TRACEY
CONCRETE

Tunnelling Brochure

DESIGNING | MANUFACTURING | DELIVERING

traceyconcrete.com

TRACEY CONCRETE

Tracey Concrete is one of the largest precast concrete manufacturers in the UK and Ireland.

Tracey Concrete's success has been built on the consistent quality of our products, efficient delivery and outstanding customer service. With our vast experience and expertise in the construction industry, we have been able to design and supply precast concrete products for some of the biggest projects in the UK and Ireland.

Our products comply with all necessary certifications and are accredited with the most up to date Irish, UK and European standards, with the relevant products being BSI kitemarked and CE marked.

WE SPECIALISE IN

- Precast Concrete Drainage Systems
- Precast Tunnelling Systems
- Agricultural Precast
- Cable Trough Systems
- Ready-mix and Liquid Screed Concrete
- Bespoke Precast Concrete Systems
- Bio Klenze™ Sewage Treatment Systems
- Quarry Products

bsi. ISO 9001:2015 Quality Management | ISO 14001:2015 Environmental Management | OHSAS 18001 Occupational Health and Safety Management

bsi. UKAS MANAGEMENT SYSTEMS 0003

Tracey Concrete's Precast Factory - Enniskillen

t.028 6632 6437

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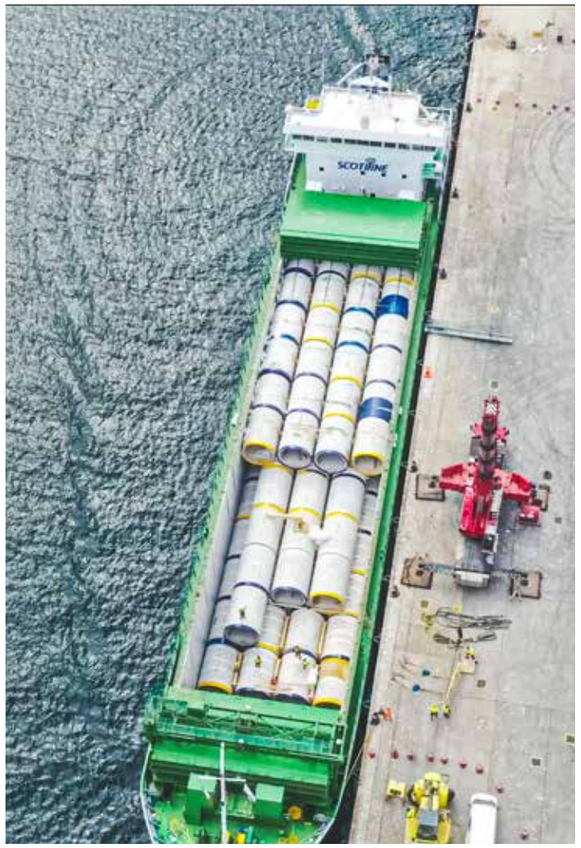

Full boat load of Bespoke Jacking Pipes departing for Finland

Tracey Concrete Jacking Pipe loaded into a container for shipping

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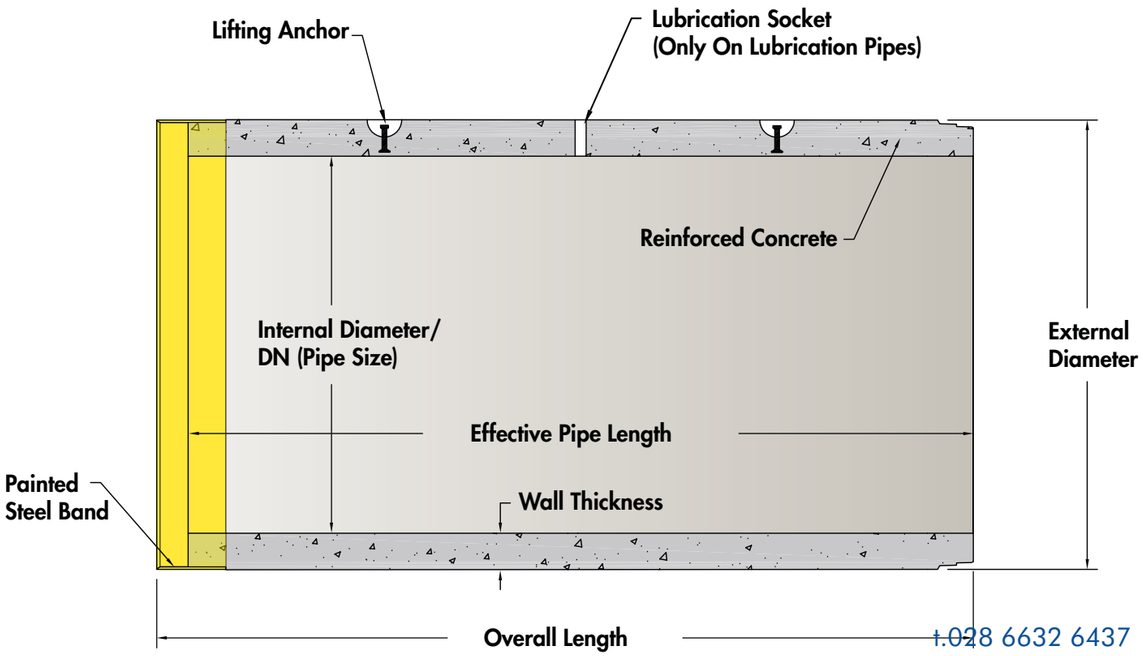
STANDARD JACKING PIPES

Tracey Concrete manufacture a comprehensive range of high quality Jacking Products to suit the requirements of the latest generation of pipe jacking systems. Tracey Concrete have a long tradition of producing high quality concrete pipes and operates an ISO9001 quality management system.

DN Sizes	Wall Thickness	External Dia	Effective Length	Packer Thickness	Weight	Max Jacking Force	Max Jacking Force for closed joint
DN	t	OD	l	a	W	Fjmax	FCj
(mm)	(mm)	(mm)	(mm)	(mm)	(kg)	(Tonnes)	(Tonnes)
450	75	600	1200	12	390	160	80
450	75	600	2000	12	650	160	80
600	80	760	1200	15	516	230	110
600	80	760	2000	15	860	230	110
900	100	1100	2500	15	1920	460	230
1000	110	1200	2500	15	2600	510	250
1200	115	1430	2500	18	2960	720	360
1200	145	1490	2500	18	3660	970	480
1500	140	1780	2500	18	4500	1140	570
1600	170	1940	2500	18	6000	1540	770
1800	160	2120	2500	18	6150	1590	790
1829	197	2223	2500	18	8040	2050	1020
2040	180	2400	2500	18	8400	1820	910

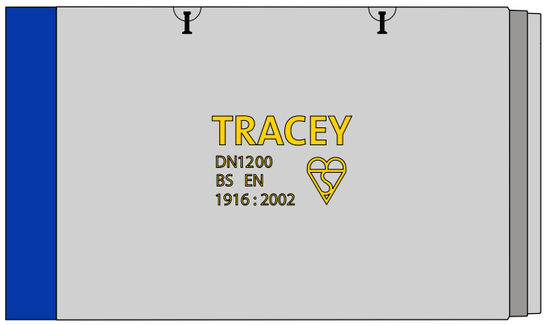


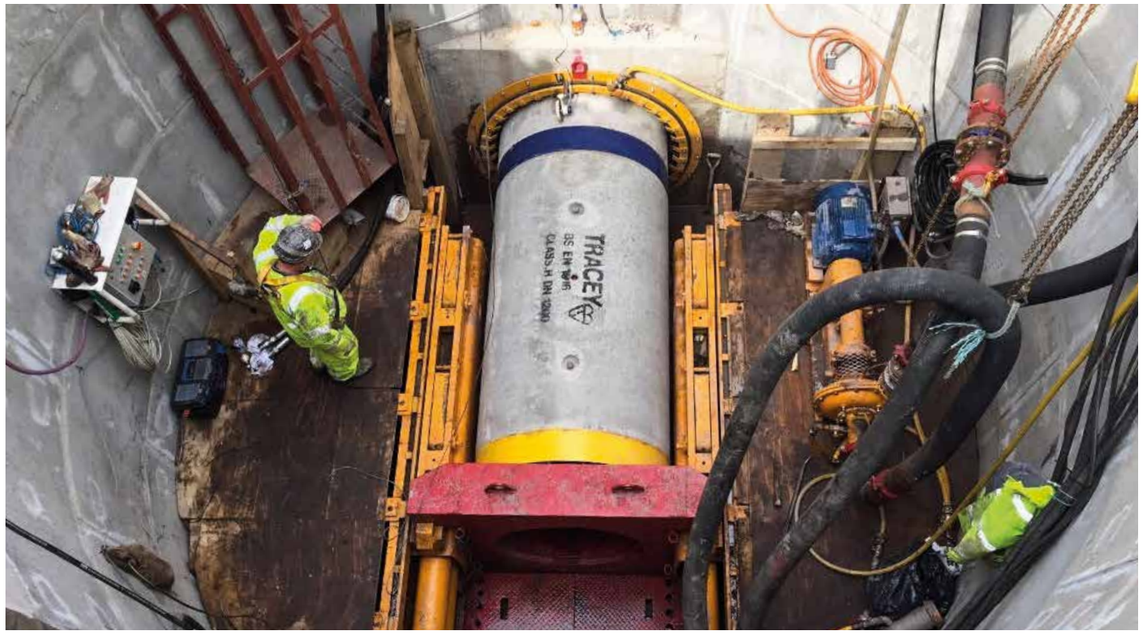
STANDARD JACKING PIPES

Tracey Concrete Jacking Pipes incorporate the tried and tested butt end joint system with cast in steel band. Tracey Concrete Jacking Pipes are BSI Kitemarked in accordance with BS EN 1916 and BS5911-1.

The butt ends joint design enables jacking forces to be transmitted over the maximum concrete area of the pipe hence reducing possibility of damage due to jacking loads. A compressible packing must be used to ensure even distribution of the jacking loads. The cast-in mild steel collar ensures no lateral displacement of the pipe during jacking. Stainless steel collars can be supplied on request.

Precast jacking pipes being lowered into lauch shaft





Precast jacking pipe in position for push by hydraulic jacking rams

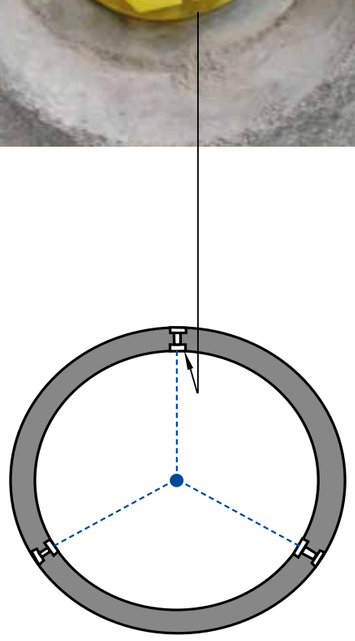
LUBRICATION PIPES

Lubrication pipes are similar in design to standard jacking pipe but have lubricating grout sockets cast into the pipe. Tracey Concretes standard lubricating grout socket is a 1 ¼″ BSP steel socket fitted with plugs. Non-return valves are supplied as standard.

The ratio of lubrication pipe to standard jacking pipe will vary, depending on the ground conditions for each job.

Tracey Concrete Jacking Pipes are manufactured with coloured steel bands so as to ensure ease of identification on site:

- Lubrication Pipes - Yellow steel band
- Standard Pipes - Blue steel band



Lubrication Socket Locations
Bespoke positions on request

LIFTING & HANDLING

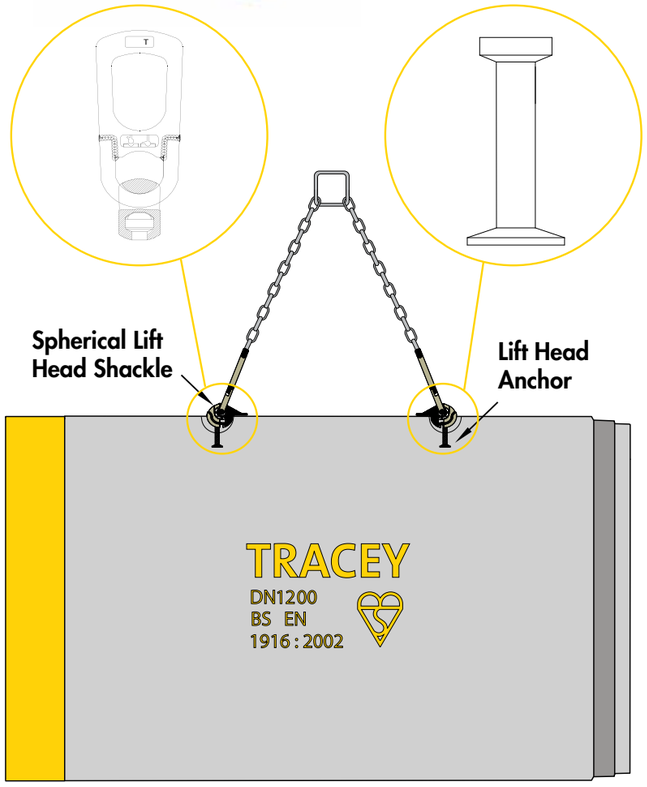
Pipes should be lifted using a two legged chain and two shortening clutches for altering chain lengths to ensure vertical loading on the lifting anchor. Under no circumstances should the lifting system be used to lift more than one pipe at a time or to aid the jointing of pipes. Ensure that the crane hoist is centrally placed between the two anchors and lift the pipe. Lifting should be carried out slowly and steadily, avoiding all shocks and impacts.

After lifting of the pipe the lifting shackles should be removed and the lifting hole filled
Tracey Concrete install 2No spherical lift head anchors in each pipe and can supply shackles on request.

Sizes mm	DN450	DN600	DN900	DN1200	DN1500	DN1600	DN1800	DN2040
Lifting Shackle	No cast in lifter	No cast in lifter	2No. 5T	2No. 5T	2No. 7.5T	2No. 7.5T	2No. 10T	2No. 10T

On smaller dia pipes (DN450 & DN600) no lifters are cast in, to lift and install these pipes LOLER certified slings should be used for the lift. Do not use chains are they may damage the concrete joint & steel band which may have an adverse effect on sealing the pipe.

lifting angle for chains should be ≥ 45°

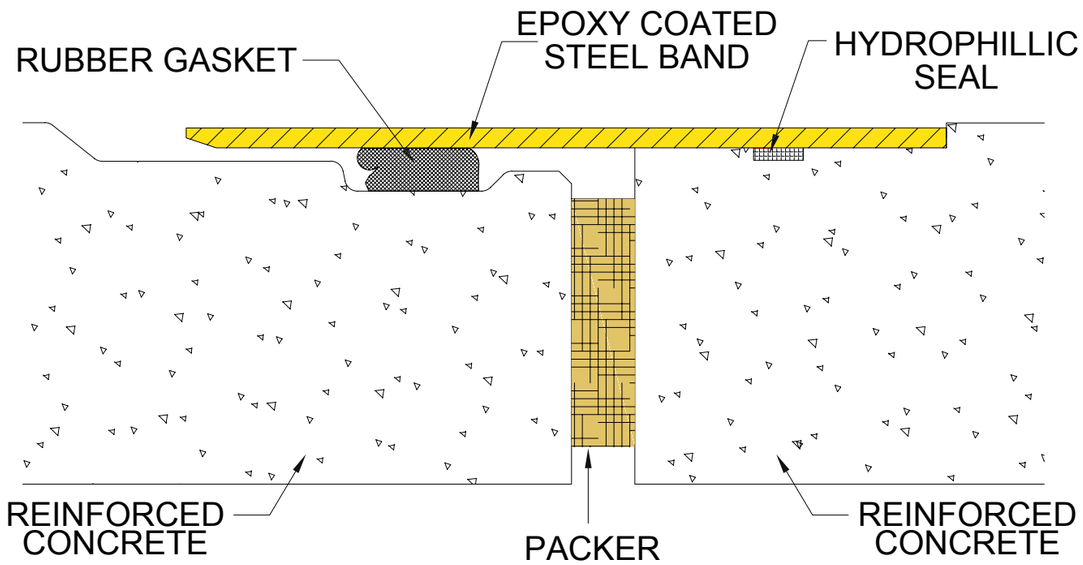


Standard jacking pipe lifted with sling and chain onsite during installation

JOINT DETAIL

Tracey Concrete joint is designed to withstand a pressure of 0.5 bar, in circumstances where the pressure will exceed this value a seal can be supplied or the design of this joint amended.

The below image is for indicative purposes only and the joint dimension vary per pipe size. For more information on the specific dimensions of each joint please contact Tracey Concrete technical team.



TYPICAL JOINT DIAGRAM

Tracey Concrete supply a F104 seal as standard. Other seal types are available on request.

The bond between the steel collar and the concrete have been designed and developed from many years of experience in order to achieve a watertight and robust seal. For more information on this design please contact Tracey Concrete technical team.

During installation to achieve a successful connection it is important to lubricate the inner face of the steel collar and the rubber seal.

SEAL

The Non-Integrated Seals supplied by Tracey Concrete, are designed as a sliding seal. The special design on the joint and seal make the system easy to use during jointing. The seal is compressed when the pipe spigot is inserted into the socket, creating a positive seal under both internal and external pressure.
The special design gives:

- Low assembly force
- Excellent sealing capability under both internal and external pressure
- Good distribution of transverse shear load

JOINT INSTRUCTIONS

1. Stretch the seal onto the pipe spigot and position against the shoulder as shown. Equalize the tension by lifting and releasing the seal at several points

2. Apply Tracey Concrete lubricant on the socket. This must be evenly spread over the surface of the entire socket.

3. Advance the pipe so that the rubber seal is in uniform contact with the edge of the steel collar of the pipe with which it is be jointed

4. Centre the spigot into the socket and assemble

Manufacturing wetcast jacking pipes is a more specialised process than drycast, however wetcast jacking pipes are now in demand as the tunnelling industry realises their advantages over traditional dry cast pipes.

An advantage of wetcast manufacturing is the smooth exterior of the jacking pipe product. A smoother pipe surface reduces the skin friction on the pipeline, thereby lowering the required jacking force being applied to the pipe to complete the drive.

Wetcast jacking pipes can be made bigger & longer, 4m in diameter and up to 5m in length. On long pipelines added length can save the tunnelling contractor time loading less pipes and more time for jacking. Traditional drycast pipes are normally limited to a max length of 2.5m & diameters of 2.4m.

Wetcast pipes have a higher resistance to strain and can carry an larger axial load than drycast pipes. High strains on any pipe is not recommended but in a difficult situation a wetcast pipe will be able to take those loads better than a dry cast pipe.

Wetcast jacking moulds during steam curing process

WETCAST JACKING PIPES

Advantages of wetcast

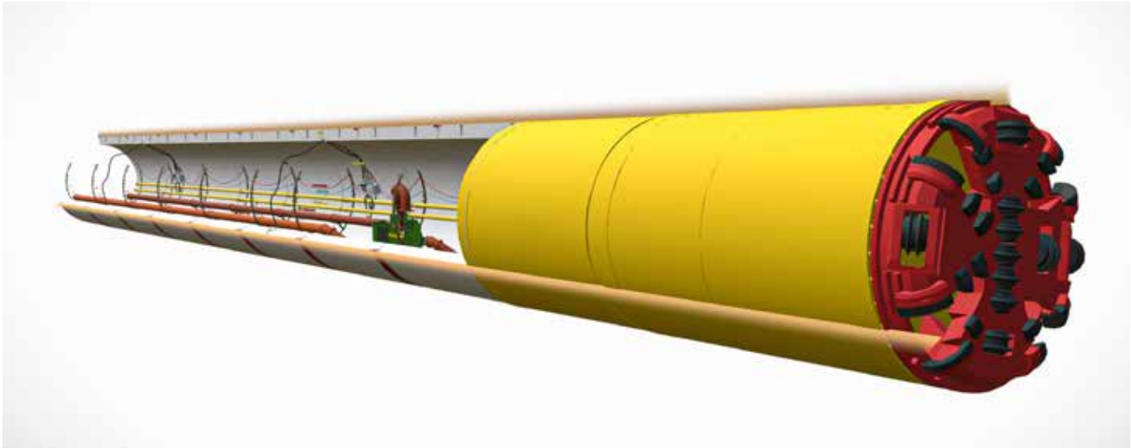
- Option of adding internal pipe liner such as HDPE or steel
- Extra steel cages : flow-ability of wetcast allows concrete to travel between multipe cages
- Longer pipe: Wetcast pipes can be made up to 4m+
- Smoother pipe surface: less the skin friction on the pipeline

DN Sizes	Wall Thickness	External Dia	Effective Length	Packer Thickness	Weight	Max Jacking Force	Max Jacking Force for closed joint
DN	t	OD	l	a	W	Fjmax	FCj
(mm)	(mm)	(mm)	(mm)	(mm)	(kg)	(Tonnes)	(Tonnes)
610	125	860	2500	15	1855.5	660	330
900	128	1156	3000	15	3100	960	480
1200	145	1490	3000	18	4600	1460	730
1350	170	1690	3000	18	6200	1980	990
1350	170	1690	4000	18	8240	1980	990
1500	183	1866	3000	18	7250	2380	1190
1500	183	1866	4000	18	9800	2380	1190
1829	197.5	2224	3000	18	9450	3120	1560
1829	197.5	2224	4000	18	12780	3120	1560
2130	250	2630	3000	18	14270	4750	2370
2130	250	2630	4000	18	18940	4750	2370
2500	240	2980	3000	18	15500	4790	2390
2500	240	2980	4000	18	20940	4790	2390
2700	280	3260	3000	18	20000	6240	3120
2700	280	3260	4000	18	26500	6240	3120
3000	300	3600	3000	18	23670	7480	3740
3000	300	3600	4000	18	31450	7480	3740

For the most up to date spec contact our technical sales teams for drawings

WETCAST JACKING PIPES

Tracey jacking pipe systems has been developed in conjunction with major tunnelling contractors and is suitable for use in traditional open face shields or with the latest full face tunnel boring machines (TBM) shown below.



Tunnel Boring Machine

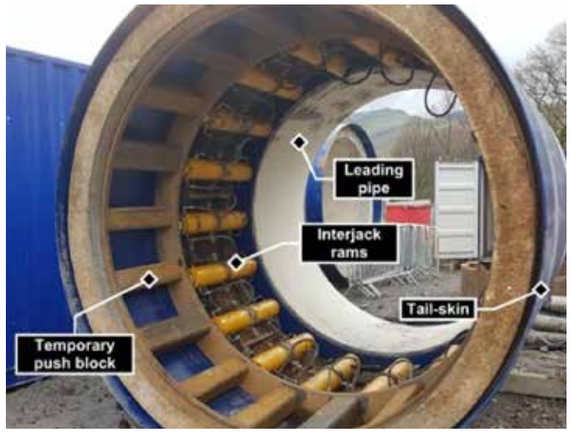
Jacking pipe frame

INTERMEDIATE JACKING STATION

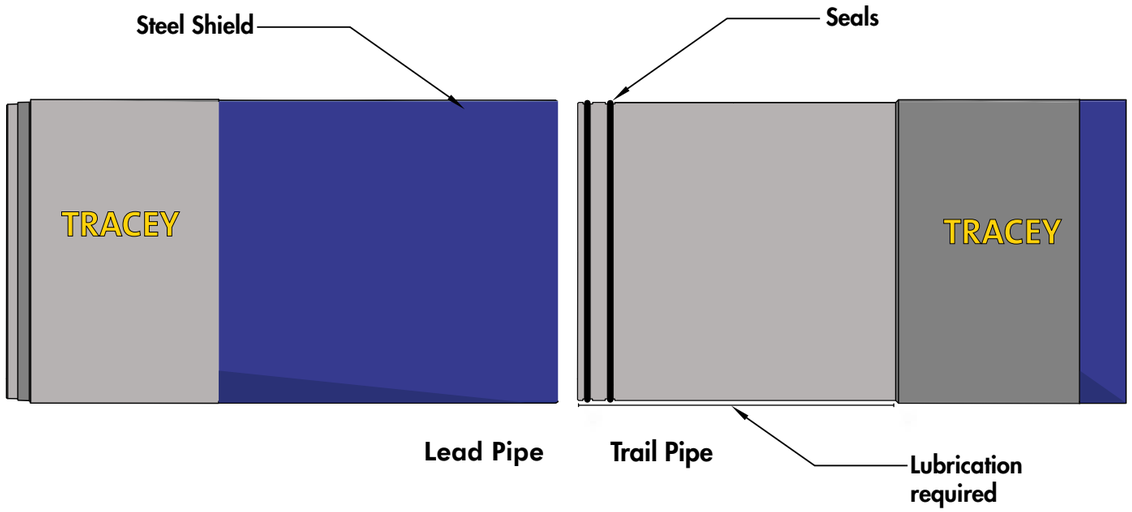
An Intermediate Jacking Station is a fabricated steel cylinder fitted with hydraulic jacks that are installed temporarily into the pipeline between two Interjack pipes ~ **Trail Pipe** & **Lead Pipe**

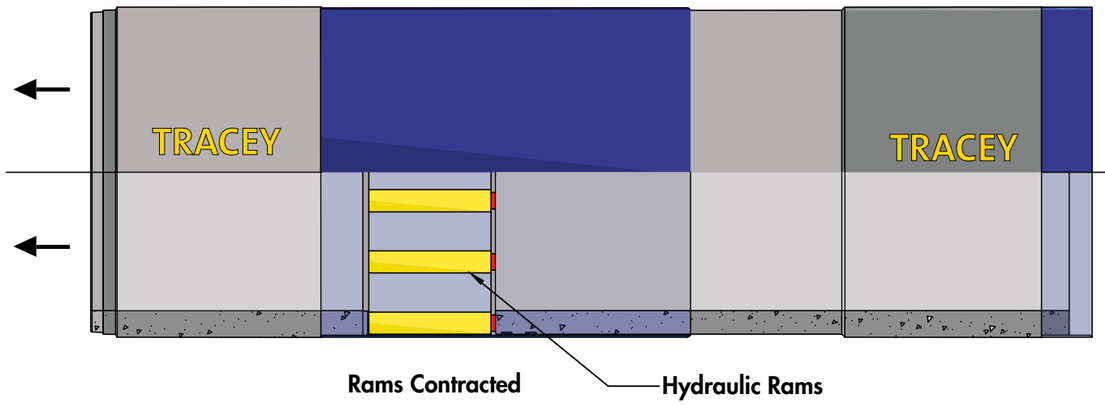
Interjacks are used on drives were jacking forces exceed the maximum that the pipes or jacks are capable of. Interjacks reduce the forces by pushing the pipes in front of the interjack first which means the main jacks are only required to push the rear section of pipes.

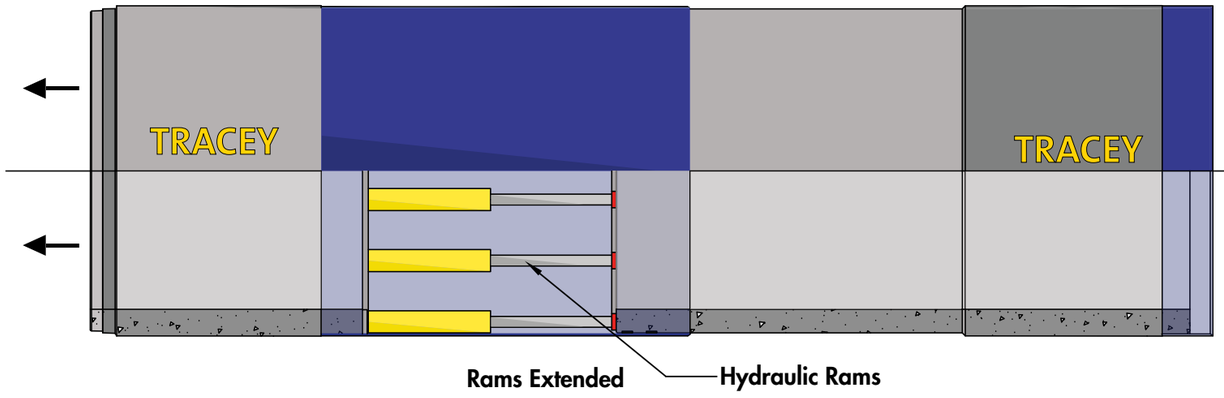
It is critical to use sufficient amounts of lubricant on the inner face of the steel shield and on the outer surface of the trail as well as the seals.



INTERMEDIATE JACKING STATION







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Trans Adriatic Pipeline

UNITED KINGDOM

CAISSON CHAMBERS

Caisson chamber sinking system was originally designed for micro-tunnelling, but it is also widely used in the construction of pumping stations, wet wells & manholes, particularly in difficult ground conditions.

ADVANTAGES

- Fast, clean & accurate construction
- Immediate permanent shafts
- Minimal labour costs
- Quicker construction times
- Inherently safer
- Fewer joints than segmental system
- Construct shafts without having to dewater

Caisson Chamber	Weight	Depths Available			Wall Thickness	Cutting Shoe Weight	
DN	KG/m	500mm	750mm	1000mm	mm	10mm	20mm
1800	1800	✔	✔	✔	125	270	520
2100	2400	✔	✔	✔	140	320	580
2400	2900	✔	✔	✔	150	380	640
2700	3300	✔	✔	✔	150	440	800
3000	4500	✔	✔	✔	180	540	1000
3600	6800	✔	✔	✔	200	640	1160
4000*	10000	-	✔	✔	200	730	1300

DN4000mm supplied as two piece unit

SHAFT & LANDING COVERSLABS

Shaft and landing cover slabs are produced as part of the Tracey Concrete tunnelling product range, manufactured using specialist steel moulds with high strength wetcast concrete and bespoke steel reinforcement. Tracey Concrete manufacture shaft slabs to customer specification. Shaft slabs are made with lift head anchors cast in and are handled onsite using spherical lift head shackles, which Tracey Concrete can supply. Bespoke shaft slabs can be manufactured up to 25m.

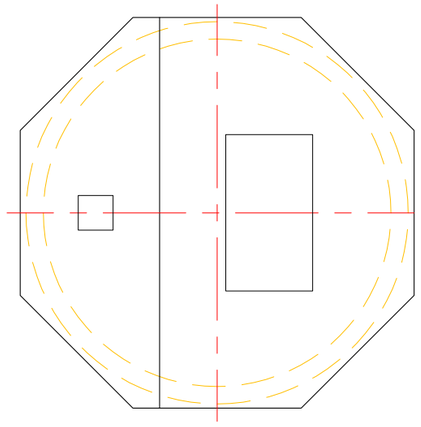
All our tunnelling products are manufactured in accordance with Tracey Concrete's BSI accredited ISO 9001 quality management system.

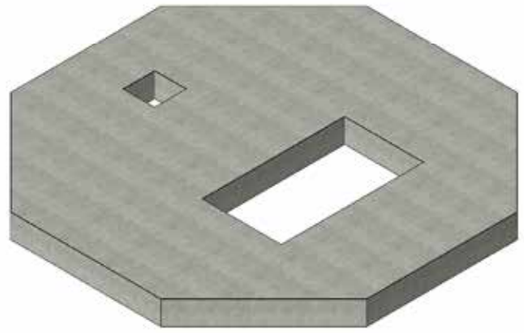
BESPOKE COVERSLABS

Tracey Concrete manufactures a wide range of Cover Slabs in accordance with BS EN 1917, BS 5911-3. DN3600 & 4000 Cover Slabs are generally designed in accordance with BS EN 1992-1-1. Bespoke slabs can be manufactured to customers required specification including multiple openings, depths and loadings.

To Suit Internal Dia	Overall Dia	Effective Depth	Approx Weight	Standard Openings Available - Bespoke Openings				
mm	mm	mm	KG	600 SQ	675 SQ	750 SQ	1200 x 675	750 x 600
1800	2050	200	1425	✔	✔	✔	✔	✔
2100	2375	200	1990	✔	✔	✔	✔	✔
2400	2780	225	3160	✔	✔	✔	✔	✔
2700	3005	225	3735	✔	✔	✔	✔	✔
3000	3400	300	6470	✔	✔	✔	✔	✔
3600	4000	300	9085	✔	✔	✔	✔	✔
***4000**	4500	300	11590	✔	✔	✔	✔	✔

*4000 slabs are manufactured in 2 pieces
*Larger and bespoke slabs DN2100 - 4000 are manufactured hexagonal



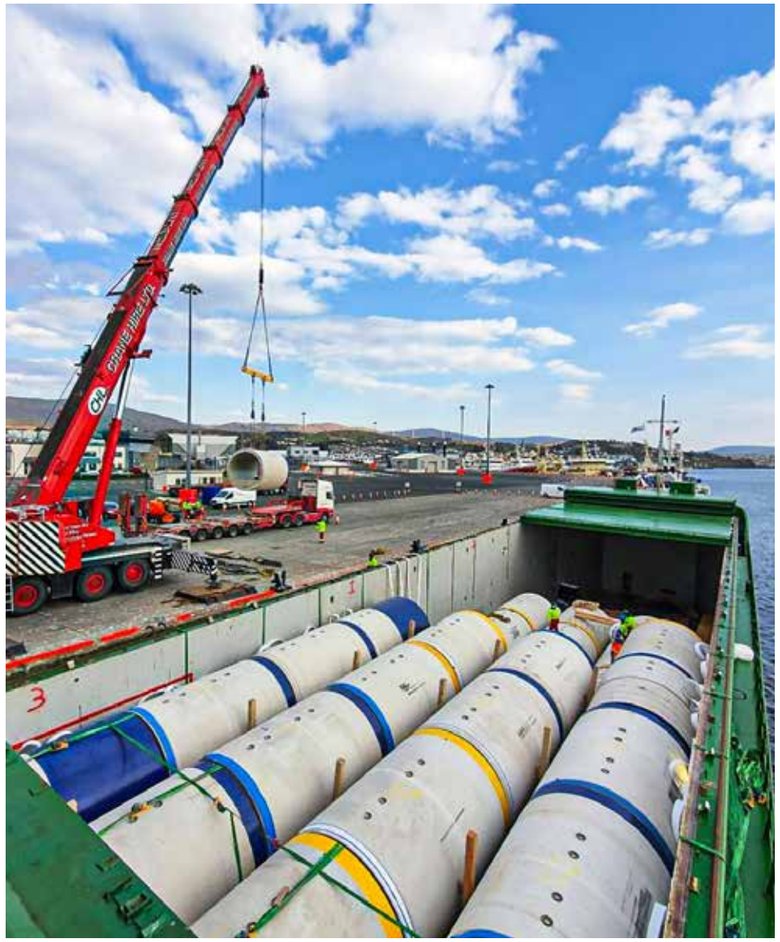


TRANSPORT & SHIPPING

Tracey Concrete have supplied bespoke jacking pipes & tunnelling products to projects worldwide. Most recenty projects in Canada, North America, Finland, Albania and throughout the UK & Ireland.

Using modern casting techniques we can manufacture our products to suit all shipping requirements e.g. special length pipes to suit limited space shipping containers.

For larger scale tunnelling projects shipping jacking pipes via boat is an alternative to shipping containers.Tracey Concrete's main jacking pipe production facility is in close proximity to Killybegs, Belfast & Dublin Ports.



QUALITY & TESTING

Material & aggregate testing is an essential to produce a high quality precast concrete product. At Tracey Concrete we carry all nesscessary testing on our materials and finished manufactured pipe to guarantee they are of the highest quality. As a world leading manufacturer of precast jacking pipes we are constantly striving to improve our products to ensure they are of industry leading standard.

Making & Testing Concrete Cubes

Flow test

Crush Test on Jacking Pipe

Flow test on concrete

MEET THE TEAM

Darren Maguire (MEI)
Irish Sales Manager
Mob: 07971100854
E:darren@traceyconcrete.com

John Nabbs
National Sales Manager
Mob: 07867 317144
Email:john@traceyconcrete.com

Martin Corrigan
UK Sales Manager
Mob: 07795 836823
Email:martin@traceyconcrete.com

Stephen Maguire
Technical Engineer
T: 028 / 048 66326437
E: stephen@traceyconcrete.com

Paddy Corrigan
Technical Engineer
T: 028 / 048 66326437
E: paddyc@traceyconcrete.com

Neil Thornton (MEI)
Technical Engineer
T: 028 / 048 66326437
E: neil@traceyconcrete.com

Anthony McManus
Irish Accounts / Sales
T: 028 / 048 66326437
E: anthony@traceyconcrete.com

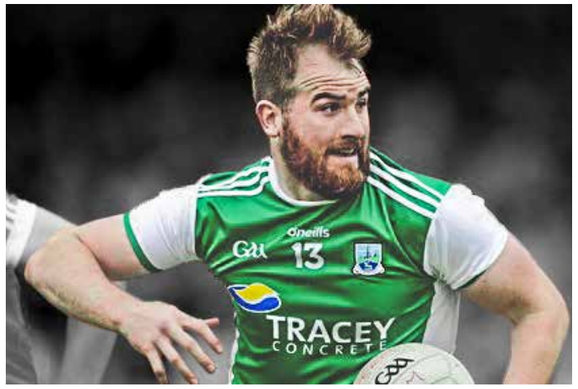
Luke McClintock
Technical Engineer
T: 028 / 048 66326437
E: luke@traceyconcrete.com

Tahreer M. Fayyad
Technical Engineer
T: 028 / 048 66326437
E: tahreer@traceyconcrete.com

CORPORATE & SOCIAL RESPONSIBILITY

SPONSORSHIP

Tracey Concrete have been the main sponsor of Fermanagh GAA since 1991 which is the longest in GAA History. We at Tracey Concrete understand the importance of supporting community based organisations. We also sponsor our local Rugby Club at youth level - Enniskillen RFC



CHARITY WORK

Marie Curie is our chosen charity. We take part in the Lady Of The Lake Festival each year to raise funds for Marie Curie. In 2019 we raised £5,250.00

Our UK National Sales Manager John Nabbs at the top of Croagh Patrick in aid of Stand Up to Cancer.

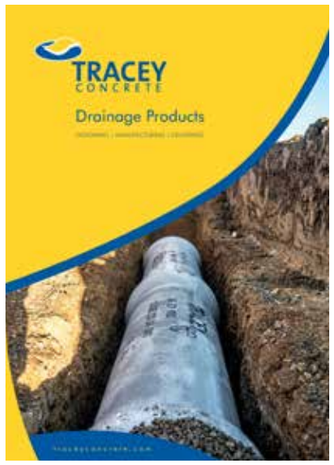
CORONA VIRUS - COVID 19

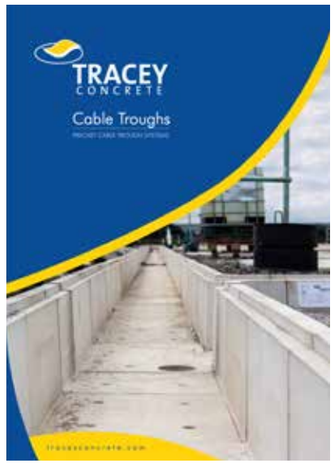
During the Corona Virus - Covid 19 Pandemic Tracey Concrete donated over 300No FP3 Masks and PPE to our local hospitals and nursing homes. All our employees who continued to work through this time have access to masks, gloves, visors and at a social distance of over 2m. Our procedures were reviewed and changed to suit the requirements set out by the government.

Coronavirus
COVID-19

Coronavirus
COVID-19
Public Health
Advice

CASE STUDIES & BROCHURES





All Case Studies & Brochures available to download on our website

Tracey Concrete Limited
Old Rossorry, Sligo Road
Enniskillen, Co. Fermanagh
BT74 7LF

Belcoo Quarry
Greenahoe Road, Belcoo
Co. Fermanagh
BT93 5HD

TELEPHONE
028 6632 6437
EMAIL
headoffice@traceyconcrete.com
traceyconcrete.com

ISO 9001:2015 Quality Management
ISO 14001:2015 Environmental Management
OHSAS 18001 Occupational Health and Safety Management