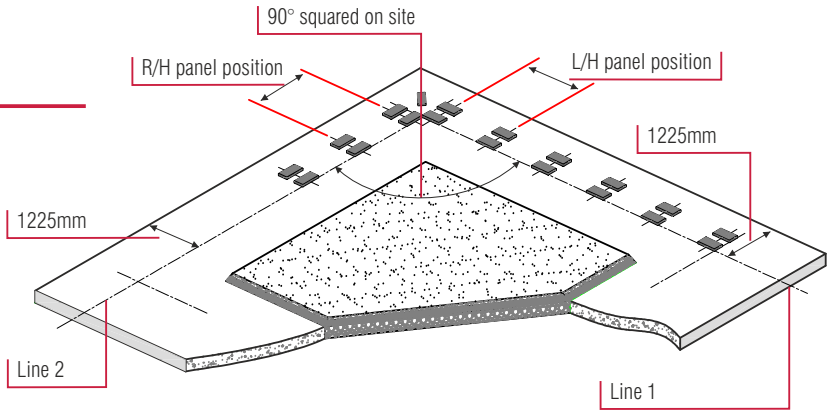
Stage 4 - Setting Out

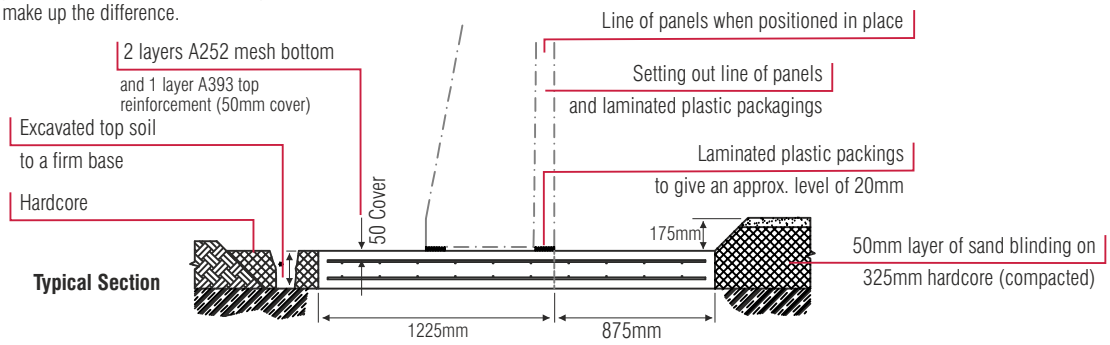
Setting Out of Panels

Mark out two setting out lines square to internal dimensions of tank on top of concrete plinth to guide installation of panels.

Mark out 1055mm centres off line 1 and 1055mm to line 2. Take levels at 4 corners of tank. At the highest level, position a 10mm laminated plastic packing to act as a datum.

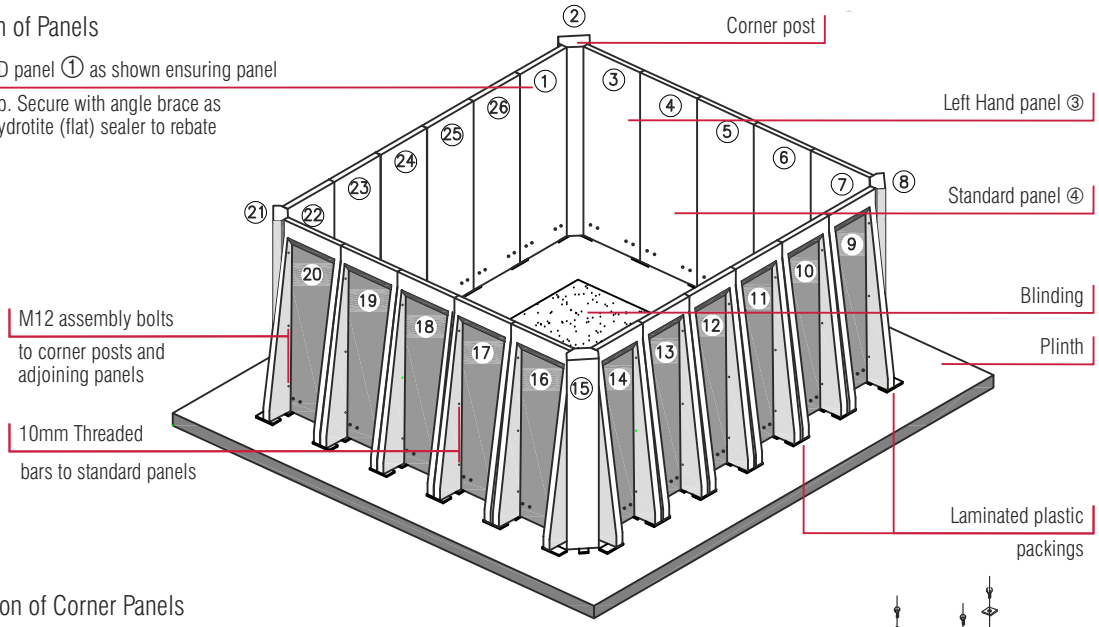
Position packings to line 1 flush with the setting out line at centres marked off. Ensure packings are level with the datum packer providing shims to make up the difference.





Stage 5 - Installation of Panels

Install first a RIGHT HAND panel ① as shown ensuring panel is in line, level and plumb. Secure with angle brace as shown in stage 5A. Fix Hydrotite (flat) sealer to rebate using adhesive supplied.



Stage 5A - Installation of Corner Panels

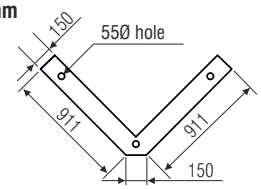
Install corner post and LEFT HAND panel. Finger tighten the M16 assembly bolts into sockets cast in panels ensuring that the Hydrotite bead nestles accurately in the groove of the adjacent panel.

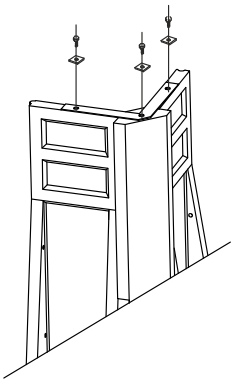
Install remaining panels in sequence as shown, setting out and positioning packings a line at a time as described before. Fix Hydrotite sealer as before. Recommended torque 210Nm.

Install top brace to all corners as shown.

To all corners, install the painted steel top braces (as supplied). Plates to be bolted down to lifting sockets using 3no M30 bolts with 100x100x8mm washer plates (32mmØ hole).

Corner Plate Detail 10mm Thick





Rectangular Tanks

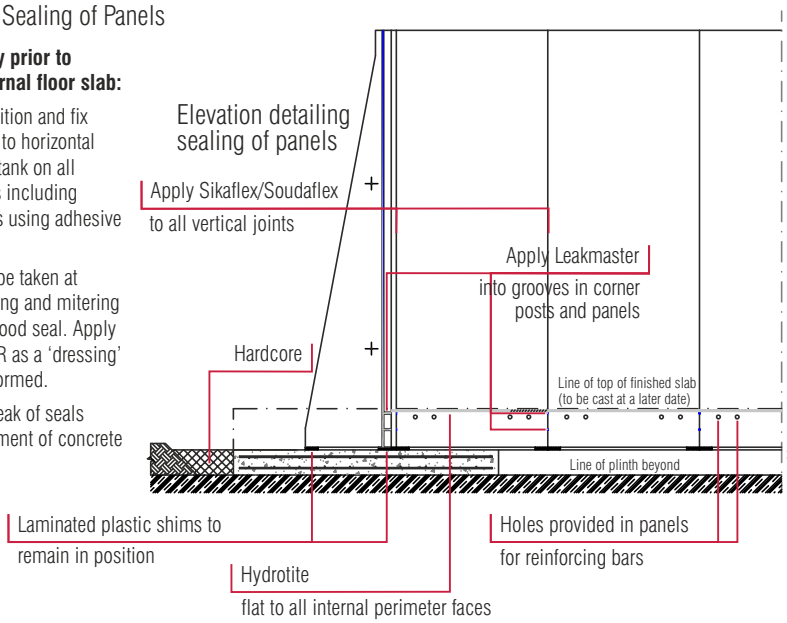
Stage 6 - Sealing of Panels

Immediately prior to casting internal floor slab:

Carefully position and fix Hydrotite flat to horizontal perimeter of tank on all internal faces including division walls using adhesive supplied.

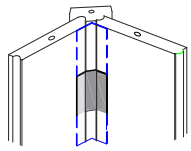
Care should be taken at corners, cutting and mitering to ensure a good seal. Apply LEAKMASTER as a 'dressing' to any joint formed.

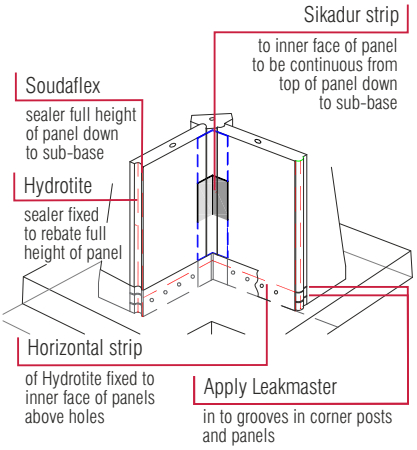
Ensure no break of seals during placement of concrete slab.



Sealwall Corner Sealing detail

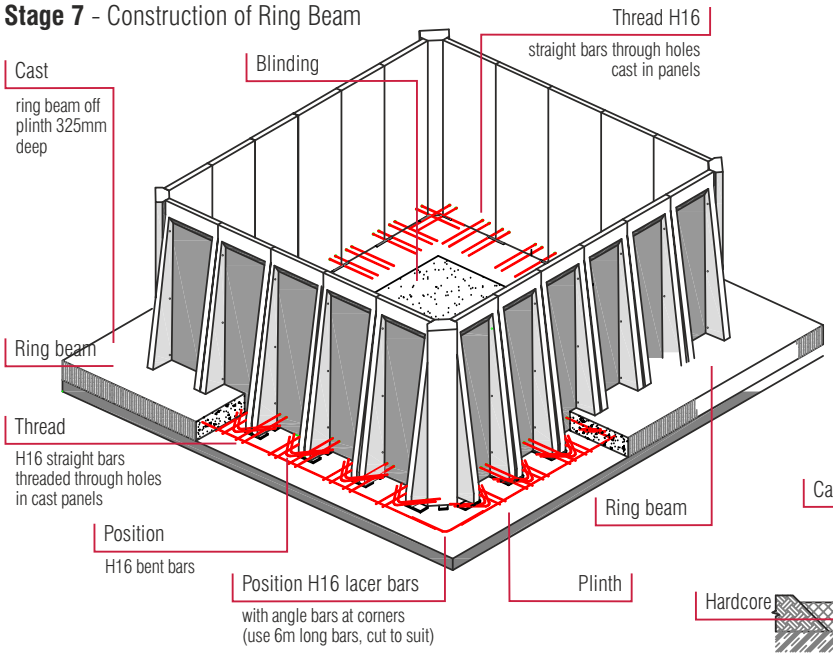
After void between units is filled, clean and prepare concrete surface to allow correct installation of Sikadur strip. Strip should be taken down full height of Sealwall panel (below slab level to top). Strip should be installed in strict accordance to manufacturers literature and recommendations.





Note:
A 'hot work permit' may be required in damp conditions in order to ensure that sealants adhere to concrete.

Stage 7 - Construction of Ring Beam



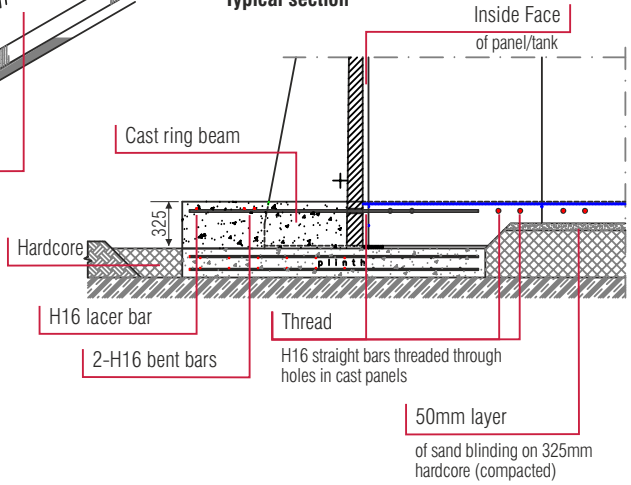
Set up reinforcement by threading H16 straight bars through holes cast in wall panels (4 per panel).

Position 2 No. H16 bent bars around outer ends of panels and position H16 lacer bar around perimeter (bars supplied in 6m lengths - cut to suit on site).

Set out formers in order to cast a ring beam 325mm deep off plinth.

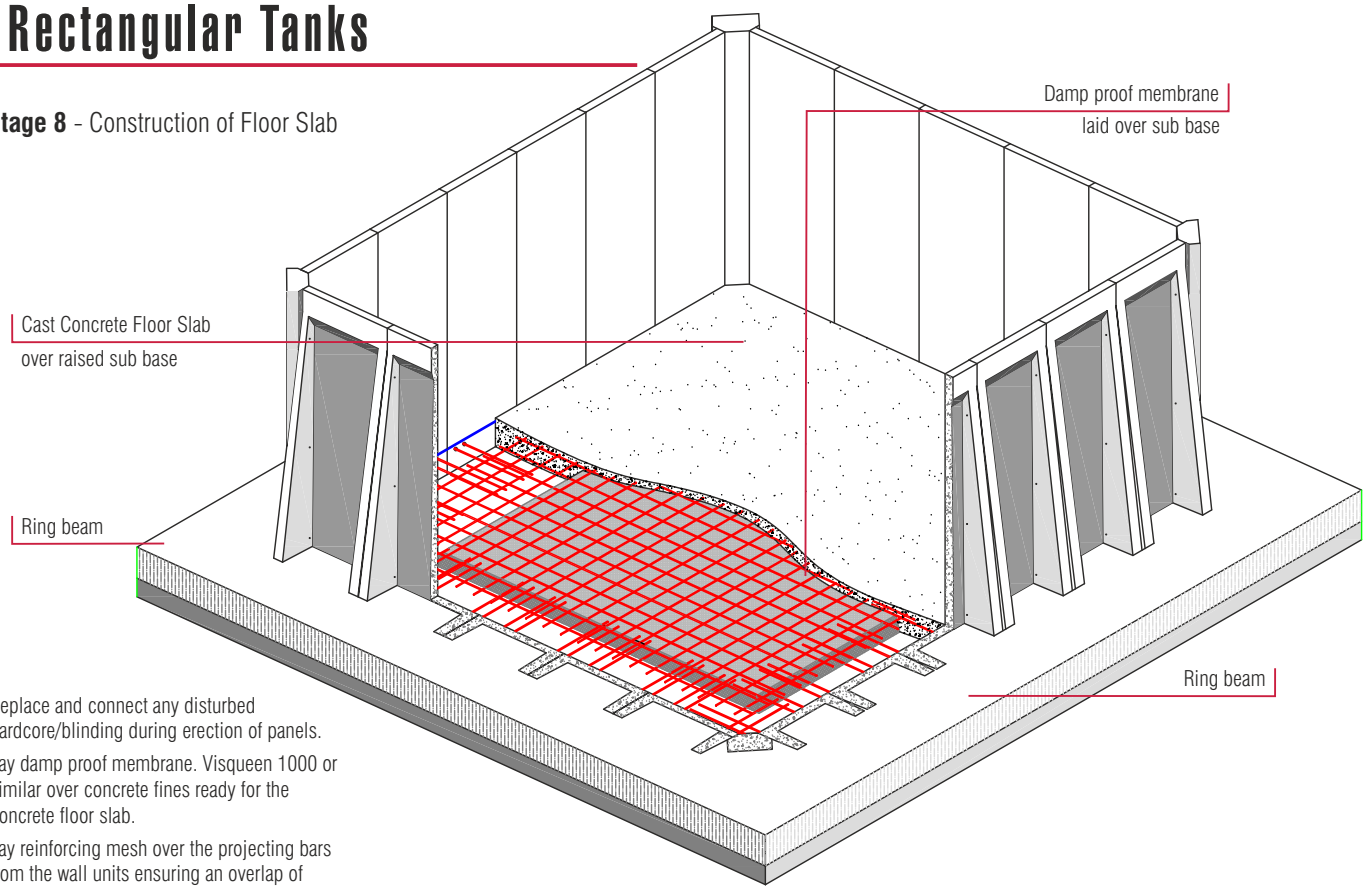
Concrete to be C40 or RC40 using 20mm max aggregate with medium workability.

Typical section



Rectangular Tanks

Stage 8 - Construction of Floor Slab



Replace and connect any disturbed hardcore/blinding during erection of panels.

Lay damp proof membrane. Visqueen 1000 or similar over concrete fines ready for the concrete floor slab.

Lay reinforcing mesh over the projecting bars from the wall units ensuring an overlap of 300mm.

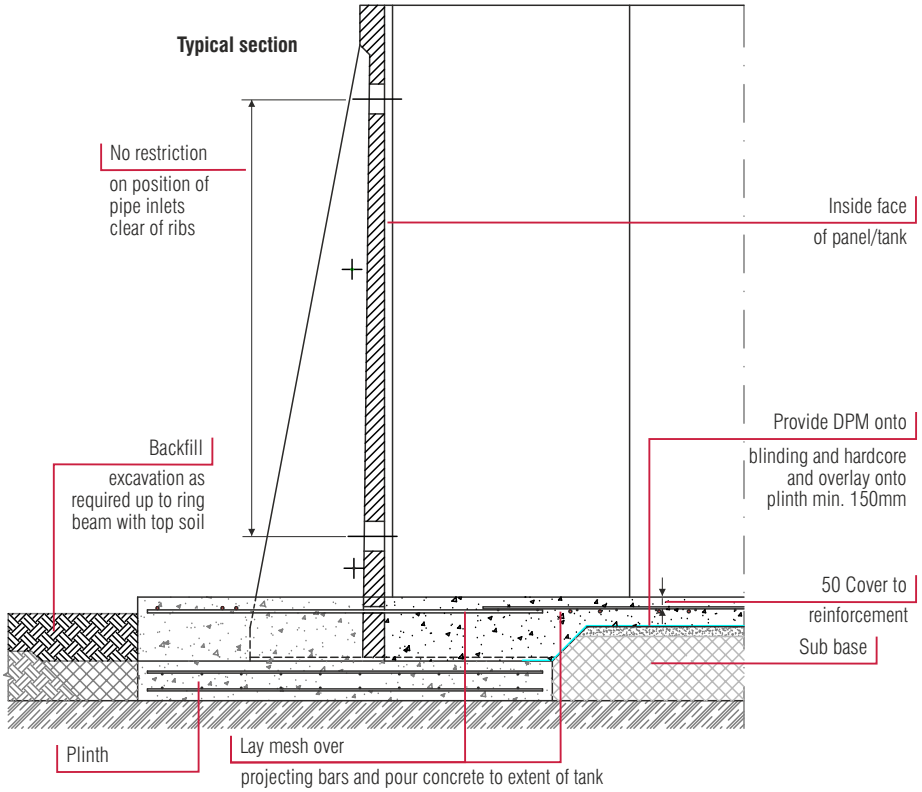
Use wire chair spacers to support the mesh and provide 50mm minimum cover to top of finished slab.

Concrete may be pump/poured to reduce joints. Alternatively traditional laying methods can be used but concrete must be mechanically tamped.

Concrete can be C40 or RC40 using 20mm maximum aggregate with medium workability and compacted with a vibrating beam.

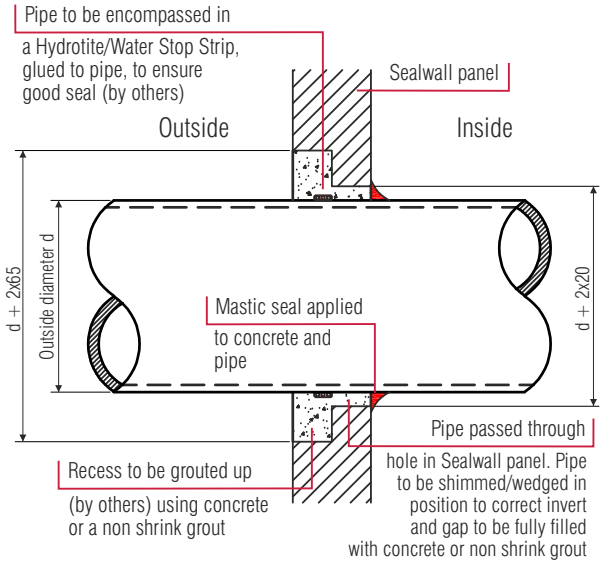
Seek guidance on additives or other variation from ready mix companies or from Naylor Concrete.

Typical section

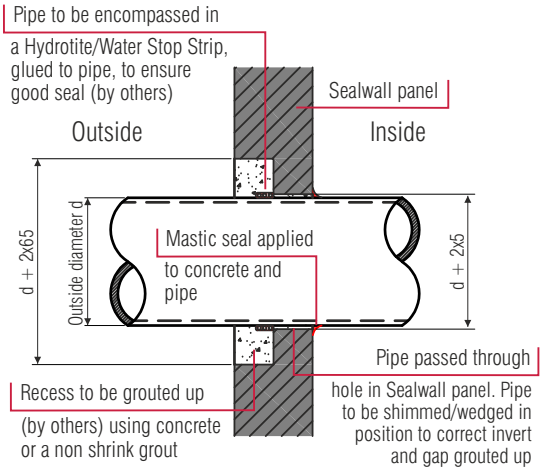


Rectangular Tanks

Stage 9 - Pipe Protrusion Details



Pipe protrusion through Sealwall units - **Clay Pipe**



Pipe protrusion through Sealwall units - **Plastic Pipe**

BELOW GROUND STRUCTURES

Excavations for construction of underground tanks should be considered special projects. Ground conditions play a major part in the work and if there are any doubts, obtain specialist advice.

There is a risk of flotation if the tanks are constructed in ground with a high water table or if surface water is allowed to flow into the ground surrounding the tanks.

Consult Naylor Concrete, or obtain specialist advice if ground water level is above the base of the tank (e.g. If pumping is required to keep the excavation dry).

Modifications to the design of the tank base and floor slab, or permanent underground drainage may be required if the ground water level is above the base of the tank.

Surface water interceptor drains may be required if the tanks are being constructed in impervious clay ground to prevent a build up of ground water around the tanks.

SPECIFICATION FOR BACKFILLING

Backfilling material must be carefully selected. Materials excavated from the site of the tank may not be suitable if it is clay, or consists of large boulders or large pieces of rubble.

Suitable materials are general rubble (which should not include large pieces), crushed rock, sand, sandy clay, loam or topsoil. Materials which consist predominantly of clay (i.e. more than 50%) must not be used.

The backfill materials should be placed in horizontal layers with a maximum thickness of 300mm.

Each layer must be lightly compacted by using a vibrating plate, or by a method of similar means.

Heavy plant or rollers must not be used near to the back of the wall.

If the excavated face is battered back at an angle less than 75 degrees, 'benching' will need to be formed before backfilling.

Finished ground levels must not be higher than the top of the tank wall for a distance of 3 metres from the back of the wall.

No heavy plant or vehicles must approach within 3 metres from the back of the wall.

Consult Naylor Concrete if there is any doubt about site or material suitability.

Notes:

1. It is main contractors responsibility to detail the provision of: expansion/contraction/construction joints as required.
2. Where sealants are applied by contractors other than Naylor Concrete, then it is the main contractors responsibility to ensure compliance with all Health & Safety requirements and appropriate COSHH regulations.

Sealwall

PERFORMANCE & BENEFITS

Installation

Sealwall units are manufactured offsite and are not affected by adverse weather. Minimal in situ work is required to install these units. For a 10m diameter tank that is 4m high, the installation time is around 5-6 days, including install and final in situ base work. Details of the in situ work required before and after the units arrive are provided upon order.

Low on-site costs, with zero wastage. Minimum on-site labour costs and minimal space required.

Unit Width (m)	Unit Height (m)	Unit Weight (Kg)	Unit Weight (t)
1	3.3	1360	1.5
1	3.8	1529	1.68
1	4.3	1670	1.86

Unit Strengths

Our Sealwall units are all designed to contain liquid and retain backfill, therefore units can be buried below ground or used above ground.

Density of water (kN/m^3)	Density of soil (kN/m^3)	External surcharge (kN/m^2)
10.8	19	10

Performance

Our Sealwall Liquid Holding tanks are available in unlimited sizes, depending on your needs. As a result, these tanks can be designed to hold as much as you require, without the need to adjust the design of the individual unit.

Each Sealwall Liquid Holding tank has a design life of 50 years, so you can rest assured that once installed, you'll have minimal maintenance during the lifespan of your tank.

We advise a visual inspection every 12 months, where possible, to check the vertical joints of the tank internally and externally. Carrying out any remedial work required.

Every 15 years, an extensive inspection can be carried out, by emptying the tank and inspecting internal seals.

Benefits

Choosing Naylor Concrete Sealwall for your liquid holding tank has a wide variety of benefits.

A few are listed below:

- Allows for Program Planning with achievable timelines
- Potential cost savings of 15-25% due to reduced installation time
- Reduction in Health and Safety issues
- Reduction in traffic management
- Requires little to no snagging as drawings are issued for installation
- Installation of panels is approx. 30 minutes
- Vehicle deliveries are kept to a minimum, with 8 panels delivered per vehicle

Case Study

Watton Water Recycling Centre

Naylor Concrete worked with Anglian Water to install two new water settlement tanks at the Watton Water Recycling Centre. Part of a £3million improvement scheme, this project allowed Anglian Water to protect and improve water quality.

Working closely with the Naylor Concrete technical team to develop a detailed design solution for 1x 18m diameter primary settlement tank and 1x 21m diameter final settlement tank.

For this project, our 4.3m high Sealwall units and coping stones were requested, allowing for a 4m liquid holding limit. The two tanks were installed onsite by specialist contractor, Bell Formworks.

Site:	Watton Water Recycling Centre
Client:	Anglian Water
Contractor:	Bell Formworks
Product Supplied:	4.3m High Sealwall Units

More from Naylor Concrete

Precast

Retaining Walls

Verti-Block
An innovative design that is both aesthetically appealing and easy to install. Ideal for flood protection, gravity walls, property dividers and more.

Rockwall
Ideal for the industrial and agricultural sectors to retain land or create storage bunds and skip bays.

Groundwall
Suitable for use above or below ground and designed to withstand heavy loads generated by heavy plant and vehicles.

Modular Tanks
Perfect for below ground or partially buried liquid storage of dirty water or leachate. Use a group of tanks for the creation of separation, holding and washdown tanks.

Prestressed Panels
Suitable for a wide range of applications, including building cladding, division walling and the creation of storage areas.

Bollards
Designed to provide the most cost-effective solution for security, property and perimeter protection and the prevention of vandalism.

Lintels

An extensive range of lintels for a wide variety of applications, from housebuilding, foundations, schools, hospitals, care homes, shopping centres, airports and more.

Choose from

Economy Range
Our best-selling range that are also cost-effective

Hi-Spec
One of the most specified lintels in the UK, available in standard finish and Fair Faced for use in exposed/painted constructions

Fire-Spec
Designed to the same standards as our Hi-Spec range, with three different fire ratings, 60, 90 and 120 minutes. Available in standard or Fair Faced finish.

XtraFire™
Our most advanced range, with fire ratings up to 240 minutes available.

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PRESTRESSED CONCRETE LINTELS | PADSTONES
RETAINING WALLS | LIQUID HOLDING TANKS | FENCING

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Ref: PRECAST SEALWALL - 1 September 2024