



Practical tips for laying vitrified clay pipes professionally



الشركة السعودية لإنتاج الأنابيب الفخارية المحدودة
SAUDI VITRIFIED CLAY PIPE CO., LTD.

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1. Unloading of the truck

Pipes are to be checked on unloading. Possible damages must be reported on the delivery note. Checking can be done with talcum (see pg 7)

a) With crane or excavator

- Use lifting belts; chain or ropes may not be used.
- The lifting belts must be placed outside around the pallets and outside the base timber.

correct (✓)



wrong (✗)



- Steer the pallets manually to prevent them colliding with anything.
- Do not move the pallets on the truck with the aid of levers or crowbars.
- Do not allow the pipes to be impacted by any hard object (e.g. crane hook, chain etc.).

b) With forklift truck

Correct:

- When placing the pallets transversely on the forks, make sure the forks are positioned sufficiently widely apart.
- When placing the pallets longitudinally on the forks, place protective timber between the parcel and the fork's base. Better is to transport the parcel in transversal direction on the forkteeth.
- When transporting individual pipes by sliding a tooth into a pipe, always have protective material between the forks and the pipe.

correct (✓)



wrong (✗)



2. Storage on site

- Do not put the pallets down on to hard ground with a bang.
- Put the pallets down only on ground that is sufficiently hard to prevent the base timber sinking into it.
- Leave sufficient space between individual pallets.
- To avoid damage to the sealing elements, store individual pipes only on a wooden base.

correct (✓)

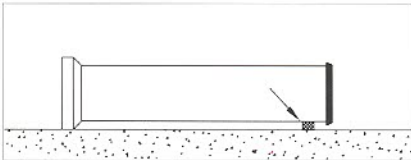


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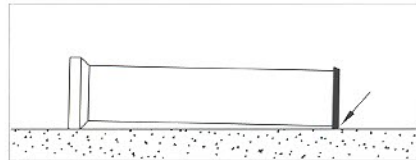


- Store fittings standing upright on their sockets.

correct (✓)



wrong (✗)



3. Transportation to the pipe trench

correct (✓)



- Transport individual pipes with belts (mark on crown - yellow or white spot = centre of gravity - pipe hangs level).

- Preferably transport complete pallets to the point of laying before opening them. Most pallets can be split up in two or three smaller pallets. (see table in the catalogue; range of products or packing list)
- Put down the parcel on flat ground so that the pipes do not slip when the securing bands are cut.
- Never transport individual pipes in the excavator shovel.

wrong (✗)



wrong (✗)



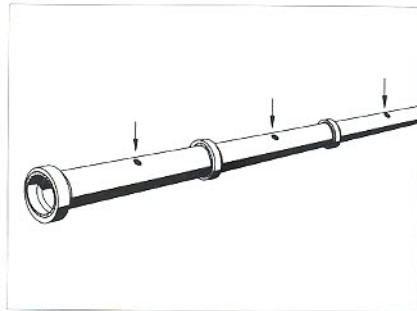
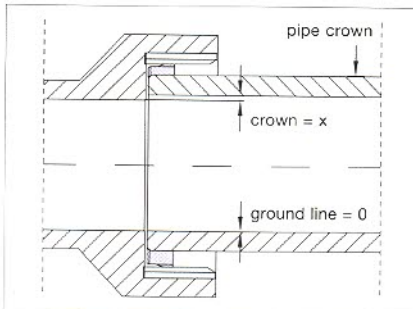
4. Installation

- Before the pipes are laid, check both ends of each pipe optically and internally with the aid of talcum powder in order to find any cracks that might have occurred in the course of transport.

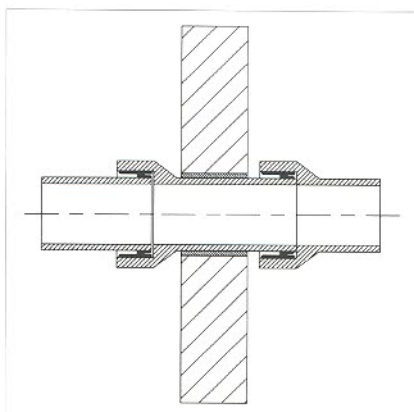
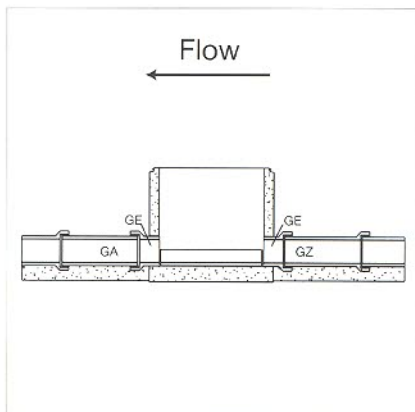
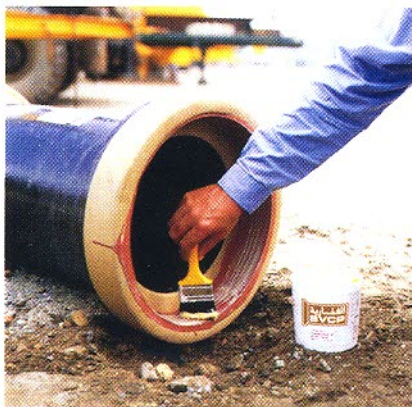
correct (✓)



- The paint mark must always point upwards. This ensures:
 - * The pipe inverts will be level (any steps that might arise between two pipes will be within the permissible tolerance)
 - * A possible small variance between two jointed pipes in the axial line will not lie in the flow zone. (Any small deviation of straightness will lay aside)



- The shape of the seals enables precentering to be carried out.
- First lubricant should be applied to the spigot and to the socket seal.



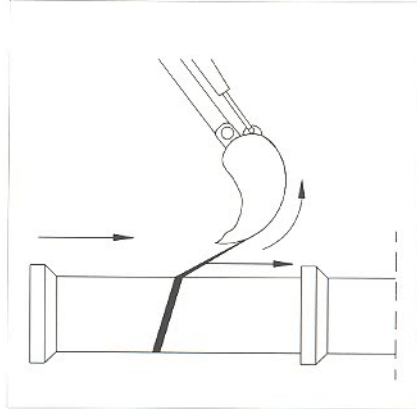
- Short lengths of pipe should be used at points where differences in settling are to be expected, e.g. in the region of shafts or at wall breakthroughs, in order to produce flexible connections.

- Pushing the pipes together with the crane bucket and a belt. (\geq DN 400)

correct (✓)

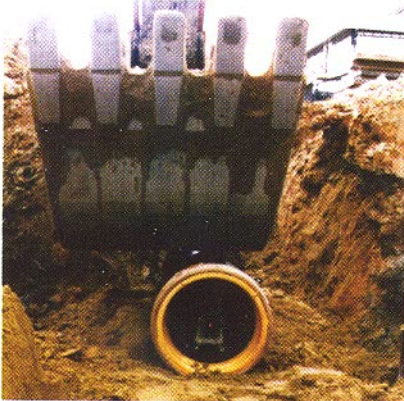


correct (✓)



- Pushing the pipes together with a crowbar - always have a piece of timber between the pipe and the crowbar. (\leq DN 400)
- Do not push against the pipe with the excavator shovel in order to correct the axial line.

wrong (✗)



correct (✓)



- In a normal practise the sockets will point in the upside direction.
- Install pipes always in the centerline of the trench.

5. Excavation and compaction

- For the minimum required width of the trench (in accordance with nominal size and depth of laying), refer to EN 1610 for the laying of sewer pipes.
- A trench that is too narrow makes it difficult to compact the bedding zone properly. A trench that is too wide increases the laying costs and both increase the loading on the pipe. Minimum trench width for security reasons are given in the table. In order to reach good compaction results the specifier might precise larger trench widths.
- Minimum trench width, in relation to DN and in relation to depth

| | Supported and unsupported trenches ($\beta > 60^\circ$) | Unsupported trenches ($\beta \leq 60^\circ$) | depth | min. width |
|---------------|---|--|----------|------------|
| DN \leq 225 | OD + 0,40 | OD + 0,40 | < 1,0 | - |
| DN 225-350 | OD + 0,50 | OD + 0,40 | 1,0-1,75 | 0,80 |
| DN 350-700 | OD + 0,70 | OD + 0,40 | 1,75-4,0 | 0,90 |
| DN 700-1200 | OD + 0,85 | OD + 0,40 | > 4,0 | 1,0 |

OD = external pipe diameter (see d_3 in the catalogue; "range of products")

Socket holes must be made so that the sockets do not lie on a compacted bottom; this would result in point loading. Support must be provided over the whole barrel length.

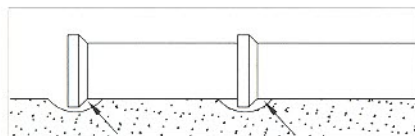
correct (✓)



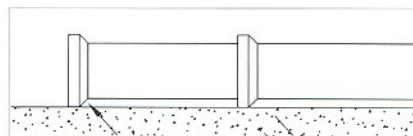
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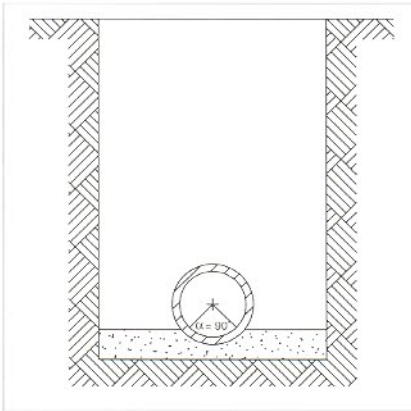


correct (✓)



wrong (✗)

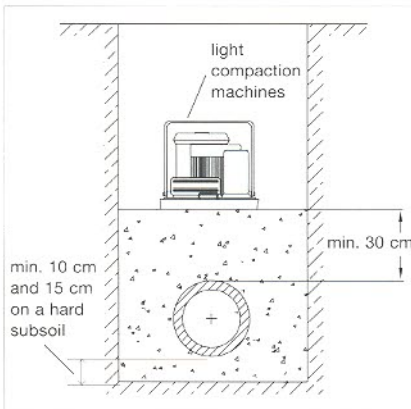




Between the trench bottom and the pipe a bedding angle of at least 90° must be realised with materials that can be compacted well.

The backfilling directly above the pipe and to a width equal to the outside diameter of the pipe should be compacted by hand where required. Mechanical compaction of the main backfill directly above the pipe should not be commenced until there is a total depth of cover at least 300 mm above the top of the pipe. This layer must consist of stonefree soil.

The selection of the compacting device, the number of passes and the thickness of the layer to be compacted should match the backmaterial.



If the layer above the pipe is inadequately thick (less than 30 cm), do not move the compactor over the pipeline.

When compacting at the sides of the trench, ensure that the compactor does not contact the pipes (Fig. A). Similarly do not run the compactor over the pipes (Fig. B).

correct (✓)

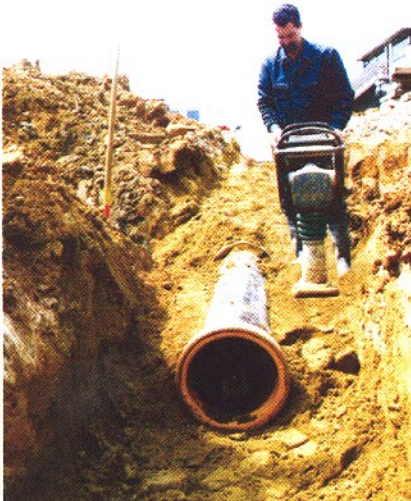


Figure A

wrong (✗)



Figure B

6. Accessories

P-rings

SBR-rubber-seal to replace the spigot seal when pipes are cut-to-length or when the spigot seal is damaged.



B-rings

Sealing elements used in connection with the branch piece for lateral connections.



M sleeves

Sleeve type seals for connecting two spigots of vitrified clay pipes or fittings. (Mainly for repairs)



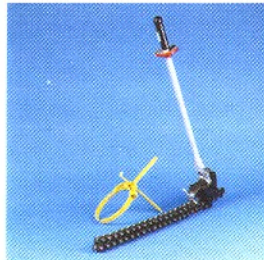
Lubricant

Is applied to all sealing elements to facilitate the jointing of pipes and fittings.



Cutting devices

Cutting rings and cutting chains for cutting vitrified clay pipes.



U / A Rings

Sealing element used to connect clay pipe to UPVC/Cast iron Pipe, up to DN 200.



Should you require more detailed information, please request our comprehensive accessories catalogue.

7. Test with water:

Testing for leaktightness of pipelines, manholes shall be conducted either with water or with air (see pg 15) after backfilling of the trench. With a water test the pressure is equivalent to filling the section up to the ground level of the downstream or upstream manhole, as appropriate, with a minimum of 10 and a maximum of 50 kPa (0,5 bar = 5 m water column) at the top of the pipe. A conditioning time of 1 hour at the test pressure before testing should be applied. The testing time shall be 15 ± 1 minutes. Pressure shall be maintained within 1 kPa of the specified test pressure. The total amount of water added during the test to achieve this pressure requirement (W_{15}) shall be measured and recorded and not be higher than:

- 0,07 l/m² during 15 min, for pipelines

Important points observe:

- * stoppers should be adequately secured;
- * during the filling period the line should be vented.

| DN (mm) | Content l/m on base d1 | Permissible water addition in l per wetted running metre for a water consumption of 0,07 l/m ² during 15 minutes. |
|---------|------------------------|--|
| 100 | 8 | 0,021 |
| 150 | 18 | 0,032 |
| 200 | 31 | 0,043 |
| 250 | 49 | 0,054 |
| 300 | 71 | 0,065 |
| 350 | 96 | 0,076 |
| 400 | 126 | 0,087 |
| 450 | 159 | 0,098 |
| 500 | 196 | 0,110 |
| 600 | 283 | 0,131 |
| 700 | 385 | 0,154 |
| 800 | 503 | 0,176 |
| 900 | 634 | 0,198 |
| 1000 | 785 | 0,220 |
| 1200 | 1130 | 0,264 |

Example with DN 250: length 35 m, permissible W_{15} , $0,054 \times 35 = 1.890$ liter.

8. Air test

The Air Test is carried out by measuring the loss of air pressure in the pipeline over a period of 5 minutes.

The following procedure should be adopted.

1. Connect a 'U' tube gauge (manometer) to a vented sealing plug at one end of the pipeline together with a means of applying the air pressure. The other end of the pipeline and all side arms or other openings must be sealed with airtight plugs.
2. Apply pressure either by mouth or hand pump to achieve a pressure of slightly more than 100mm water gauge for pipelines, or where trapped gullies and/or trapped ground floor appliances are directly connected, of slightly more than 50mm water gauge. The pressure in the pipeline will be indicated by the vertical distance between the water surfaces in the two sections of the U-tube.
3. Allow 5 minutes for stabilization of air temperature, and then readjust the air pressure to 100mm or 50mm water gauge, as appropriate, by either releasing a little air through one of the vent valves or by blowing in a little more air.

Acceptance Criteria

The level in the manometer tube should not fall by more than 25mm in a period of 5 minutes for 100mm water gauge test head, or by more than 12mm in a period of 5 minutes for a 50mm water gauge test head (see 2 above).

Possible Reasons for Apparent Failure

1. Temperature changes of the air in the pipe due to the effects of direct sunlight or a change in the cloud cover, cold wind or rain which can give misleading results. (A change of temperature of 1°C during the test will result in a corresponding change in air pressure in the pipeline of about 38mm water gauge).
2. Leaky plugs or faulty test equipment.
3. Dryness of the pipe wall.

NOTE: Unfortunately pressure is affected by changes in temperature. For this reason a pipeline should not be judged to be unsatisfactory on the result of an air test alone but, in a case of apparent failure, should be subjected to a water test.

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