# 4 DRAINAGE PIPES IN TRENCHES

## 4.1 GENERAL

### 4.1.1 Scope

1 This Part specifies the requirements for trenches and bedding for drainage pipes constructed internally and externally.

2 Related Sections and Parts are as follows:

This Section

Part 1..... General
Part 2..... Internal Drainage Works
Part 3..... External Drainage Works
Part 6..... Commissioning of Systems

Section 1 General
Section 5 Concrete
Section 8 Sewerage

### 4.1.2 References

1 The following standards are referred to in this Part:

BS 743.....Materials for damp-proof courses.

BS 882.....Aggregates from natural sources for concrete

BS 1142.....Fibre building boards

BS 2494.....Specification for elastomeric joint rings for pipework and pipeline

BS 6076.....Tubular polythene film for use as a protective sleeving for buried iron pipes and fittings

## 4.2 LAYING OF DRAINAGE PIPES IN TRENCHES

### 4.2.1 System Description

1 The laying of drainage pipes in trenches shall generally be in accordance with the relevant provisions of Section 8, Sewerage.

### 4.2.2 General

1 Where socketed pipes are required to be laid on a granular or sand bed, or directly on a trench bottom, joint holes shall be formed in the bedding material or final excavated surface to ensure that each pipe is uniformly supported throughout the length of its barrel and to enable the joint to made.

2 Pipes shall be laid on setting blocks only where a concrete bed or cradle is used.

3 Where pipes are required to be bedded directly on the trench bottom, the final excavated surface shall be trimmed and levelled to provide even bedding for the pipeline and shall be free from all extraneous matter that may damage the pipe, pipe coating, or sleeving. Where rock is encountered, the trench shall be cut at least 150 mm deeper than other ground and made up with well compacted selected fill material.

4 No protective cap, disc or other appliance on the end of a pipe or fitting shall be removed permanently until the pipe or fitting which it protects is about to be jointed. Pipes and fittings, including any lining or sheathing, shall be examined for damage and the joint surfaces and components shall be cleaned immediately before laying.

5 Suitable measures shall be taken to prevent soil or other material from entering pipes, and to anchor each pipe to prevent flotation or other movement before the Works are complete.

6 Where pipeline marker tape is specified, it shall be laid between 100 mm and 300 mm above the pipe.

### 4.2.3 Bedding

1 Bedding for pipes shall be constructed by spreading and compacting granular bedding material over the whole width of the pipe trench. After the pipes have been laid, additional material shall, if required, be placed and compacted equally on each side of the pipe, and where practicable, this shall be done in sequence with the removal of the trench supports.

2 Bedding material shall be in accordance with Table 4.1 unless otherwise specified in the Project Documentation.

3 Nominal single sized aggregate and graded aggregate shall comply with Table No. 4 of BS 882.

4 Sand for bedding material shall comply with the relevant provisions of BS 882.

5 Bedding systems other than those specified in this Clause may be allowed upon approval of the Engineer or as recommended by the pipe manufacturer.

Table 4.1
Bedding Material

| Pipe Diameter | Bedding |
|---|---|
| up to 65 mm | Sand |
| 65 - 100 mm | 10 mm single sized aggregate |
| 100 - 200 mm | 10 or 14 mm single sized or 14-15 mm graded aggregate |
| Over 200 mm | 10,14 or 20 mm single sized or 15-5 or 20-5 mm graded aggregate. |

### 4.2.4 Protective Coatings

1 Coatings, sheathings or wrappings shall be examined for damage, repaired where necessary, and made continuos before trench excavations are backfilled.

### 4.2.5 Concrete Protection to Pipes

1 Pipes to be bedded on or cradled with concrete shall be supported on precast concrete setting blocks. The top face of each block shall be covered with two layers of compressible packing complying with BS 743.

2 Concrete provided as a protection to pipes shall be Grade C20, placed to the required depth in one operation.

3 Where pipes with flexible joints are used, the concrete protection shall be interrupted over its full cross-section at each pipe joint by a shaped compressible filler of bitumen impregnated insulating board to BS 1142 or equally compressible material. The thickness of the compressible filler shall be in accordance with Table 4.2.

Table 4.2
Thickness of Compressible Filler

| Nominal Bore of Pipe (mm) | Thickness of Compressible Filler (mm) |
|---|---|
| Up to 300 | 13 |
| Over 300 and up to 600 | 25 |
| Over 600 and up to 1200 | 38 |

4 Rapid hardening cement shall not be used in concrete for the protection of plastics pipe.

5 Plastics pipes shall be wrapped with a layer of plastic sheeting complying with a composition in accordance with Clause 3 of BS 6076 and a nominal thickness of 125 microns before being surrounded by concrete.

6 Concrete work shall comply with the relevant provisions of Section 5, Concrete.

### 4.2.6 Completion of Pipe Surround

1 Fill material shall, where required, be placed and compacted over the full width of the trench in layers not exceeding 150 mm before compaction, to a finished thickness of 250 mm above the crown of the pipes.

### 4.2.7 Backfilling

1 Backfilling shall, wherever practicable, be undertaken immediately the specified operations preceding it have been completed. Backfilling shall not, however, be commenced until the parts of the Works to be covered have achieved a strength sufficient to withstand all loading imposed thereon.

2 Backfilling around existing structures shall be undertaken in such manner as to avoid uneven loading or damage.

3 Filling material to excavations shall be deposited in layers not exceeding 250 mm unconsolidated thickness and compacted to 95% modified proctor.

4 Where the excavations have been supported and the supports are to be removed, these, where practicable, shall be withdrawn progressively as backfilling proceeds in such a manner as to minimise the danger of collapse. All voids formed behind the supports shall be carefully filled and compacted

### 4.2.8 Protective Coatings

1 Coatings, sheathings or wrappings shall be examined for damage, repaired where necessary, and made continuos before trench excavations are backfilled.

### 4.2.9 Pipes under Buildings

1 Where a pipe has less than 300 mm of cover under a load bearing slab, it should be surrounded with concrete as an integral part of the slab. Where possible, the concrete surround shall be poured at the same time as the slab. The surround shall be tied to the slab with nominal steel reinforcement placed vertically with turned over ends.

2 No provision for pipe flexibility along the concrete surround shall be made, unless an expansion joint is included in the slab. A construction joint should be included in the surround at that point which must also coincide with a pipe joint.

3 In normal, stable ground conditions, and with 300 mm or more of cover to the pipeline beneath the slab, a total granular surround can be used as a pipe bedding. Refer to Clause 4.2.3 of this Part for the bedding specification.

4 Flexibility shall be incorporated into the pipeline as it leaves any concrete surround.

5 Where plastic pipes are to be surrounded in concrete, Clause 4.2.5 of this Part shall apply.

## 4.3 ACCESS TO DRAINAGE PIPES IN TRENCHES

### 4.3.1 General

1 Access is required to drainage installations for testing, inspection, maintenance and removal of debris.

### 4.3.2 Rodding Eyes

1 Rodding eyes shall be constructed in pipework of the same diameter as the drains it serves and should connect to the drain at an angle not steeper than 45° from the horizontal.

### 4.3.3 Provision of Access to Drains

1 Every drain length should be accessible for maintenance and rodding without the need to enter buildings. Access should be provided at the head of each run of a drain and at changes in direction, gradient or pipe diameter.

2 Table 4.3 indicates the recommended maximum distance between rodding eyes, inspection chambers and manholes.

3 Where a branch drain joins another drain without the provision of an inspection chamber or manhole at the junction, access should be provided on the branch drains within 12 m of the junction.

Table 4.3
Maximum Spacings of Access Points

| Distance to | from Junction or Branch | from Inspection Chamber | from Manhole |
|---|---|---|---|
| start of external drain | - | 22 m | 45 m |
| rodding eye | 22 m | 45 m | 45 m |
| inspection chamber | 22 m | 45 m | 45 m |
| manhole | 45 m | 45 m | 90 m |

## 4.4 TESTING

### 4.4.1 Testing of Pipework

1 Pressure tests shall be carried out on below ground drainage pipes. Test procedures are detailed in Part 6 of this Section.

END OF PART