KERA.DRIVE
Jacking Pipes

TRENCHLESS CONSTRUCTION | TECHNICAL MANUAL

STEINZEUG KERAMO



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Ecological Economical Proven

Future-oriented wastewater solutions from Steinzeug-Keramo

Steinzeug-Keramo, a wienerberger company, is a solutions and systems provider for the sustainable water and wastewater industry.

As a medium-sized company with many years of experience, we prove ourselves to our partners with fully developed expertise in the production, installation and operation of water and waste–water systems. At the same time, we attach great value to the high quality and sustainability of our products. Our core competency is in the production of future-proof pipe systems that are fully compliant with the highest technical, economic and ecological requirements.

We produce pipes, manholes, fittings and accessories in the highest quality, and offer entire system solutions – for safe, reliable and economical operation spanning generations.

At the same time, the range of products we offer is geared towards efficient construction site management and fulfills all the requirements of modern sewer systems. What's more, the use of natural raw materials and the application of the most modern process engineering results in extremely durable products that are fully recyclable and have a service life exceeding 150 years.

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KERA.DRIVE

KERA Vitrified Clay Pipe Systems 4

Certificates 5

Trenchless Construction 6

KERA.DRIVE Jacking Pipes | DN 150 10

KERA.DRIVE Jacking Pipes | DN 200 – DN 300 11

KERA.DRIVE Jacking Pipes | DN 400 – DN 500 12

KERA.DRIVE Jacking Pipes | DN 600 13

Connectors | DN 200 – DN 600 14

KERA.DRIVE Jacking Accessories 16

Material Properties of Vitrified Clay 19

Testing Equipment and Application 20

Jacking Technologies 22

Guided Auger Boring 24

Microtunneling 26

House Connections 28

Jacking Technologies – Renewel Methods 30

Pits – Starting and Reception Shafts 32

Service & Support 35

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KERA Vitrified Clay

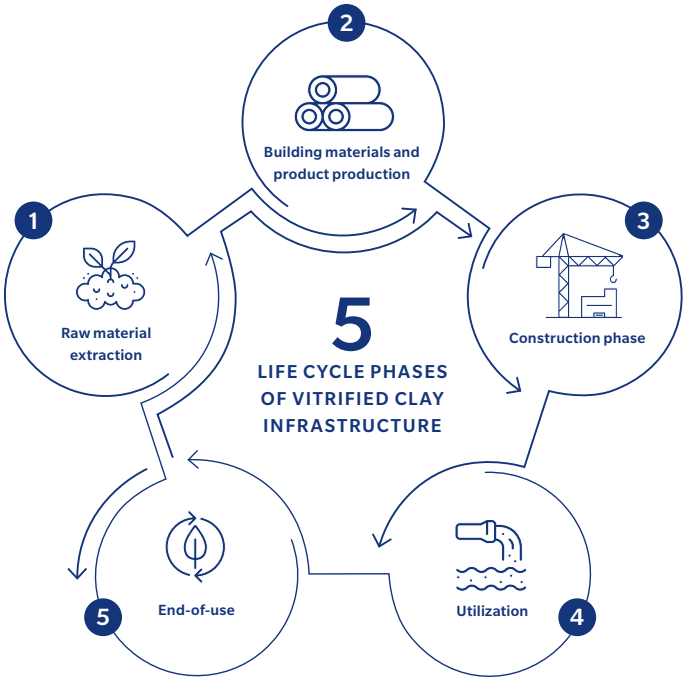
A sustainable choice for the future.

Vitrified clay pipe systems are an environmentally conscious and sustainable choice for sewer and wastewater applications, excelling in their extreme longevity and durability.

Why clay?

Vitrified clay pipes and fittings are ecologically favourable as they do not undergo chemical or physical ageing and therefore retain their quality throughout their entire service life. Since vitrified clay pipes and fittings don't contain any pollutants or harmful substances, they don't affect the surrounding ecosystem, making them an environmentally friendly choice. Their long service life with low maintenance and servicing requirements also makes them an economical solution in the long term.

Clay pipes and fittings are made by only natural, inexhaustive resources. The amount of raw resources is limited as only three materials are used in the manufacturing process of vitrified clay pipes and fittings: clay, chamotte & water.



1. The extraction of clay from nature
2. The manufacture of vitified clay pipes and fittings
3. The installation of the clay pipes and fittings in the ground
4. The operation of the pipes and fittings for wastewater disposal
5. Several end-of-use scenarios are possible



Clay, the natural raw material

Clay is a widely abundant and a practically inexhaustible resource because it is based on silicates: silicon is the second most abundant component present in the earth's crust.

If you have any questions regarding sustainability, we are happy to help you.

Please contact us.

Certificates

We are proud of our continuous certification and adherence to all standards and regulations across Europe.

ISO 9001:2015
Quality Management System

ISO 50001:2018
Energy Management System

Design, manufacturing and supply of vitrified clay pipes, fittings and their joints, vitrified clay manholes including design and supply of compatible accessories

EN 295 Parts 1-7
Vitrified Clay Pipe Systems for Drains and Sewers
ZP WN 295

The European Standard EN 295 specifies requirements for vitrified clay pipes, fittings and flexible joints for buried drain and sewer systems for the conveyance of wastewater (including domestic wastewater, surface water and rainwater) under gravity and periodic hydraulic surcharge or under continuous low head of pressure.

ZP WN 295
The ZP WN 295 is a certification scheme for glazed vitrified clay pipes, fittings and their accessories for drains and sewers.

This certification scheme is the basis for the voluntary third party control by MPA.

The BENOR mark assures that our products comply with well-defined quality standards which are based upon the **EN 295** and the **ZP WN 295.**

The voluntary third party control is carried out by COPRO.

The Q+ mark assures that our products comply with well-defined quality standards which are based upon the **EN 295, ZP WN 295 and prR 592 012-3:2015.**

The voluntary third party control is carried out by MPA.

BRL 52230
Quality and Environmental Compatibility of Building Materials

This assessment guideline addresses the environmental aspects of prefabricated ceramic products.

Certification System 3 - ISO/IEC 17067
Environmental Labels and Declarations - Self-Declared Environmental Claims (Type II Environmental Labeling)

This standard provides guidelines and requirements for self-declared environmental claims, also known as Type II environmental labels. We utilize this framework to communicate the environmental impact of our products and services transparently and reliably.

CE Label

The CE label indicates that our products have been assessed and meet all EU-wide requirements for safety, health, and environmental protection. This label is mandatory for all products manufactured globally that are marketed in the EU.

The NF mark assures that our products comply with well-defined quality standards which are based upon the **EN 295** and the **NF 121.**

The voluntary third party control is carried out by CSTB.

More certificate and regulations info is available

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Trenchless Construction

For almost 40 years, trenchless construction has offered many convincing advantages – economically, environmentally, and socially.



Your Solution In Urban Environments

- Limited job site usage
- Citizen-friendly: no interference with day-to-day life on the surface, e.g. in shopping streets or traffic routes;
- no noise pollution

Countering PFAs Influence

- Minimal above-ground operations
- Environmentally friendly – easy on flora and fauna
- Protecting the Earth's surface
- Reducting in soil removal

Groundwater Protection

- Easy on groundwater resources
- No need to lower groundwater levels to build

Unnoticed, undisturbed, and easy on the environment



Enhanced Service Life

- Particularly high structural quality and safety of the wastewater system
- High strength reserve of the jacking pipes for sewer operation
- Construction method with lowest potential for subsidence

Positive Construction Experience

- Generally no interference with engineering infrastructure
- Very high working safety

Positive Energy Balance

- Less building and transport equipment
- Shorter transport distance
- Substantial reductions in CO_2 emissions and fine dust



Trenchless Construction

The advantages are enormous

The installation of wastewater pipes using trenchless construction is becoming increasingly important. It limits the negative impacts caused by construction work on road traffic, residents, and the surrounding natural environment. The KERA.Drive range of jacking pipes covers all of the system components you need for contemporary new constructions or for the receptioned renovation of existing sewer systems using pipe jacking construction. The range includes a broad selection of vitrified clay jacking pipes.

While wastewater jacking pipes made of vitrified clay are being installed beneath the surface, life above ground goes on largely disturbed. Apart from the start and reception shafts – and, depending on the distance covered, a few intermediate shafts – there are no above-ground restrictions of any significance along the entire course of the installation. Transport routes, for example, don't suffer from traffic jams, nor business from turnover reductions, nor towns from major construction sites. Noise and mess are mostly avoided, CO_2 emissions and fine dust are considerably reduced, streets are not torn up, and flora and fauna are protected. Aditionally the excavation of contaminated soil can be limited, as most of the harmful substances such as PFAS are located in the first meter of the soil.

In short: compared to open-trench construction, trenchless pipe laying reduces economic losses and environmental stress to a minimum.

POTENTIAL APPLICATIONS

- Construction of new sewers
- Development of new residential zones
- Renewal of existing systems
- House connections
- Crossing of roads and highways
- Crossing of railway tracks and waterways
- Creation of protective pipelines for cables, etc.

Unnoticed



Undisturbed



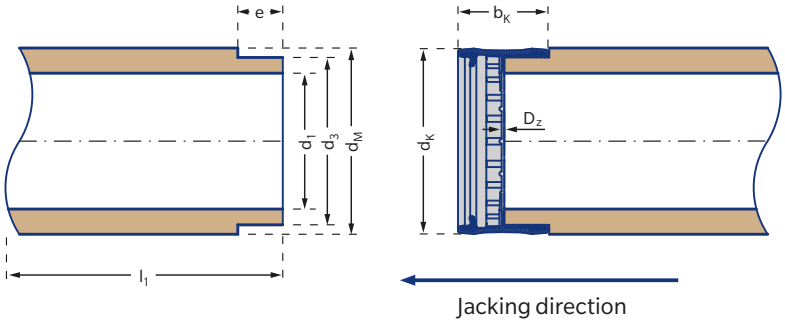
Easy on the environment



KERA.DRIVE DN 150



1 coupling
2 spigot



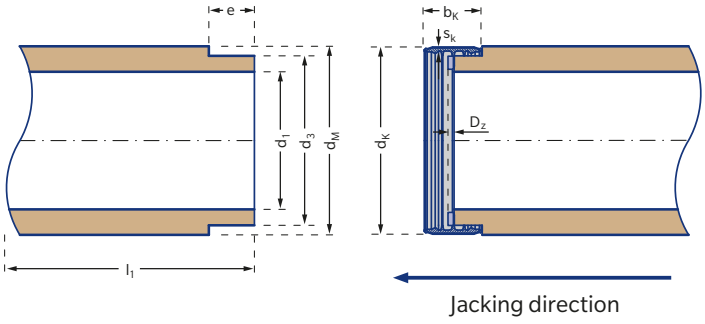
		DN 150 mm
Internal Diameter	d_1	149 ±2,5
Spigot Diameter	d_3	186 ±2,0
External Pipe Diameter	d_M	213 +0/-4,0
Assembly Depth	e	50
Pipe Length	l_1	997
Coupling Diameter	d_k	207,5
Coupling Width	b_k	103
Thickness of Thrust Ring	D_z	3
Weight		36 Kg/m
Crushing Strength		64 kN/m
Admissible Jacking Force Guided Auger Boring		150 kN
Admissible Jacking Force Micro Tunneling		–
Watertightness		up to 2,4 bar

Vitrified clay jacking pipe in accordance with EN 295 and ZP WN 295, inside and outside glazed.
Coupling with integrated thrust ring made of glass fiber reinforced polypropylene.
The maximum admissible jacking force must be calculated on a case-by-case basis in accordance with nationally applicable regulations, e.g. DWA-A 161.
The values stated here are guideline values for planning purposes.

KERA.DRIVE DN 200 – DN 300



1. coupling
2. spigot
3. pressure thrust ring
4. integrated rubber joint



		DN 200 mm	DN 250 mm	DN 300 mm
Internal Diameter	d_1	199 ±3,0	250 ±3,0	299 ±4,0
Spigot Diameter	d_3	244 ±2,0	322 +0/-1,0	374 +0/-1,0
External Pipe Diameter	d_M	276 +0/-6,0	360 +0/-6,0	406 +0/-8,0
Assembly Depth	e	49	48	48
Pipe Length	l_1	990	990/1990	990/1990
Coupling Diameter	d_k	261	338,5	391,5
Coupling Thickness	s_k	1,5	1,5	2,0
Coupling Width	b_k	103	106	106
Thickness of Thrust Ring	D_z	10	10	10
Weight		60 Kg/m	105 Kg/m	120 Kg/m
Crushing Strength		80 kN/m	130 kN/m	120 kN/m
Admissible Jacking Force Guided Auger Boring		300 kN	600 kN	750 kN
Admissible Jacking Force Micro Tunneling		–	600 kN	700 kN
Watertightness		up to 2,4 bar	up to 2,4 bar	up to 2,4 bar

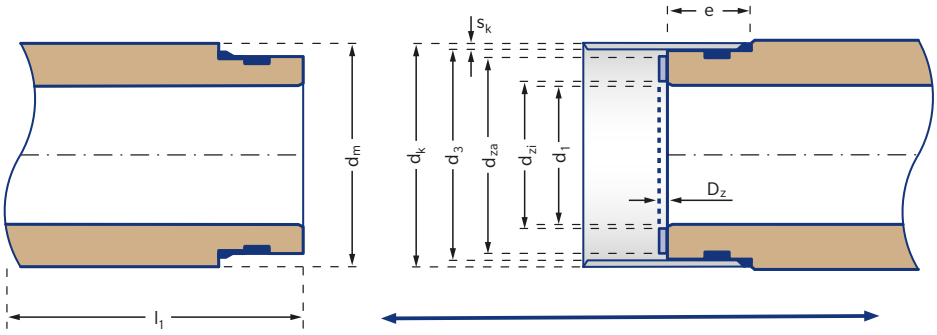
Vitrified clay jacking pipe in accordance with EN 295 and ZP WN 295, inside and outside glazed.
Stainless-steel coupling, material number 1.4404 or 1.4571, with pre-assembled rubber joint and thrust ring made of wood P5 in accordance with DIN 312.
The maximum admissible jacking force must be calculated on a case-by-case basis in accordance with nationally applicable regulations, e.g. DWA-A 161.
The values stated here are guideline values for planning purposes.

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KERA.DRIVE DN 400 – DN 500



1. coupling
2. spigot with pre-assembled rubber joint
3. pressure thrust ring



Jacking is possible in both directions

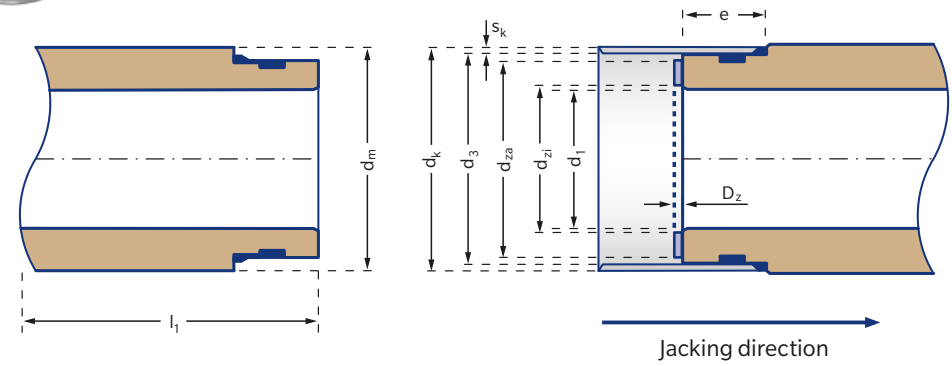
		DN 400 mm	DN 500 mm
Internal Diameter	d_1	400 ±5,0	498 ±7,0
Spigot Diameter	d_3	529 +0/-1,0	632 +0/-1,0
External Pipe Diameter	d_M	554 +0/-10,0	660 +0/-14,0
Assembly Depth	e	62	62
Pipe Length	l_1	985/1985	985/1985
Coupling Diameter	d_k	541	643,5
Coupling Thickness	s_k	3	3
Coupling Width	b_k	130	130
Thickness of Thrust Ring	D_z	15	15
Weight		240 Kg/m	300 Kg/m
Crushing Strength		160 kN/m	140 kN/m
Admissible Jacking Force Guided Auger Boring		1650 kN	2200 kN
Admissible Jacking Force Micro Tunneling		1550 kN	1900 kN
Watertightness		up to 2,4 bar	up to 2,4 bar

Vitrified clay jacking pipe in accordance with EN 295 and ZP WN 295, inside and outside glazed.
Stainless-steel coupling, material number 1.4404 or 1.4571, with pre-assembled rubber joint and thrust ring made of wood P5 in accordance with DIN 312.
The maximum admissible jacking force must be calculated on a case-by-case basis in accordance with nationally applicable regulations, e.g. DWA-A 161.
The values stated here are guideline values for planning purposes.

KERA.DRIVE DN 600



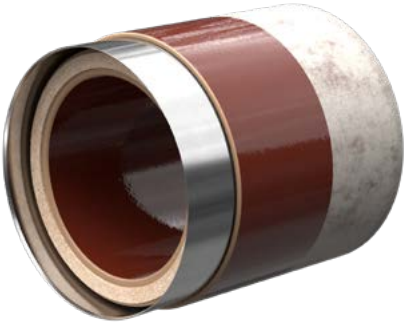
1. coupling
2. spigot with pre-assembled rubber joint and pre-stressing ring
3. pressure thrust ring



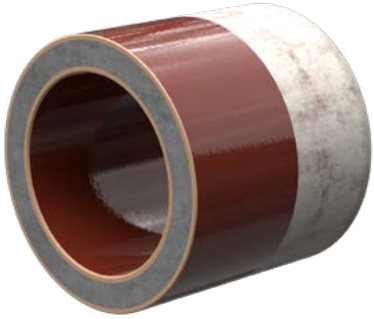
		DN 600 mm
Internal Diameter	d_1	599 ±7,0
Spigot Diameter	d_3	733 +0/-1,0
External Pipe Diameter	d_M	762 +0/-14,0
Assembly Depth	e	68,5
Pipe Length	l_1	982/1982
Coupling Diameter	d_k	745
Coupling Thickness	s_k	3
Coupling Width	b_k	143
Thickness of Thrust Ring	D_z	18
Weight		360 Kg/m
Crushing Strength		120 kN/m
Admissible Jacking Force Guided Auger Boring		2600 kN
Admissible Jacking Force Micro Tunneling		2350 kN
Watertightness		up to 2,4 bar

Vitrified clay jacking pipe in accordance with EN 295 and ZP WN 295, inside and outside glazed.
Stainless-steel coupling, material number 1.4404 or 1.4571, with pre-assembled rubber joint and thrust ring made of wood P5 in accordance with DIN 312.
Pre-assembled stainless-steel pre-stressing ring, material number 1.4301.
The maximum admissible jacking force must be calculated on a case-by-case basis in accordance with nationally applicable regulations, e.g. DWA-A 161.
The values stated here are guideline values for planning purposes.

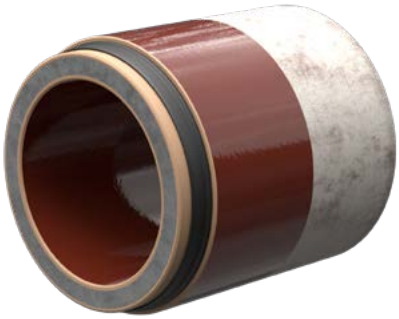
Manhole Jacking Connectors DN 200 – DN 600



Manhole Connector Part A



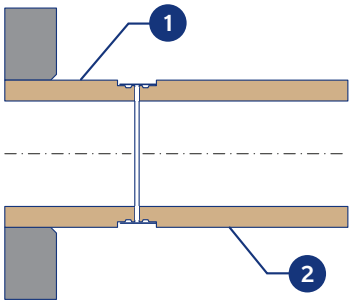
Manhole Connector Part B



Manhole Connector Part C

Manhole connector A/B/C in 0,33, 0,5 or 1,0 meter length

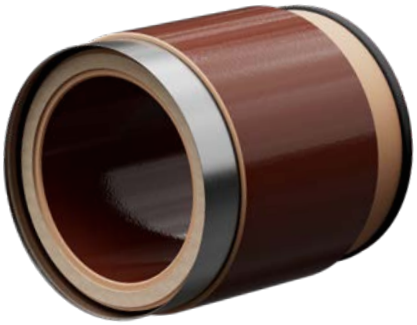
Same outside diameter as the jacking pipe with removed glaze or an adhesive to be able to use concrete to fill up the space between the prefabricated hole in the manhole and the outside diameter of the connector. These connectors can be cut by the constructor himself.



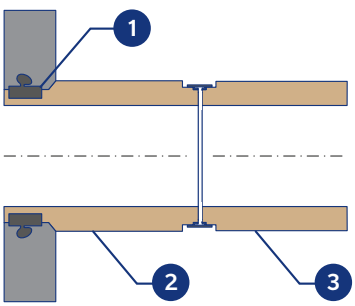
1. Manhole connector A or C, cemented on site
2. Jacking pipe

Precondition:
Manhole is pushed onto the jacking pipe

Jacking Transition Connection DN 200 – DN 600





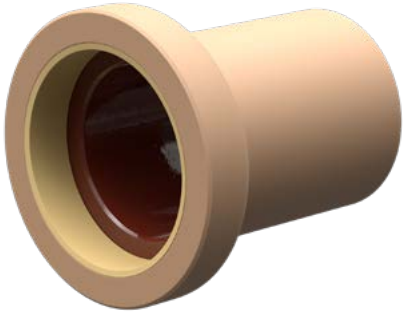


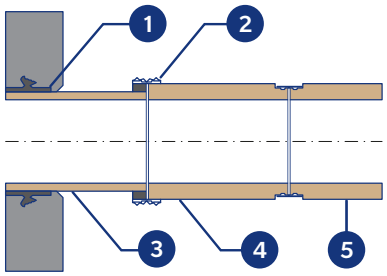
1. BKK element high strength or GE connector high strength
2. Transition connector 1 m length with P-Ring
3. Jacking pipe

GE Connector

Jacking Pipe	GE Connector	
DN	DN	ID d_4 in mm
200	200 SS	260
250	250 ES	341,5
300	300 ES	398,5
400	400 ES	515,5
500	500 ES	637
600	600 ES	758

SS – Standard strength
ES – Extra strength





1. BKK element (see page 17) or GE connector
2. Flexible coupling type 2B with compensation ring (see page 17)
3. GA Connector KERA.Base or KERA.Pro with K-joint on one side to connect to BKK element
4. Jacking pipe connector A or C
5. Jacking pipe

GA Connector

Jacking Pipe	KERA Outlet Connector	
DN	DN	OD d_3 in mm
200	200 SS	242 ± 5
250	250 ES	318 ± 6
300	300 ES	376 ± 7
400	400 ES	492 ± 8
500	500 ES	609 ± 9
600	600 ES	725 ± 12

SS – Standard strength
ES – Extra strength



KERA.DRIVE Accessories

Connection Socket F

Connecting socket F made of ABS
Compression seal and joint made of rubber elastomer

DN 125 / DN 150 / DN 200
Connection to smaller pipes,
vitrified clay pipes DN 250 and larger,
vitrified clay jacking pipes DN 200 and larger

Borehole diameter:

DN 125: 152 ±1 mm

DN 150: 172 ±1 mm

DN 200: 232 ±1 mm



Connection Socket C

Ceramic connecting socket C. Full-surface elastomer seal with sealing lips and continuous sealing collar

DN 150 / DN 200
Connection to medium and large pipes,
wall thickness 40 mm to 200 mm,
vitrified clay pipes DN 400 and larger

Borehole diameter:

DN 150: 200 ±1 mm

DN 200: 257 ±1 mm



Nominal Size	Jacking Pipes Connecting Elements*		
DN	DN 125	DN 150	DN 200
200	F	F	–
250	F	F	–
300	F	F	F
400	–	C 70	C 70
500	–	C 70	C 70
600	–	C 70	C 70

*** PLEASE NOTE:**
The choice of connecting element depends on the actual wall strength at the borehole.

BKK Element

Jacking Pipe	Bkk Element	
DN	DN	ID d_4 in mm
200	200 SS	260
250	250 ES	341,5
300	300 ES	398,5
400	400 ES	515,5
500	500 ES	637
600	600 ES	758

SS – Standard strength
ES – Extra strength



Compensation Ring

Jacking Pipe		Compensation Ring
DN	OD d_M in mm	Thickness
200	276 +0/-6	16
250	360 +0/-6	16
300	406 +0/-8	12
400	554 +0/-10	24
500	660 +0/-14	24
600	762 +0/-14	16



Flexible Coupling Typ 2B

Jacking Pipe		Felixible Coupling Typ 2B
DN	OD d_M in mm	Width in mm
200	276 +0/-6	265 - 290
250	360 +0/-6	335 - 360
300	406 +0/-8	385 - 410
400	554 +0/-10	530 - 560
500	660 +0/-14	630 - 660
600	762 +0/-14	730 - 760



KERA.DRIVE
Installation Accessories



Special Sealing Element
House Connections DN 150



Assembly Tool
Connection Sockets C



Assembly Tool
Connection Sockets F



KERA.Mat Lubricant
1 and 3 kg tubs to reduce insertion forces. Suitable for all vitrified clay joint systems acc. to EN 295 and ZP WN 295.



Spigot Testing Device
for testing to 15 bar

Material Properties of Vitrified Clay

150 years or more of service life

Piping systems made of vitrified clay deliver outstanding performance wherever long-term reliability, economic efficiency and sustainability are crucial. Thanks to their robust material properties, precise joint technology and consistently high-quality components, they ensure safe and cost-effective operation over extremely long service lives – often exceeding 150 years.

For customers, this means low lifecycle costs, high operational safety and a future-proof investment.

Longitudinal compression resistance	100 N/mm²
Wall thicknesses	up to 100 mm
Specific weight	22 kN/m³
Bending tensile strength	≥ 18 N/mm²
Tensile strength	min. 10 N/mm²
Modulus of elasticity	~ 50,000 N/mm²
Coefficient of thermal expansion	~ 5x 10^{-6} K^{-1}
Thermal conductivity	~ 1,2 W/m x K
Poisson's ratio	0,25
Watertightness	up to 2,4 bar
Corrosion resistance	fulfilled
Chemical resistance	pH 0 to 14
Frost resistance	fulfilled
Biological resistance	fulfilled
Ozone resistance	fulfilled
Hardness (Mohs)	~ 7
Fatigue strength under cyclic load (stress range)	12,8 N/mm²
Reaction to fire	non-flammable
Wall roughness	k = 0,02 mm
Abrasion resistance	$a_m \leq 0{,}25$ mm
Resistance against high pressure cleaning	up to 280 bar

Clay

The main ingredient of our vitrified clay pipes. A widely abundant and practically inexhaustible resource that is fully natural, formed by sedimentation.

Chamotte

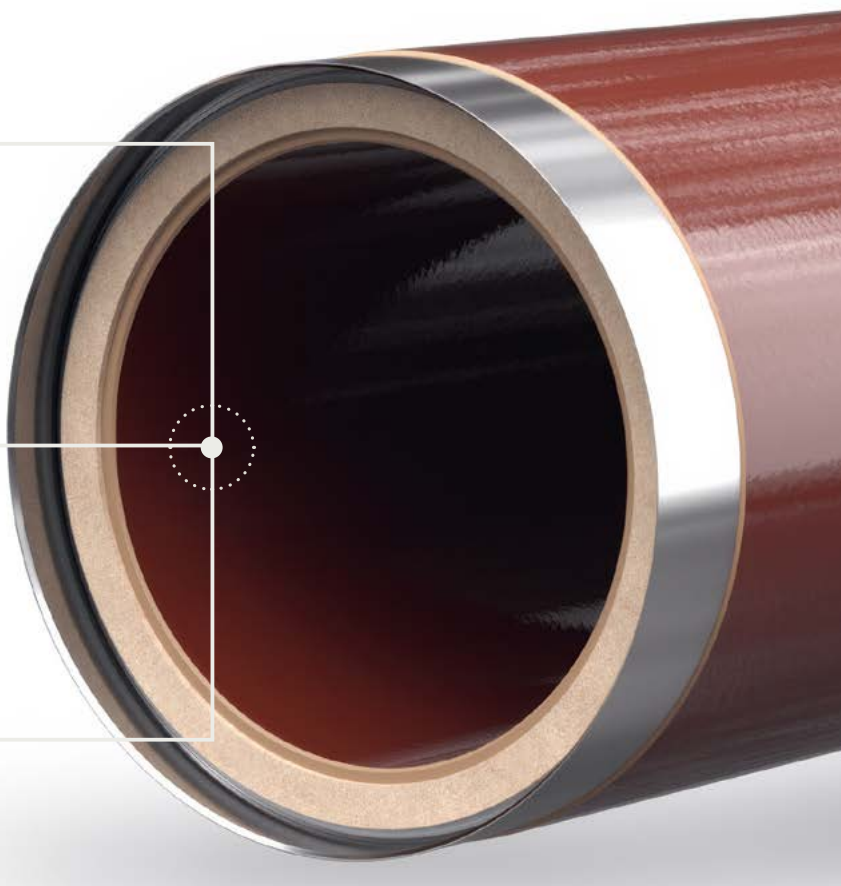
Chamotte is the term used for recycled ceramic material.

The chamotte is grinded back into granular size and incorporated in the clay mixture to provide strength to the pipes.

All our ceramic products contain at least 30% recycled material that does not degrade and holds a guarantee of the same quality.

Water

Our clay already contains a suitable amount of moisture so the need to add water is limited.



Tests

Testing the Pipes Before Pipe Jacking

- Correct fit of the coupling
- Correct fit of the pre-assembled rubber joint
- Correct fit of the thrust ring
- Undamaged pipe surfaces
- Dusting with talcum powder DN 150 to DN 800
- Testing of spigots with spigot test device DN 150 to DN 500



Before installation, the pipe ends are tested for damage with talcum powder and the testing device.

First, the pipe ends are wiped out with talcum powder. If no cracks or other damage are apparent, the test is carried out with the testing device.

The device comprises a pressure pump fitted with a manometer, pressure hose, and proof rings. Be sure to use suitable rings that are capable of applying a water pressure of 15 bar.





Connect the pressure pump to the proof ring with the pressure hose and then fill the compartment of the pressure pump with water.





After fitting the proof ring into the spigot, close the shut-off valve on the pressure pump. Switch on the pressure pump and build the pressure up to 15 bar. At pressures over 15 bar, a safety valve opens automatically. Maintain the pressure for 10 seconds, then open valve and remove the disk.

KERA.DRIVE Testing Equipment and Application



KERA.DRIVE Spigot Testing Device

1 Fill the device with water and connect it to the plug with a hose.

2 Open valve V1 and close valve V2.





3 Apply pressure to 15 bar and close valve V1.





4 The test time is 10 seconds.
Open both valves after the test.



STEINZEUG KERAMO

Jacking Technologies

Underground Construction

We supply jacking pipes for
main sewers and house connections.

New Construction

Guided auger boring

- with soil displacement
- with soil removal

Microtunneling

- with auger spoil removal
- with slurry shield

Manned pipe jacking

Renewal

Pipe Eating

Pipe Bursting
(related method)



Guided Auger Boring

This guided jacking method is used primarily for constructing smaller-diameter pipe systems.

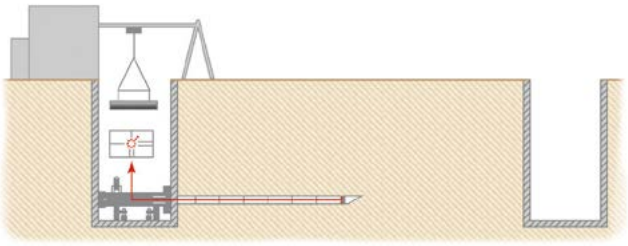
With soil displacement – DN 150 and larger

Applications

- Main sewers
- House connections
- Stone-free, displaceable soils
- In groundwater with additional measures
- Pipe-system lengths up to approx. 80 m

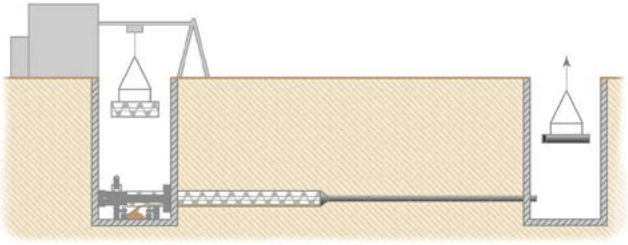
Features

- Low space requirements
- Fast preparation of construction site
- Low equipment and personnel costs



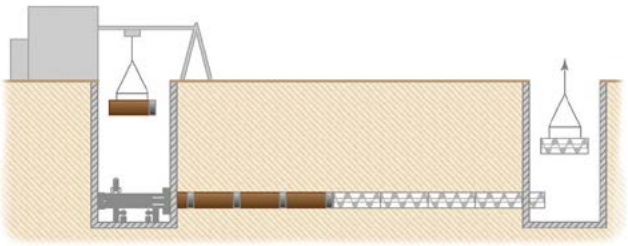
Phase 1

- Jacking of the (hollow) pilot rod through the soil to the reception shaft
- Continuous monitoring of direction and gradient using guide optics



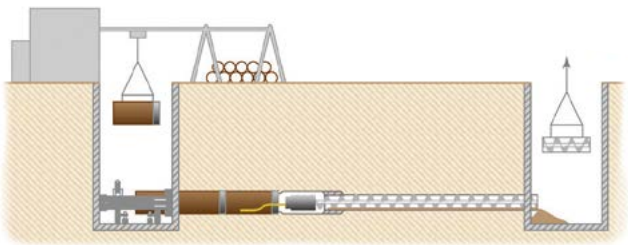
Phase 2

- Attachment of the drill pipe (fitted with an internal auger) to the last pilot pipe
- Soil removal
- Removal of the pilot pipe in the reception shaft



Phase 3

- Removal of the drill pipe in the reception shaft
- Jacking of the vitrified clay jacking pipe



Phase 4 (necessary from DN 400)

- Use of an additional, directly driven reamer
- Used after the last drill pipe, followed by removal of soil in the reception shaft
- Jacking of the vitrified clay jacking pipe after the reamer

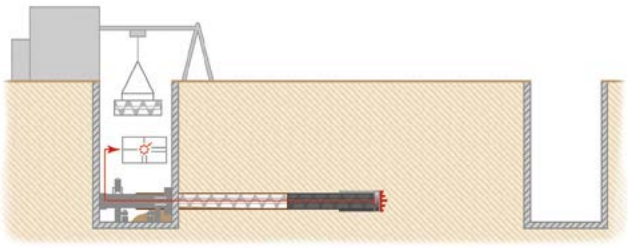
With soil removal – DN 300 and larger

Applications

- Main sewers
- Highly compact soils (SPT values > 35)
- In soft rock formations (hardnesses up to 10 MPa)
- System lengths up to approx. 100 m

Features

- Low space requirements
- Fast preparation of construction site
- Low equipment and personnel costs
- Pipe eating possible



Pilot pipe jacking with soil removal using a patented front-steer system is a method involving the removal of soil. It is used predominantly in soils that are non-displaceable

- The cutting head is guided through the soil, which is simultaneously retrieved.
- Jacking of steel pipes fitted with an auger (attached behind the cutting head).
- Removal of soil in the starting shaft.
- Jacking of vitrified clay jacking pipes once the cutting head has reached the reception shaft.





Microtunneling

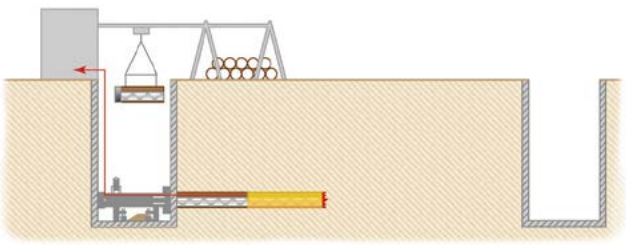
A guided method using hydraulic presses: the pipe assembly – the tip of which is fitted with a jacking machine – is jacked from the starting shaft in the direction of the reception shaft depending on pipe diameter and geological conditions. The distances that can be covered can be up to 200 m or even more.

The removed soil is transported by an auger or by slurry-transport techniques.

With auger soil removal – DN 250 and larger

Applications

- Main sewers DN 250 or larger
- Easily to moderately drillable soils
- In groundwater with additional measures
- System lengths up to approx. 100 m



Features

- Moderate space requirements
- Fast preparation of construction site
- Low equipment and personnel costs
- Pipe eating possible
- Insertion of the vitrified clay jacking pipes directly behind the jacking machine
- Guidance of the jacking machine by guidance cylinders in the cutting head
- Laser measurement with reception board and geolaser
- Removal of soil at the cutting face by the cutting wheel
- Removal of soil by augers
- Removal of soil via conveyance pipes and augers in the starting shaft
- Recovery of jacking machine in the reception shaft

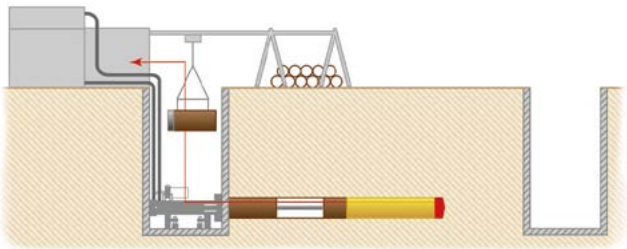




With slurry shield – DN 250 and larger

Applications

- Broad range of applications in virtually all types of soil
- Can be used in groundwater
- System lengths up to 250m and more



Features

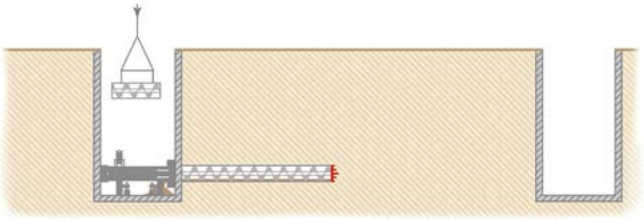
- Reduction of groundwater level not necessary
- Long jacking distances possible
- Pipe eating possible
- Insertion of the vitrified clay jacking pipes directly behind the jacking machine
- Guidance of the jacking machine by guidance cylinders in the cutting head
- Laser measurement with reception board and geolaser
- Removal of soil at the cutting face by the cutting wheel
- Removal of the soil by slurry shields
- Separation of soil and water in the separation plant
- Recovery of jacking machine in the reception shaft

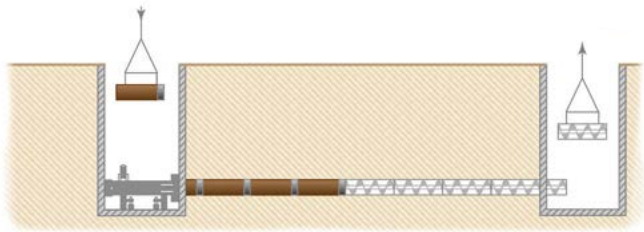
House Connections

These guided jacking methods are used primarily for constructing smaller-diameter pipe systems and connecting to residental properties.

Thrust Jacking Method

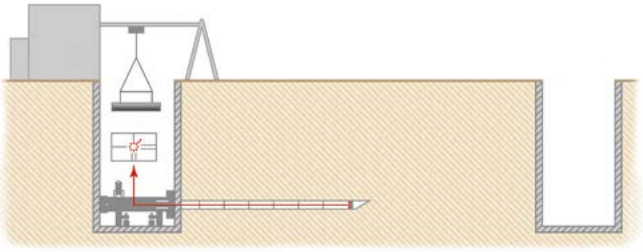
- 2 to 8 m using the unguided horizontal directional drilling method

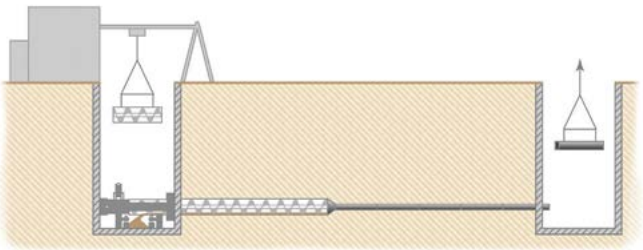


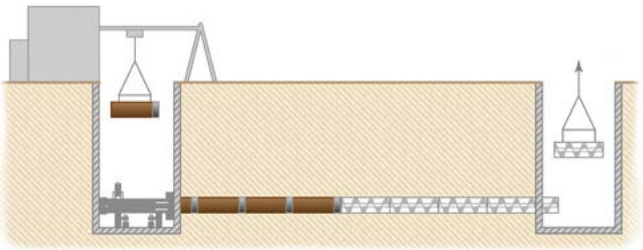


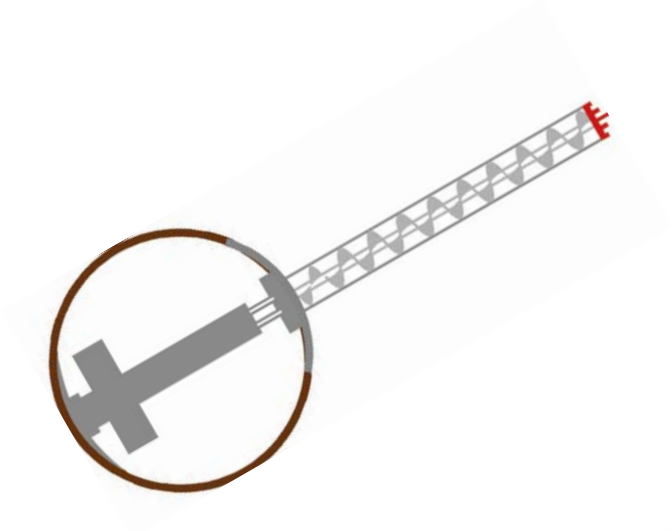
Guided Jacking Method

- Guided auger boring with soil displacement: using the guided jacking method from the starting shaft to the reception shaft (see also “Guided auger boring - main pipelines”)









Drilling from within a Pipe ≥ DN 1200

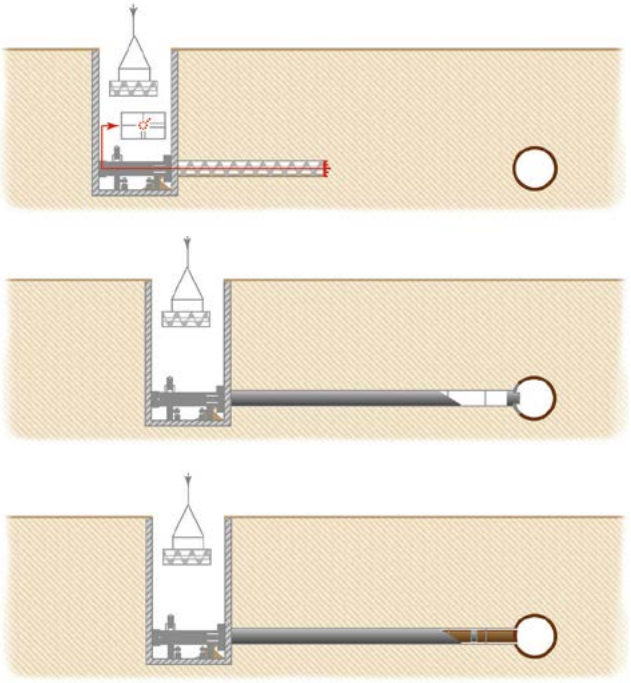
- Underground drilling to household connection from accessible sewers
- Unguided from sewers DN 1200 or larger
- Guided from sewers DN 1800 or larger

Blind-Hole Drilling DN 150 and DN 200

- Blind-hole drilling is a drilling method without reception shaft
- Vitrified clay pipes jacked into steel pipes
- Steel pipes retracted into starting shaft up to approx. 100 m

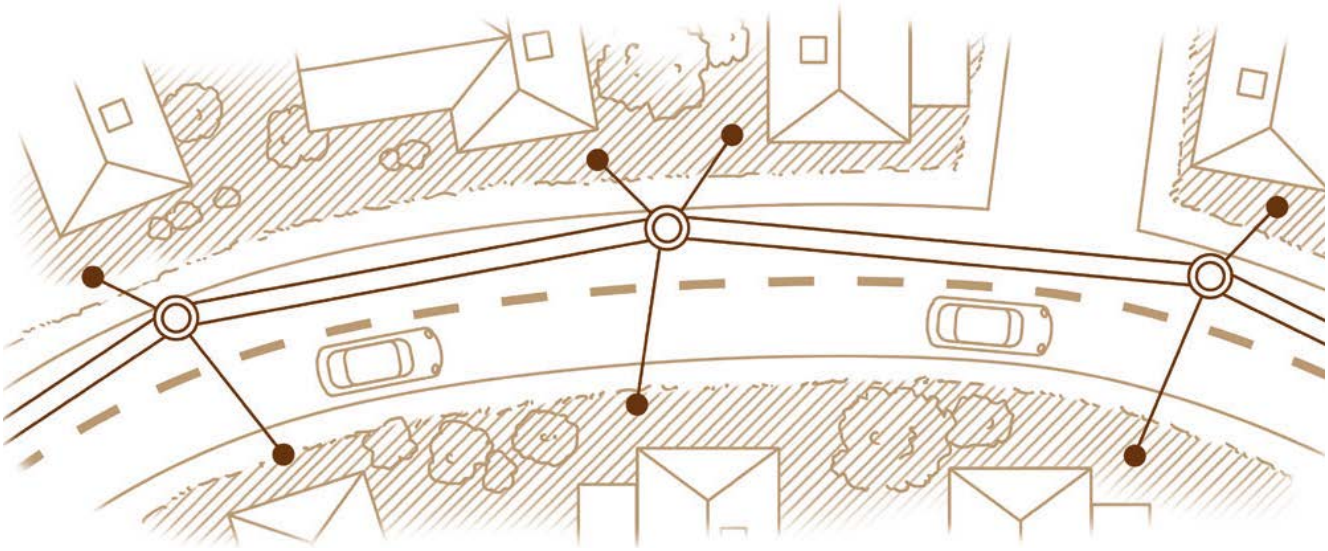
Underground Connection DN 150 To Main Sewer ≥ DN 300

- Drilling with a pilot auger
- Core drilling into main sewer
- Jack media pipes with special sealing element on the first vitrified clay jacking pipe



The Berlin Method

In the Berlin Method, house connections are drilled from existing starting, reception, pass-through, or intermediate shafts — or are connected using the open-trench method.



Renewal Methods

Pipe Eating

Pipe eating is a guided variant of the jacking method and involves the "swallowing" and destruction of the defective old pipe (no steel pipes, no reinforced concrete pipes).



DN 250 and larger

Applications

- Main sewers DN 250 or larger
- The new pipe must have the same or a larger diameter than the pipe to be replaced
- Identical cross-section/enlargement possible the old pipe must be backfilled

The following technologies can be used for this method:

- Microtunnel construction with auger soil removal
- Microtunnel construction with slurry shield
- Guided auger boring with soil removal (front steer)

Features

- The new pipe does not lie on a bed of scrap, but in the natural substratum/bedding material
- The new pipe assembly can be constructed along the same invert or axis

Pipe Bursting

Pipe bursting is an unguided jacking method.



DN 150 and larger

Applications

- For main sewers DN 150 or larger
- The new pipe must have the same or a larger diameter than the pipe to be replaced
- Identical cross-section/enlargement possible
- Destruction and displacement of the old pipe into the surrounding subsoil

Features

- Unguided method
- Replacement of the old pipe by a new one
- The new pipe line is along the same invert or axis, no correction of axis

Pits

Starting and Reception Shafts

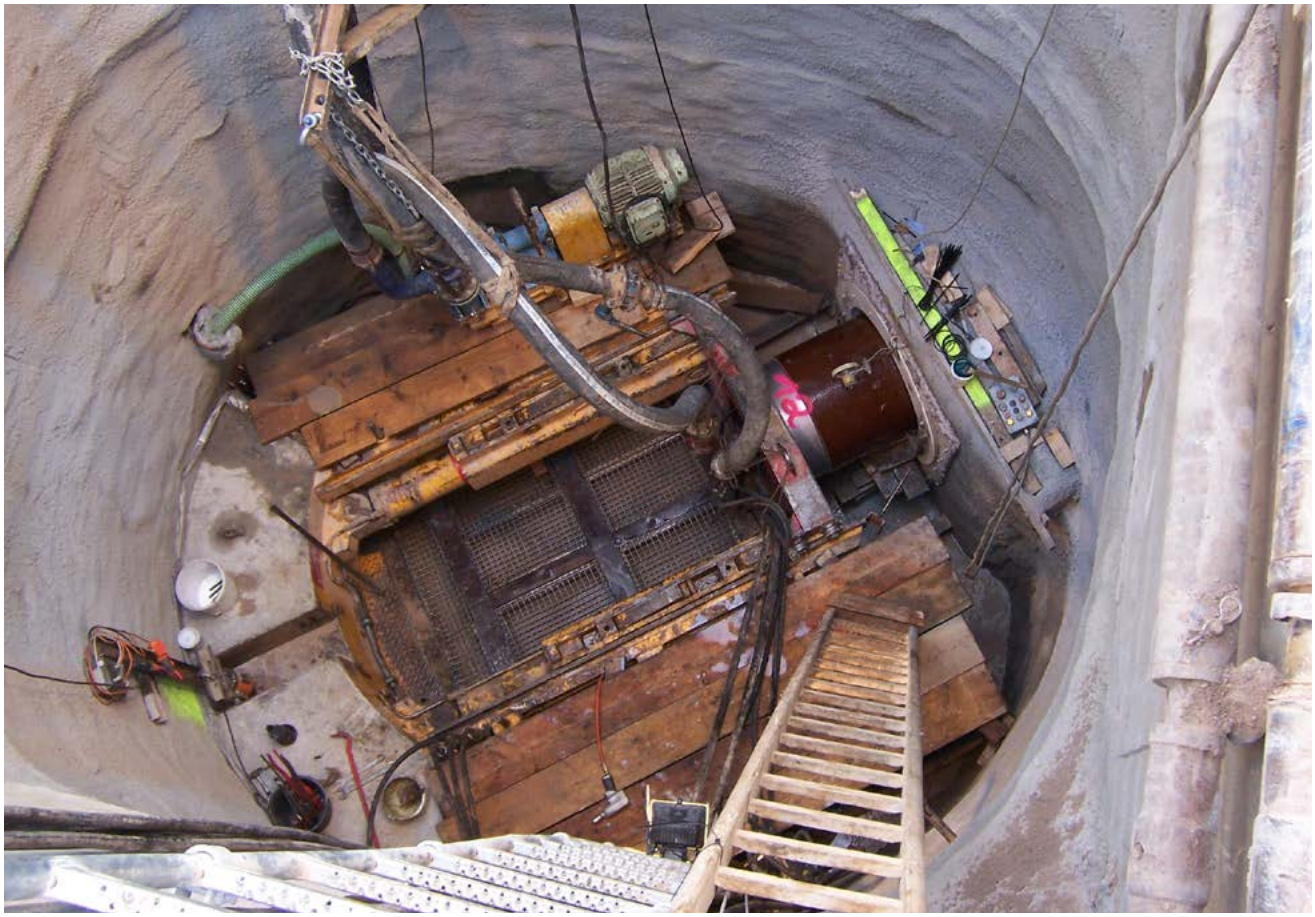
The preparation of the starting and reception shafts is an important part of the tunneling operations. The ways in which these shafts must be shored are primarily dependent on the subsoil conditions, the tunneling methods to be used, and the depth at which the tunnel is to be drilled. Pilot jacking and microtunneling can be done from relatively small starting shafts.

Minimum Dimensions of Starting and Reception Shafts

Dimensions	*Starting shaft	*Reception shaft
DN 150	DN 2000 / 1500 2,00 m x 1,50 m	2,00 m x 1,50 m 1,00 m x 1,00 m
DN 200 – DN 300 Pipe length 1,00 m	DN 2000 2,80 m x 2,50 m	DN 2000 (1500) 2,00 m x 2,00 m
DN 250 – DN 600 Pipe length 2,00 m	5,00 m x 4,00 m (with compact jacking frame)	DN 2500 (2600) 2,50 m x 2,50 m

*** PLEASE NOTE:**
Local regulations may apply.









Service & Support

- Regional contacts
- On-site consultancy service
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We are committed to understanding your needs, working with you at every stage, and supporting you in all aspects of sewer construction. Our expert teams embody this comprehensive service approach.



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Wienerberger Infra GmbH, Europaallee 63, 50226 Frechen
T +49 2234 507-0, **E** info.infra@wienerberger.com, **steinzeug-keramo.com**

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