



Investigation and assessment of drain and sewer systems

BSI Standards Publication

outside buildings —

Part 2: Visual inspection coding system

ICS 93.030

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National foreword

This British Standard is the UK implementation of EN 13508-2:2003+A1:2011, incorporating corrigendum March 2007. It supersedes BS EN 13508-2:2003, which is withdrawn.

The start and finish of text introduced or altered by corrigendum is indicated in the text by tags **AC** **AC**. Text altered by CEN corrigendum March 2007 is indicated in the text by **AC1** **AC1**.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to CEN text carry the number of the CEN amendment. For example, text altered by CEN amendment A1 is indicated by **A1** **A1**.

The UK participation in its preparation was entrusted to Technical Committee B/505, Waste water engineering.

A list of organizations represented on this committee can be obtained on request to its secretary.

The UK has had a coding system, the Manual of Sewer Condition Classification (MSCC), for many years. Clause 5.4 allows the national equivalent codes to be used in place of the language independent codes described in EN 13508-2. A national equivalent coding system complying with the requirements of EN 13508-2 has been produced and is described in National Annex NB. This is very similar to the MSCC coding system.

Users with archives of data coded according to the MSCC can retain this data. Guidance on converting such data into the system described in EN 13508-2 can be found in National Annex NA.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

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English Version

Investigation and assessment of drain and sewer systems outside buildings - Part 2: Visual inspection coding system

Investigation et évaluation des réseaux d'assainissement à
l'extérieur des bâtiments - Partie 2: Système de codage de
l'inspection visuelle

Untersuchung und Beurteilung Zustand von
Entwässerungssystemen außerhalb von Gebäuden - Teil 2:
Kodiersystem für die optische Inspektion

This European Standard was approved by CEN on 4 November 2002 and includes Corrigendum 1 issued by CEN on 21 March 2007 and Amendment 1 approved by CEN on 17 March 2011.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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Foreword

This document (EN 13508-2:2003+A1:2011) has been prepared by Technical Committee CEN/TC 165 "Wastewater engineering", the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 2011, and conflicting national standards shall be withdrawn at the latest by November 2011.

This document includes Corrigendum 1 issued by CEN on 21 March 2007 and Amendment 1 approved by CEN on 17 March 2011.

This document supersedes EN 13508-2:2003.

The start and finish of text introduced or altered by amendment is indicated in the text by tags **A1** and **A1**.

The modifications of the related CEN Corrigendum have been implemented at the appropriate places in the text and are indicated by the tags **AC** and **AC**.

The Standard series EN 13508 "Condition of drain and sewer systems outside buildings" contains the following parts

- Part 1: General requirements
- Part 2: Visual inspection coding system

Other parts, dealing with other methods of inspection, can be added later.

In drafting this part of this European Standard account has been taken of other available standards, in particular EN 752 "Drain and sewer systems outside buildings"

To allow for the alteration of existing data and coding system software in accordance with this standard and training of inspection personnel, a transition period is granted until (DAV + 36 month) for the withdrawal of conflicting national standards and the application of this standard.

Where there are existing inspection programmes to meet legal requirements commenced before the publication of this standard, it is permitted to complete such programmes using the original coding system.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Introduction

In producing this draft standard, existing national coding systems have been reviewed. To preserve the link with existing data, TC165/WG22 has tried to ensure that there is an equivalent code, or combination of codes, for every observation recorded in an existing national system. ^{A1} This will allow existing data to be transferred to the new coding system. ^{A1}

At present the amount of detail recorded varies between countries. The choice of features to be recorded and the extent of detail to be included is left to the employing authority.

Before the standard can be fully applied, extensive retraining of operators and modification of software will be necessary.

1 Scope

^{A1} This European Standard is applicable to the investigation and assessment of drain and sewer systems outside buildings. ^{A1}

^{A1} It is applicable to drain and sewer systems, which operate essentially under gravity, from the point where the wastewater leaves a building or roof drainage system, or enters a road gully, to the point where it is discharged into a treatment works or receiving water. ^{A1} Drains and sewers below buildings are included provided that they do not form part of the drainage system of the building.

This part of the European Standard specifies a coding system for the description of the internal condition of drains, sewers, manholes and inspection chambers identified through visual inspection. Where appropriate, it can also be used for pressure and vacuum systems in accordance with the requirements of the employing authority. ^{A1} Visual inspection of drain and sewer systems can be carried out as part of the investigation in order to undertake the assessment. ^{A1}

This part of the European Standard does not generally specify requirements for carrying out inspections.

2 Normative references

^{A1} The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies. ^{A1}

EN 476:1997, *General requirements for components used in discharge pipes, drains and sewers for gravity systems*

^{A1} EN 752:2008, *Drain and sewer systems outside buildings* ^{A1}

^{A1} EN 1085:2007, *Wastewater treatment — Vocabulary* ^{A1}

ISO 8601, *Data elements and interchange formats — Information interchange — Representation of dates and times*

3 Terms and definitions

For the purposes of this European Standard, the following terms and definitions apply:

NOTE These definitions are general terms. Other specific terms are defined in the text.

3.1

adjusting construction

A1 part of a manhole or inspection chamber between the cover and frame and either the shaft or the cover slab. This is used to adjust the level of the cover and frame to accord with the required surface level **A1**

3.2

backdrop manhole

manhole with a connection, by means of a vertical pipe, at or just above invert, from a drain or sewer at a higher level

A1 [EN 752:2008, Term 3.5] **A1**

3.3

benching

near horizontal surface adjacent to the channel in a manhole or inspection chamber, or a large sewer

3.4

chamber

part of a manhole or inspection chamber providing working space above the channel

3.5

chamber unit

component part of a manhole or inspection chamber manufactured as a single entity and intended to be joined with other chamber units

3.6

combined system

A1 drain and sewer system designed to carry both foul wastewater and surface water in the same pipeline(s) **A1**

A1 [EN 752:2008, Term 3.12, EN 1085:2007, Term 2110] **A1**

3.7

connection

general term used for the location at which one pipeline joins another pipeline or a manhole or inspection chamber

3.8

drain

pipeline, usually underground, designed to carry wastewater and/or surface water from a source to a sewer.

A1 [EN 752:2008, Term 3.19, EN 1085:2007, Term 2250] **A1**

3.9

drain system

network of pipelines and ancillary works that conveys wastewater and/or surface water to a cesspool, sewer system or other place of disposal

A1 *deleted text* **A1**

3.10

employing authority

organisation which owns or is responsible for the **A1** management **A1** of a drain or sewer system

3.11

exfiltration

A1 escape of wastewater from a drain or sewer system into surrounding ground **A1**

A1 [EN 752:2008, Term 3.24, EN 1085:2007, Term 2230] **A1**

3.12

gradient

ratio between the vertical and the horizontal projections of a pipe length

 *deleted text* 

3.13

gravity system

 drain or sewer system where flow is caused by the force of gravity and where the pipeline is designed usually to operate partially full 

 [EN 752:2008, Term 3.30, EN 1085:2007, Term 2260] 

3.14

groundwater

water present in the sub-surface strata

 *deleted text* 

3.15

infiltration

 <into the drain and sewer system> unwanted flow resulting from an ingress of groundwater into a drain or sewer system 

 [EN 752:2008, Term 3.33, EN 1085:2007, Term 2220] 

3.16

inspection chamber

 chamber with a removable cover constructed on a drain or sewer that permits the introduction of cleaning and inspection equipment from surface level, but does not provide access for personnel 

 [EN 752:2008, Term 3.34] 

3.17

invert

lowest point of the internal surface of the barrel of a pipe or channel at any cross section

[EN 476:1997]

3.18

joint

location at which the ends of two adjacent pipe units are joined together longitudinally

3.19

junction

connection made using a prefabricated junction pipe unit

3.20

landing

intermediate rest platform used to limit the height of a run of steps in a manhole

3.21

manhole

chamber with a removable cover constructed on a drain or sewer to permit entry by personnel

 [EN 752:2008, Term 3.41] 

3.22

node

manhole, inspection chamber, outfall, rodding eye or other significant intermediate point

3.23

outfall

 structure or point from which wastewater is discharged to a wastewater treatment plant or receiving water 

 [EN 752:2008, Term 3.42, EN 1085:2007, Term 1280] 

3.24

pipe unit

component part of a drain or sewer manufactured as a single entity and intended to be joined with other pipe units.

3.25

pipeline

assembly of pipes, fittings, masonry and insitu concrete units and joints between manholes or other structures.

3.26

pipeline length

continuous section of drain or sewer between two adjacent nodes

3.27

pipe unit length

length of a manufactured pipe unit used in the construction of a pipeline

3.28

ramp manhole

manhole with a steeply inclined pipe or channel from a drain or sewer at a higher level

Ⓐ [EN 752:2008, Term 3.47] Ⓐ

3.29

receiving water

Ⓐ any type of water body where water or wastewater is discharged Ⓐ

Ⓐ [EN 752:2008, Term 3.49, EN 1085:2007, Term 1100] Ⓐ

3.30

rehabilitation

Ⓐ measures for restoring or upgrading the performance of existing drain and sewer systems Ⓐ

Ⓐ [EN 752:2008, Term 3.50] Ⓐ

3.31

repair

rectification of local damage

Ⓐ [EN 752:2008, Term 3.53] Ⓐ

3.32

rising main

Ⓐ pipe through which wastewater is pumped Ⓐ

Ⓐ [EN 752:2008, Term 3.56, EN 1085:2007, Term 2170] Ⓐ

Ⓐ *deleted text* Ⓐ

Ⓐ 3.33 Ⓐ

sewer

Ⓐ pipeline or other construction, usually underground, designed to carry wastewater from more than one source Ⓐ

Ⓐ [EN 752:2008, Term 3.65, EN 1085:2007, Term 2270] Ⓐ

Ⓐ 3.34 Ⓐ

sewer system

Ⓐ network of pipelines and ancillary works which conveys wastewater from drains to a treatment works or other place of disposal Ⓐ

Ⓐ [EN 752:2008, Term 3.66, EN 1085:2007, Term 2180] Ⓐ

Ⓐ 3.35 Ⓐ

shaft

upper part of a manhole or inspection chamber between the adjusting construction and the chamber

Ⓐ 3.36 Ⓐ

surface water

water from precipitation, which has not seeped into the ground and which is discharged to the drain or sewer system directly from the ground or from exterior building surfaces

Ⓐ [EN 752:2008, Term 3.73, EN 1085:2007, Term 2070] Ⓐ

A1 3.37 A1

taper

part of manhole or inspection chamber where the cross sectional area changes gradually

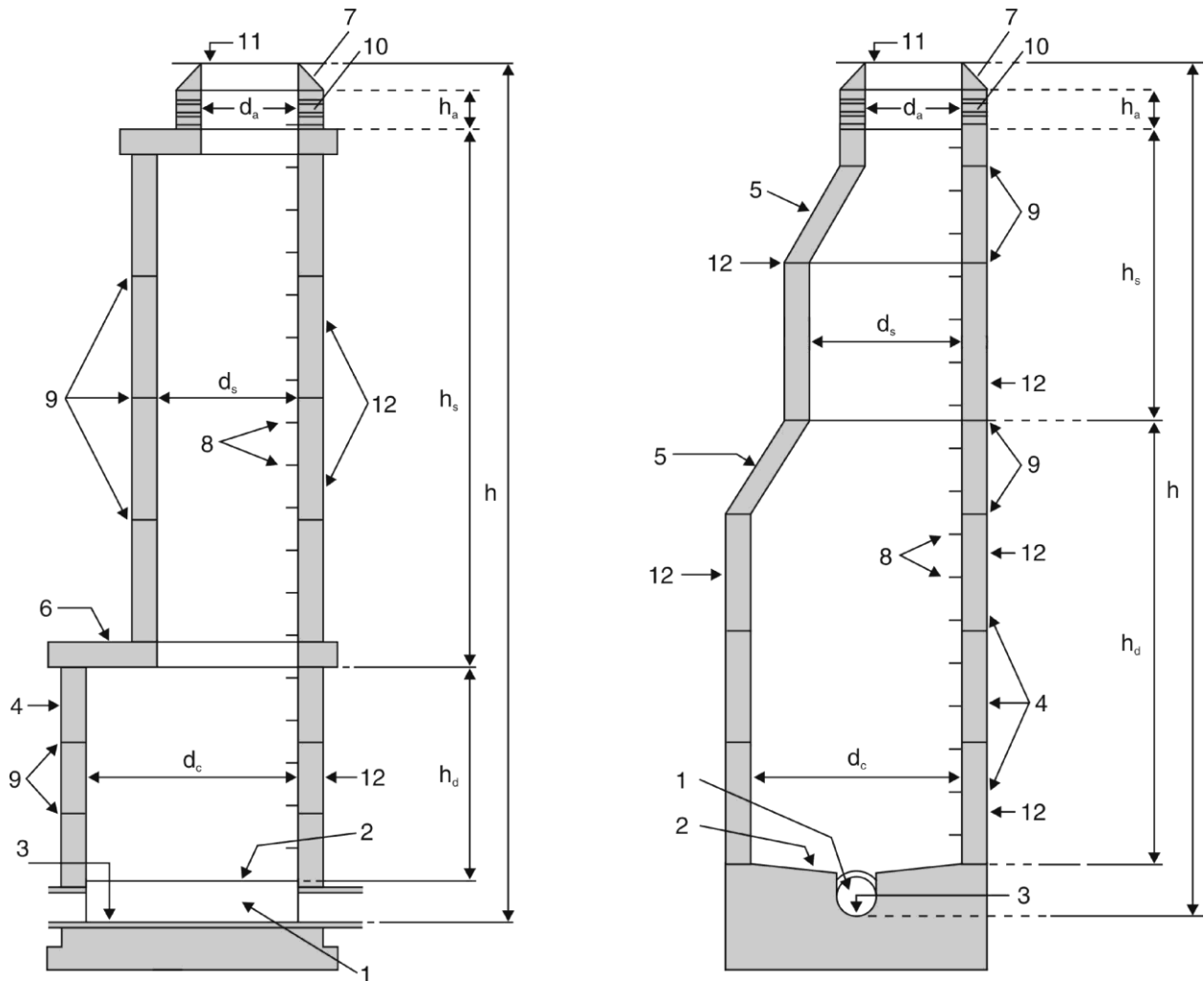
A1 3.38 A1

wastewater

A1 water composed of any combination of water discharged from domestic, industrial or commercial premises, surface run-off and accidentally any sewer infiltration water A1

A1 [EN 752:2008, Term 3.80, EN 1085:2007, Term 1010] A1

A1



Key

1 channel	7 manhole top (cover and frame)	h depth to invert
2 benching	8 step	h_a depth of adjusting construction
3 invert	9 sealing material	h_s depth of shaft
4 chamber unit	10 adjusting construction	h_d depth of chamber
5 taper	11 cover level	d_a access diameter/size
6 reducing slab	12 manhole wall	d_s shaft diameter/size
		d_c chamber diameter/size ^{A1}

Figure 1 — Illustration of terms relating to manholes

4 Sources of additional information

This standard specifies a coding system for visual inspection of drain and sewer systems. For further guidance on the execution of visual inspection in various countries reference should be made to national documents until such time as fully comprehensive European Standards are available.

The documents listed in annex H contain details, which can be used in the framework of this part.

5 General

5.1 Purpose

EN 752 requires the use of a uniform standard coding system complying with this European Standard to ensure that results from visual inspections can be compared. This part of this standard specifies a system, which can be used to objectively record the visual information from the inspection. It does not include methods for assessing the condition of the drain or sewer as this requires subjective judgements and the use of additional information.

The coded information can be used for one or more of the following purposes:

- to assess the performance deficiencies as part of the development of a rehabilitation plan (see EN 752:2008, Clause 6);
- to provide information for use in the planning of maintenance activities, e.g. sewer cleaning programmes (see EN 752:2008, Clause 6);
- to investigate specific maintenance or operational problems (see EN 752:2008, Clause 11);
- the recording of inventory data (see EN 752:2008, Clause 6). A1

5.2 Methods

The visual inspection can be carried out in one of the following ways:

- inspection of the pipeline from within the pipeline;
- inspection of the pipeline from within the manhole or inspection chamber;
- inspection of the manhole or inspection chamber from within the manhole or inspection chamber;
- inspection of the manhole or inspection chamber from the surface.

Several inspection techniques can be used such as:

- remotely controlled CCTV camera;
- man entry;
- mirrors;
- photographic camera.

The personnel involved in inspection work shall be adequately trained in the inspection methods and in the coding system.

The inspection shall be carried out sufficiently slowly to enable all features to be observed. Where a closed circuit television camera is used, the camera should only be moved along the pipe when the lens is pointing forward in the direction of the axis of the sewer.

[A1] The relevant authority can prescribe requirements regarding the health, safety and welfare of the public and/or personnel. The work should be carried out in accordance with EN 752:2008, Clause 7 and Annex D. **[A1]**

5.3 The use of the coding system

The coding system specified in this European Standard for drains and sewers is described in clauses 6, 7 and 8. The coding system specified in this European Standard for manholes and inspection chambers is described in clauses 9, 10 and 11. Colour photographs showing examples of some observations are included to illustrate the use of the coding systems (see annex F and annex G).

Each observation is described by a main code comprising three letters and additional information. The first letter of the main code describes the application of the code (i.e. to a pipeline see clause 6 or to a manhole or inspection chamber see clause 10). The second letter indicates the type of code (see 8.1.2 and 11.1.2). The third letter determines the specific observation (see 8.1.3 and 11.1.3).

Where different observation types occur at the same point then each defect or feature shall be coded separately.

The defects, features and the general condition shall be coded in accordance with this standard and should be supported either with photographs or by a video recording.

5.4 National equivalent coding systems

The codes used in this standard are independent of any language. In order to make the codes more memorable or more compatible with existing systems, a list of national equivalent codes may be produced. Where these are produced, a table of equivalence should be included in a national annex to this standard. Only the language independent codes specified in this standard can be used with the electronic data transfer format described in annex B.

Rules for national equivalent coding systems are given in annex A.

5.5 Data transfer

The coded information is frequently transferred between databases. A recommended format for data transfer, using this coding system, is included in annex B.

5.6 Information to be supplied by the employing authority

The coding systems are intended to provide a comprehensive choice of codes to allow the inspector to describe the drains, sewers, manholes or inspection chambers as required by the employing authority. The codes are only to be used as directed by the employing authority who may decide which features are to be recorded.

The employing authority should specify the following from the options available in this standard:

- a) Header information
 - i) The coding system to be used for recording header information (e.g. national equivalent system or annex C or D)
 - ii) Which of the optional header information items is to be recorded (see 7.2 and 10.2)
 - iii) The reference points to be used for the longitudinal location in inspections of drains and sewers (see 8.1.7) and the vertical and circumferential location in manholes and inspection chambers (see 11.1.5 and 11.1.8).
- b) The information about the individual observations.
 - i) Whether the coding system to be used is the system described in clause 8 or clause 11 of this standard or a specified national equivalent system in accordance with 5.4.

- ii) The types of observations to be recorded. (These observations shall be recorded in accordance with the coding systems described in clause 8 and clause 11, or a national equivalent system in accordance with 5.4).
- iii) The level of detail required in accordance with clause 8 and clause 11 - by specifying for each code:
 - whether quantification information, longitudinal, vertical, circumferential location information, or whether the fact that the observation is associated with a joint, is to be recorded;
 - whether quantification information is to be recorded as a single value or as a band;
 - if bands are to be used, the ranges of values be included in each band;
 - the tolerances to be used for estimation and/or measurement of values.

6 Drains and sewers - Coding system

The coding system for drains and sewers comprises a series of codes which shall be used to describe the defects and features found in the drain or sewer. ^{A1} A separate inspection report shall be prepared for each pipeline length. ^{A1} ^{A1} If an additional node is found during the inspection then separate inspection reports shall be prepared for each of the two pipeline lengths. Where an inspection is abandoned and reinspected either in the same direction or from the other direction, then separate inspection reports shall be prepared for each inspection. ^{A1}

^{A1} NOTE Where the inspection of a sewer length is carried out by more than one separate inspection, the documentation prepared in accordance with the requirements of the employing authority (see Clause 12) can include consolidated information from all the inspection reports of that pipeline length. ^{A1}

- Header information - relating to the pipeline as a whole. This is described in clause 7 and annex C. All codes for these start with the letter A.
- Information about individual observations within the drain or sewer. This is described in clause 8. All codes for these start with the letter B.

7 Drains and sewers - Header information

7.1 Requirements

Header information is entered at the start of the inspection. The following information shall be recorded.

^{A1}

- a) The pipeline length identification, by:
 - 1) pipeline reference and/or the two node references.
 - 2) alternatively, where the pipeline length is a lateral connected to another pipeline without a chamber, the pipeline may be identified by:
 - i) the node at the junction with the main pipeline may be defined using the reference of the main pipeline as in (1) above and the longitudinal location and clockface reference; and,
 - ii) the pipeline reference of the lateral or the node reference of the node at the other end of the lateral. ^{A1}
- b) The direction of the inspection.
- c) A textual description of the location.

- d) The coding system.
- e) The longitudinal reference point (if recording longitudinal location).
- f) The method of inspection.
- g) The date of inspection.
- h) Whether the drain or sewer was pre-cleaned.
- i) Any other information required by the employing authority.

7.2 Other header information

Other information may include:

- type of location;
- name of employing authority;
- name of town, village, district or sewer system;
- land ownership;
- original coding system (where older data is converted);
- time of inspection;
- name of inspector;
- job reference;
- video storage details;
- photograph storage details;
- purpose of inspection;
- cross section;
- material;
- lining details;
- pipe unit length;
- depth to invert of upstream and downstream nodes;
- type of drain or sewer (e.g. gravity sewer or rising main);
- type of effluent (e.g. wastewater or surface water);
- year of construction;
- strategic importance;
- precipitation;
- temperature;

- flow control measures;
- atmosphere within the pipeline.

Any changes to header information identified during the course of the inspection shall be recorded.

A recommended coding system for the header information is given in annex C.

If the header information is coded in accordance with annex C, the recommended data transfer format described in annex B can be used.

8 Drains and sewers - Codes

8.1 Introduction

8.1.1 General

A1 Each observation shall be recorded using a main code or combination of main codes (see 8.1.2) that broadly describe the feature, together with the following additional information where required. **A1**

- Characterisation - up to two codes which describes the feature in more detail. (see 8.1.3)
- Quantification - up to two values which quantify the feature (see 8.1.4).
- Circumferential location - up to two clockface references which locate the position of the observation around the circumference (see 8.1.5).
- Joint - identifies when the observation is associated with a joint (see 8.1.6).
- Longitudinal location - the distance from the stated reference point including a method of recording observations which continue over a significant length (see 8.1.7).
- Photograph reference (see 8.1.8).
- Video reference (see 8.1.9).
- Remarks - text which describes aspects of the observation which cannot be described any other way. (see 8.1.10)

The employing authority may specify which observations are to be recorded and the amount of detail that is recorded for each observation (see 5.6).

An example of the record for a longitudinal crack at the top of the pipe 10.5 metres from the start point is shown in Table 1 (see 8.2).

Table 1

Longitudinal location	Continuous Defect Code	Main Code	Characterisation		Quantification		Circumferential location		Joint	Photo Ref	Video ref.	Remarks
			1	2	1	2	1	2				
10.5		BAB	B	A			12				00:10:30	

An example of the record for an 100 mm diameter intruding lateral connection (intruding half of the diameter of the main pipe) 16.5 metres from the start point is shown in Table 2.

NOTE Note two codes are necessary to describe the feature (see 8.2 and 8.4).

Table 2

Longitudinal Location	Continuous Defect Code	Main Code	Characterisation		Quantification		Circumferential location		Joint	Photo Ref	Video ref.	Remarks
			1	2	1	2	1	2				
16.5		BCA	E	A	100		9				00:12:20	
16.5		BAG			50		9				00:12:20	

8.1.2 Main code

The main codes which are used to describe the observations are listed in 8.2 to 8.5 together with a description of the observation and the use of the code. No observation shall be recorded without using one of these codes.

For clarity these codes have been grouped under 4 headings and the second letter indicates the respective group:

- Codes relating to the fabric of the pipeline (codes BA..),
- Codes relating to the operation of the pipeline (codes BB..),
- Inventory codes (codes BC..),
- Other Codes (codes BD..).

This is entirely for editorial purposes and the headings should not be used to interpret or otherwise restrict the meaning of the codes.

8.1.3 Characterisation

Codes are given to further describe the observation. Up to two types of characterisation are given for each observation type. They shall be recorded in the order in which they are given.

When required by the employing authority, and where an observation cannot be observed (for example, if it is not possible to see corrosion in an uncleaned sewer) the code YY shall be used as a first characterisation code.

Only characterisation codes listed in this standard may be used.

8.1.4 Quantification

Up to two values shall be recorded as specified in 8.2 to 8.5.

Unless these clauses specify the use of the two quantification values differently, the two values may be used to record a band, by specifying the lower and upper limits (e.g. 10% to 15%).

8.1.5 Circumferential location

Where specified in 8.2 to 8.5, the position of the observation shall be recorded using the clockface reference. The clockface is determined from the angle subtended at the centre of the cross section (the point defined by half the height and half the width (see Figure 2) between the observation and the soffit of the pipeline.

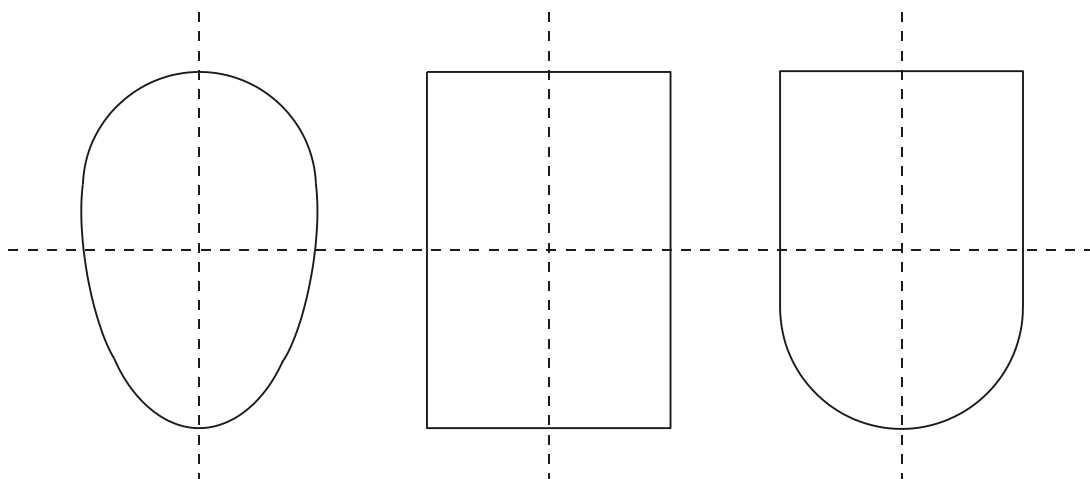


Figure 2 — Examples of definition of the centre of the cross section

The clockface reference shall be determined by reference to Table 3.

An observation at the centre of the soffit of a sewer would therefore be described as being at 12 o'clock.

Where 8.2 to 8.5 require that the start and finish clockface references are given these shall be in the clockwise direction. Where 8.2 to 8.5 require only a single clockface reference this shall relate to the centre of the observation.

Where an observation is repeated around the circumference of the pipeline, at the same longitudinal location, each occurrence of the observation shall be coded separately.

Table 3 — Values of clockface references

Angle (degrees)	Clockface reference
0 ± 15	12
30 ± 15	01
60 ± 15	02
90 ± 15	03
120 ± 15	04
150 ± 15	05
180 ± 15	06
210 ± 15	07
240 ± 15	08
270 ± 15	09
300 ± 15	10
330 ± 15	11
360 ± 15	12

Examples of the use of clockface references are given in Figure 3.

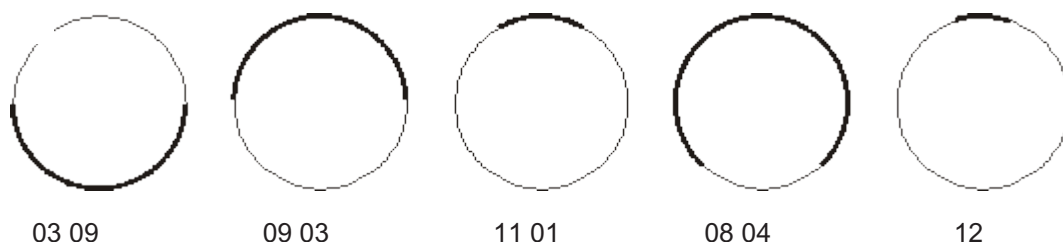


Figure 3 — Examples of clockface references

8.1.6 Observation at joint

[A₁] Where an observation occurs at a joint between two adjacent pipe units or between a pipe unit and the manhole this shall be recorded using the code (A) where required. **[A₁]**

8.1.7 Longitudinal location

The location of each observation shall be specified by stating the distance in metres from the reference point (see 7.1 e)). The reference point shall be one of the following.

- a) The inside face of the wall of the starting node, (manhole, inspection chamber or outfall etc.) at the point where the drain or sewer passes through the wall.
- b) The soffit of the end of the pipeline length inside the starting node. This will be the same point as described in a) above except where the pipe projects into the manhole.
- c) The centre of the starting manhole or inspection chamber.
- d) The midpoint of the incoming and outgoing pipes, measured along the channel.

Where observations continue over a length of more than 1 m, the start and finish of the observation shall be recorded separately, using a continuous observation code containing A (start) or B (finish) and a numeric label which identifies all references to the same observation.

A1 Where the quantification and/or the circumferential location of a continuous observation changes along its length this shall be recorded either by:

- finishing the continuous observation and starting a new continuous observation; or,
- by repeating the code for the observation with the revised quantification and/or circumferential location using the continuous observation code containing C (change) and the numeric label for the observation;
- by recording the quantification and circumferential location for the start of the observation at the start of the observation and the quantification and the circumferential location for the finish of the observation at the finish observation. **A1**

A1 Measurements shall be recorded in metres to a minimum of one decimal place. **A1**

8.1.8 Photograph reference

A reference to identify any still photographs or still computer images shall be recorded against an observation wherever a photograph is taken. **A1** If the image is a computer image the reference should be the filename. **A1** If the photograph is of no coded feature the General photograph (BDA) code shall be used.

8.1.9 Video location reference

Where the inspection is recorded on video, a reference which allows the observation to be located on the video sequence shall be recorded. The method of locating used shall be stated in the header information in accordance with clause 7. Where a time based method is used, the time shall be recorded in accordance with ISO 8601 in a hh:mm:ss format.

8.1.10 Remarks

Where an observation cannot be fully described by a code, further details should be recorded in the remarks section. A remark should be as short and descriptive as possible.

8.2 Codes relating to the fabric of the pipeline

Table 4 — Details of codes relating to the fabric of the pipeline

Main Code	Additional information	Description
Deformation		
BAA		The cross sectional shape of the pipeline has been deformed from its original shape. The employing authority may specify whether this code is to be used either for flexible pipes only, or for pipes of all materials.
	Characterisation	The orientation of the deformation: — vertical (A) – the height of the pipe has been reduced — horizontal (B) - the width of the pipe has been reduced.
	Quantification	The percentage change in the dimension which reduces.
	Circumferential location	If the deformation is localised then the circumferential location should be recorded.
Fissure		
BAB		
	Characterisation 1	The nature of the fissure : — surface crack (A) – a crack only in the surface; — crack (B) – crack lines visible on the pipe wall, pieces still in place; — fracture (C) – crack visibly open in a pipe wall, pieces still in place.
	Characterisation 2	The orientation of the fissure: — longitudinal (A) – A crack or fracture which is mainly parallel to the axis of the pipe; — circumferential (B) – A crack or fracture which is mainly around the circumference of the pipe; — complex (C) - A group of cracks or fractures which cannot be described as longitudinal or circumferential; — helical (D); —  radiating from a point (star fissure) (E). 
	Quantification	The width of the fissure in millimetres.
	Circumferential location	The position should be recorded.
Break/Collapse		
BAC		
	Characterisation	The nature of the break or collapse: — break (A) – pieces of pipe visibly displaced but not missing; — missing (B) – missing pieces of wall; — collapse (C) – complete loss of structural integrity.

Table 4 (continued)

Main Code	Additional information	Description
	Quantification	$\overline{A_1}$ Where possible the length of the break or collapse is to be recorded. $\overline{A_1}$ The length of the break or collapse in millimetres where this is less than 1000 mm. NOTE Where the length is longer than 1 m longitudinal locations of the start and finish of the break or collapse are recorded in accordance with 8.1.7.
	Circumferential location	The position should be recorded.
Defective brickwork or masonry		
BAD		Individual bricks or masonry units from the fabric of a brick or masonry drain or sewer have moved from their original position.
	Characterisation 1	The extent of displacement: — displaced (A) – bricks or masonry units still present but displaced from their original position. — missing (B) – bricks or masonry units missing from their original position. — dropped invert (C) – A section of the invert of a brick or masonry pipeline has dropped in relation to the walls leaving a gap of more than 20 mm. — collapse (D) – complete loss of structural integrity.
	Characterisation 2	Where bricks or masonry units are missing : — another layer of brickwork or masonry visible (A) – though the hole left by the missing brickwork. — nothing is visible (B) – It is not possible to determine what is exposed by the missing brickwork or masonry. Where soil is visible, or a void is visible the codes BAO or BAP are also required.
	Quantification	For a dropped invert, the depth of drop in millimetres.
	Circumferential location	The position should be recorded.
Missing mortar		
BAE		All or part of the mortar from brickwork or masonry is missing.
	Quantification	The depth, in millimetres, from the surface of the brickwork or masonry to the surface of the mortar.
	Circumferential location	The position should be recorded.
Surface damage		
BAF		The surface of the pipeline has been damaged by chemical (including corrosion of metal pipes) or mechanical action.
	Characterisation 1	The type of damage:

Table 4 (continued)

Main Code	Additional information	Description
		— increased roughness (A); — spalling (breaking away of small fragments from the surface of the fabric) (B); — visible aggregate (C); — aggregate projecting from surface (D); — missing aggregate (E); — visible reinforcement (F); — reinforcement projecting from surface (G); — corroded reinforcement (H); — missing wall (I); — corrosion products on surface (J); — $\boxed{A_1}$ Blistering (internal bulge) (K); $\boxed{A_1}$ — $\boxed{A_1}$ other surface damage (Z) – where this is used further details shall be recorded in the remarks section. $\boxed{A_1}$
	Characterisation 2	$\boxed{A_1}$ The cause of the damage: — mechanical (A); — chemical - general (B); — chemical – damage in upper part of the pipe (C); — chemical – damage in lower part of the pipe (D); — cause not evident (E); — Other cause (Z) - where this is used further details shall be recorded in the remarks section. $\boxed{A_1}$
	Circumferential location	The position should be recorded.
Intruding connection		
BAG		A connecting pipe projecting into the pipeline, obstructing the cross-sectional area. Where this code is used, the connection code BCA is also required.
	Quantification	The length of the intrusion expressed as a percentage of the diameter or vertical dimension of the pipeline.
	Circumferential location	The position of the centre of the connection should be recorded.
Defective connection		
BAH		A connection is defective. Where this code is used the connection code BCA is also required.

Table 4 (continued)

Main Code	Additional information	Description
	Characterisation	Type of defect: — the position of the connection is incorrect (A); — there is a gap between the end of connecting pipe and the main pipe (B); — there is a partial gap (around part of the circumference of the connecting pipe) between the end of connecting pipe and the main pipe (C); — the connecting pipe is damaged (D); — the connecting pipe is blocked (E); — $\boxed{A_1}$ other (Z) – where this is used further details shall be recorded in the remarks section. $\langle A_1 \rangle$
	Circumferential location	The position of the centre of the connection should be recorded.
Intruding sealing material		
BAI		All or part of the material used to seal a joint between two adjacent pipes is intruding into the pipeline.
	Characterisation 1	The type of sealing material: — sealing ring (A); — $\boxed{A_1}$ other sealant (Z) – where this is used further details shall be recorded in the remarks section. $\langle A_1 \rangle$
	Characterisation 2	Where the seal is a ring, record whether it is loop : — visibly displaced but not intruding into the pipe (A); — $\boxed{A_1}$ intruding but not broken (B) – lowest point above the horizontal centreline; — intruding but not broken (C) – lowest point below the horizontal centreline; $\langle A_1 \rangle$ — $\boxed{A_1}$ intruding and broken (D). $\langle A_1 \rangle$
	Quantification	Where the seal is not a ring, the reduction in cross sectional area expressed as a percentage.
	Circumferential location	The position should be recorded. $\boxed{A_1}$ Where it is a sealing ring the start and finish references shall define the part of the cross section where the sealing ring is missing. $\langle A_1 \rangle$
Displaced joint		
BAJ		Adjacent pipes are displaced from their intended position in relation to each other. Longitudinal displacements of less than 10 mm shall not be recorded.
	Characterisation	The type of displacement: — longitudinal (A) – the pipes are displaced parallel to the line of the sewer;

Table 4 (continued)

Main Code	Additional information	Description
		— radial (B) – the pipes are displaced in a direction at right angles to the line of the sewer; — angular (C) – the axes of the pipes are not parallel.
	Quantification	The quantification measured as: — for longitudinal displacement - the distance between the end of the spigot and the inside of the socket of the adjacent pipe in millimetres. — for radial displacement – the distance of displacement in millimetres. — for angular displacements - the angle of displacement between the axes of the two pipes in degrees.
	Circumferential location	The direction of radial or angular displacement around the wall of the sewer. For example a radial displacement which appears as a step up in the invert in the direction of inspection should be 12 o'clock and a step down should be 6 o'clock. Similarly an angular displacement for an increase in upward gradient or a decrease in downward gradient vertically should be 12 o'clock.
A1 Lining observations A1		
BAK		A1 The lining of the pipeline is observed to have one of the following features. A1
	Characterisation 1	A1 The nature of the observation: A1 — the lining of the pipeline has become detached (A); — discolouration of the lining (B); — defective end of lining (C); — wrinkled lining (D); — A1 blistered or internal bulge of lining (E); A1 — A1 external bulge (F); — separation of the internal film/coating (G); — separation of seam covering (H); — crack or split (including weld failure) (I); — hole in lining (J); — lining connection defect (K); — lining material seems to be soft (L); — resin missing from laminate (M); — end of lining not sealed to host pipe or manhole (N); A1 — A1 other lining defect (Z) - where this is used further details shall be

Table 4 (continued)

Main Code	Additional information	Description
		recorded in the remarks section. $\langle A_1 \rangle$
	Characterisation 2	$\langle A_1 \rangle$ Where appropriate the orientation: — longitudinal (A) –mainly parallel to the axis of the pipe; — circumferential (B) –mainly around the circumference of the pipe; — complex (C); $\langle A_1 \rangle$ — $\langle A_1 \rangle$ helical (D). $\langle A_1 \rangle$
	Quantification	$\langle A_1 \rangle$ Where characterisation 1 is A, D, E or Z, the quantification is the reduction in cross-sectional area, expressed as a percentage. Where characterisation 1 is F the depth of the external bulge in mm. Where characterisation 1 is I the width of the crack or split in mm. Where characterisation 1 is J the length of the hole (along the axis of the pipe) in mm. $\langle A_1 \rangle$
	Circumferential location	The position should be recorded.
Defective repair		
BAL		A repair has been carried out on the drain or sewer which now has a defect. Where this code is used the point repair code BCB is also required. $\langle A_1 \rangle$ Where the repair is a localised lining (BCB B) code BAK should be used. $\langle A_1 \rangle$
	$\langle A_1 \rangle$ Characterisation 1 $\langle A_1 \rangle$	The type of defect: — part of the wall is missing (A); — a patch sealing a hole deliberately made in the pipe wall has become defective (B); — $\langle A_1 \rangle$ Separation of repair material from host pipe (C); — Missing repair material on contact surface (D); — excess repair material causing obstacle (E); — Hole in repair material (F); — Crack in repair material (G); $\langle A_1 \rangle$ — $\langle A_1 \rangle$ other (Z) – where this is used further details shall be recorded in the remarks section. $\langle A_1 \rangle$
	$\langle A_1 \rangle$ Characterisation 2	Where appropriate, the orientation: — longitudinal (A) – mainly parallel to the axis of the pipe; — circumferential (B) – mainly around the circumference of the pipe; — complex (C); — helical (D). $\langle A_1 \rangle$

Table 4 (continued)

Main Code	Additional information	Description
	 Quantification	Where characterisation 1 is C, E or Z, the quantification is the reduction in cross-sectional area, expressed as a percentage. Where characterisation 1 is G the width of the crack or split in mm. Where characterisation 1 is A, B, D or F the length of the hole (along the axis of the pipe) in mm. 
Weld failure		
BAM		A failure in a weld in the fabric of the pipeline.
	Characterisation	The orientation of the failure: — longitudinal (A) - A failure which is mainly parallel to the axis of the pipe; — circumferential (B) - A failure which is mainly around the circumference of the pipe; — helical (C).
	Circumferential location	 For longitudinal failures the position shall be recorded. For circumferential and helical failures record the start and finish points. 
Porous pipe		
BAN		The pipe material is seen to be porous  <i>deleted text</i>  .
	Circumferential location	The position should be recorded.
Soil visible through defect		
BAO		The soil outside the pipe is visible through a defect.
	 Circumferential location 	 The position should be recorded. 
Void visible through defect		
BAP		A void outside the pipe is visible through a defect.
	 Circumferential location 	 The position should be recorded. 

8.3 Codes relating to the operation of the pipeline

Table 5 — Details of codes relating to the operation of the pipeline

Main Code	Additional information	Description
Roots		
BBA		Roots of trees or other plants growing into the pipeline through joints, defects or connections.
	Characterisation	The type of root: — tap root (A); — independent fine roots (B);

		— complex mass of roots (C).
	Quantification	The reduction in cross-sectional area expressed as a percentage.
	Circumferential location	The position should be recorded.
Attached deposits		
BBB		Material attached to the wall of the pipeline.
	Characterisation	The type of material: — encrustation (A); — grease (B);

Table 5 (continued)

Main Code	Additional information	Description
		— fouling (C) (e.g. organisms attached to the wall of the pipe); — A1 other (Z) – where this is used further details shall be recorded in the remarks section. A1
	Quantification	The reduction in cross-sectional area expressed as a percentage.
	Circumferential location	The position should be recorded.
Settled deposits		
BBC		Deposited material in the invert of the pipeline.
	Characterisation	The type of material: — fine (A) (e.g. sand, silt); — coarse (B) (e.g. rubble, gravel); — hard or compacted material (C) (e.g. concrete); — A1 other (Z) – where this is used further details shall be recorded in the remarks section. A1
	Quantification	The depth of the deposit, as a percentage of the vertical dimension of the pipeline.
	Circumferential location	The position should be recorded.
Ingress of soil		
BBD		Soil from the surrounding ground is intruding into the pipeline.
	Characterisation	The type of soil: — sand (A); — peat (B); — fine material (e.g. clay, silt) (C); — gravel (D); — A1 other (Z) – where this is used further details shall be recorded in the remarks section. A1
	Quantification	The reduction in cross sectional area expressed as a percentage.
	Circumferential location	The position of the soil around the wall of the sewer should be recorded.
Other obstacles		
BBE		Objects in the pipeline, obstructing the cross-sectional area. This code shall only be used where none of the other codes (BBA to BBD) are applicable.
	Characterisation	The description of the obstacle:

Table 5 (continued)

Main Code	Additional information	Description
		— $\boxed{A_1}$ brick or masonry unit lying in invert (A); $\langle A_1 \rangle$ — $\boxed{A_1}$ pieces of drain or sewer pipe are lying in the invert (B); $\langle A_1 \rangle$ — another object lying in the invert (C); — protruding through the wall (D); — wedged in the joint (E); — entering through a connection/junction pipe (F); — external pipes or cables built through pipeline (G); — built into the structure (H); — $\boxed{A_1}$ other (Z) – where this is used further details shall be recorded in the remarks section. $\langle A_1 \rangle$
	Quantification	The reduction in cross-sectional area expressed as a percentage.
	Circumferential location	The position should be recorded.
Infiltration		
BBF		The ingress of water through the wall of the pipe or through joints or defects.
	Characterisation	$\boxed{A_1}$ The extent of the infiltration: $\langle A_1 \rangle$ — sweating (A) – slow ingress of water - no visible drips; — dripping (B) – dripping in - not continuous flow; — flowing (C) - a continuous flow; — gushing (D) – entering under pressure.
	Circumferential location	The position of the point/area of entry should be recorded.
Exfiltration		
BBG		Visible leakage of flow out of the pipeline.
	Circumferential location	Where visible, the circumferential location.
Vermin		
BBH		Vermin actually observed.
	Characterisation 1	The type of animal: — rat (A); — cockroach (B); — $\boxed{A_1}$ other (Z) – where this is used further details shall be recorded in the remarks section. $\langle A_1 \rangle$

Table 5 (continued)

Main Code	Additional information	Description
	Characterisation 2	The location of the vermin: — in the pipeline (A); — in a connection (B); — in an open joint (C); — A1 other (Z) – where this is used further details shall be recorded in the remarks section. A1
	Quantification	The number of animals observed at a single location.

8.4 Inventory codes

Table 6 — Details of inventory Codes

Main Code	Additional information	Description
Connection		
BCA		Another pipeline is connected to the pipeline being inspected. The employing authority may determine that where a connecting branch is equal to the size of the pipeline or where it is greater than a specified size, the location of a connection should be regarded as a node. It is assumed that the majority of connections recorded using this code will be circular in section.
	Characterisation 1	The type of connection: — junction (A) - a pipe unit with a prefabricated connection; — A1 saddle connection – drilled (B) - a connection made using a saddle fitting – neat hole (e.g. made with a drill); — saddle connection – chiselled (C) - a connection made using a saddle fitting - rough hole (e.g. made with a hammer and chisel); — plain connection – drilled (D) - a connection made without using any special fitting - neat hole (e.g. made with a drill); — plain connection – chiselled (E) - a connection made without using any special fitting – rough hole (e.g. made with a hammer and chisel); A1 — type of connection not evident (G); — A1 other (Z) – where this is used further details shall be recorded in the remarks section. A1

Table 6 (continued)

Main Code	Additional information	Description
	Characterisation 2	A code to indicate whether the connection has been closed. This may indicate a junction provided during construction for future use, or it may indicate that the connection has been cut off. The method of coding is: — connection open (A); — connection closed (B).
	Quantification 1	The height of the connecting pipe in millimetres.
	Quantification 2	The width of the connection in millimetres if different from the height.
	Circumferential location	The position of the centre of the connection should be recorded.
	Remarks	For non-circular sections, the shape.
Point repair		
BCB		A short section of drain or sewer has been repaired
	Characterisation	The type of repair: — pipe replaced (A); — $\boxed{A_1}$ localised lining of pipe (B); $\langle A_1 \rangle$ — injected mortar (C); — other injected sealing material (D); — hole repaired (E); — $\boxed{A_1}$ localised lining of connection (e.g. "top hat") (F); — other repair of connection (G); $\langle A_1 \rangle$ — $\boxed{A_1}$ other trenchless repair method (Z) – further details shall be recorded in the remarks section. $\langle A_1 \rangle$
	Circumferential location	The position should be recorded.
Curvature of sewer		
BCC		The route of the drain or sewer deviates by means of a prefabricated bend or deviation that does not take place at a joint (curved pipeline). $\boxed{A_1}$ This shall not be used for joint displacement – angular (code BAJ C). $\langle A_1 \rangle$
	Characterisation 1	The horizontal direction of the curvature: — left (A); — right (B).
	Characterisation 2	The vertical direction of the curvature: — up (A);

Table 6 (continued)

Main Code	Additional information	Description
		— down (B).
	Quantification	The total angle of deviation in degrees.
Start node type		
BCD		Information about the node at the start of the inspection.
	Characterisation	The type of node: — manhole (A); — inspection chamber (B); — rodding eye (C); — lamp hole (D); — outfall (E); — major connection without a manhole or inspection chamber (F); — special type defined by the employing authority (the employing authority may define a number of codes prefixed by an X (e.g. XA)); — $\boxed{A_1}$ other special chamber (Z) – further details shall be recorded in the remarks section. $\boxed{A_1}$
	Quantification 1	The node reference
	Quantification 2	The coordinates (grid reference) of the node.
	$\boxed{A_1}$ Longitudinal location	Where the reference point for the longitudinal location (see 8.1.7) is not the start of the pipe (i. e. the joint between the node and the first pipe unit) this point will not be evident from the coded information. The longitudinal location shall therefore record the location of the start of the pipe. $\boxed{A_1}$
Finish node		
BCE		Information about the node at the finish of the inspection
	Characterisation	The type of node: — manhole (A); — inspection chamber (B); — rodding eye (C); — lamp hole (D); — outfall (E); — major connection without a manhole or inspection chamber

Table 6 (continued)

Main Code	Additional information	Description
		(F); — special type defined by the employing authority (the employing authority may define a number of codes prefixed by an X (e.g. XA)); — $\overline{A_1}$ other special chamber (Z) – where this is used further details shall be recorded in the remarks section. $\overline{A_1}$
	Quantification 1	The node reference.
	Quantification 2	The coordinates (grid reference) of the node.
	$\overline{A_1}$ Longitudinal location	Where the reference point for the longitudinal location (see 8.1.7) is not the start of the pipe (i.e. the joint between the node and the first pipe unit) this point will not be evident from the coded information. The longitudinal location shall therefore record the location of the start of the pipe. $\overline{A_1}$

8.5 Other codes

Table 7 — Details of other codes

Main Code	Additional information	Description
General photograph		
BDA		A still photograph has been taken to record the general condition of the drain or sewer and is not related to a particular feature (see 8.1.8).
	Circumferential location	The direction of the camera if the camera is not forward facing.
General remark		
BDB		A remark which cannot be included in any other way.
	Remark	The text of the remark
[A₁] Inspection terminated before finish node [A₁]		
BDC		The inspection has been terminated before the intended finish node was reached. Where the reason is due to an obstruction this obstruction shall be coded separately using the appropriate main code. [A₁] NOTE If the inspection is restarted it is a new inspection. [A₁]
	[A₁] Characterisation 1 [A₁]	The reason for the termination: — obstruction (A); — high water level (B); — equipment failure (C); — [A₁] other (Z) – where this is used further details shall be recorded in the remarks section. [A₁]
	[A₁] Characterisation 2	Further characterisation as follows: — inspection objective achieved before reaching finish node (A); — inspection terminated on the instruction of the employing authority (B); — when considered with a previous partial inspection, the inspection of the whole pipeline is complete (C); — when considered with a previous partial inspection, the inspection of the whole pipeline is not complete (D); — when considered with a previous partial inspection, it is not known whether the inspection of the whole pipeline is complete (E); — other (Z) – where this is used further details shall be recorded in the remarks section. [A₁]
Water level		
BDD		The level of [A ₁] wastewater [A ₁] above the invert of the drain or sewer.
	Characterisation	[A₁] The wastewater in the pipe is: — clear effluent (the invert is visible) (A);

		— Use of code discontinued (B); — turbid (C); — coloured (D); — turbid and coloured (E). A_1
	Quantification	The level expressed as a percentage of the diameter or the vertical dimension.
A_1 Flow from incoming pipe A_1		
BDE		A_1 Information about the wastewater flowing from an incoming pipe. A_1 Where this is used the item for a connection (Code BCA) is also required.
	Characterisation 1	A_1 The wastewater flowing from the incoming pipe is: — clear effluent (the invert of the incoming pipe is visible) (A); — use of code discontinued (B); — turbid (C); — coloured (D); — turbid and coloured (E). — If the wastewater flowing from the incoming pipe is not visible because the water level in the main pipe is too high the characterisation code YY shall be used (see 8.1.3). A_1

Table 7 (continued)

Main Code	Additional information	Description
	Characterisation 2	The connecting pipe is: — wrongly connected because wastewater is observed discharging to a surface water drain or sewer (A); — wrongly connected because surface water is observed discharging to a wastewater drain or sewer (B); — not observed to be wrongly connected (C).
	Quantification	The water level in the connecting pipe, expressed as a percentage of the vertical dimension of the connecting pipe.
	Circumferential location	The position should be recorded.
Atmosphere within the pipeline		
BDF		A potentially hazardous atmosphere was encountered.
	Characterisation	The type of hazard detected as follows: — oxygen deficiency (A); — hydrogen sulfide (B); — methane (C); — A1 other (Z) – where this is used further details shall be recorded in the remarks section. A1
	Quantification 1	The percentage of the gas in the atmosphere, where this information is available.
	Quantification 2	Alternatively, the concentration of the gas in the atmosphere in ppm, where this information is available.
Loss of vision		
BDG		The view of the pipeline is obstructed.
	Characterisation	The reason for the obstruction: — camera is under water (A); — silt (B); — steam (C); — A1 other (Z) – where this is used further details shall be recorded in the remarks section. A1

9 Manholes and inspection chambers - Coding system

The coding system for manholes and inspection chambers is similar to that for drains and sewers. The details of coding are set out in 11.1. A separate report shall be prepared for each manhole or inspection chamber. The codes are of two main types.

- Header information - relating to the manhole or inspection chamber as a whole. This is described in clause 10 and annex D. Codes for these start with the letter C.
- Information about individual observations within the manhole or inspection chamber. This is described in clause 11. Codes for these start with the letter D.

10 Manholes and inspection chambers - Header information

10.1 Requirements

Header information is entered at the start of each inspection. The following information shall be recorded.

- a) The node identification of the manhole or inspection chamber.
- b) Textual description of the location.
- c) Type of node.
- d) The coding system.
- e) The vertical reference point (if recording vertical location).
- f) The circumferential reference point.
- g) The method of inspection.
- h) The date of inspection.
- i) Any other information required by the employing authority.

10.2 Other header information

Other information may include:

- type of location;
- name of employing authority;
- name of town, village, district or sewer system;
- land ownership;
- original coding system (if converted from another coding system);
- time of inspection;
- name of inspector;
- job reference;
- video image storage details;
- photograph image storage details;

- material;
- chamber unit length;
- type of effluent;
- year of construction
- access details;
- cover details;
- steps details;
- strategic importance;
- cleaning;
- precipitation ;
- temperature
- water level;
- flow control measures;
- atmosphere within the chamber;
- special hazards (e.g. syphons, sudden drops);
- pipe within a pipe;
- flap valves;
- barrier plates or beams.

Any changes to the header information identified during the course of the inspection shall be recorded.

A recommended coding system for the header information is given in annex D.

If the header information is coded in accordance with annex D, the recommended data transfer format described in annex B can be used.

11 Manholes and inspection chambers - Codes

11.1 Introduction

11.1.1 General

A1 Each observation shall be recorded using a main code or a combination of main codes (see 11.1.2) that broadly describes the feature, together with the following additional information where required. **A1**

- Characterisation - up to two codes which describes the feature in more detail (see 11.1.3).
- Quantification - up to two values which quantify the feature (see 11.1.4).
- Circumferential location - up to two clockface references which locate the position of the observation around the circumference (see 11.1.5).

- Joint - identifies when the observation is associated with a joint between two adjacent prefabricated units (see 11.1.6).
- The descriptive location - a code describing the part of the manhole or inspection chamber affected (e.g. chamber or benching) (see 11.1.7).
- The vertical location - the distance from the stated reference point, including a method of recording observations which continue over a significant length (see 11.1.8).
- Photograph reference (see 11.1.9).
- Video reference (see 11.1.10).
- Remarks - text which describes aspects of the observation which cannot be described any other way (see 11.1.11).

The employing authority may specify which observations are to be recorded and the amount of detail that is recorded for each observation (see 5.6).

An example of the record for a longitudinal crack at the circumferential reference point of the shaft of the manhole or inspection chamber, 1.5 metres from the vertical reference point, is shown in Table 8 (see 11.2):

Table 8

Vertical Location	Continuous Defect Code	Main Code	Characterisation		Quantification		Circumferential location		Joint	Descriptive location	Photo Ref	Video ref.	Remarks
			1	2	1	2	1	2					
1.5		DAB	B	A			12			C	1.5	00:10:30	

An example of the record for an 100 mm diameter intruding lateral connection to the chamber, (intruding 50 mm into the chamber) 2,25 metres from the vertical reference point is shown in Table 9.

NOTE Three codes are necessary to describe the feature (see 11.4 and 11.2).

Table 9

Vertical Location	Continuous Defect Code	Main Code	Characterisation		Quantification		Circumferential location		Joint	Descriptive location	Photo Ref.	Video ref.	Remarks
			1	2	1	2	1	2					
2.25		DCA	E		<node>	<node>	9			F		00:12:20	
2.25		DCG	A	A	100		9			F		00:12:20	
2.25		DAG			50		9			F		00:12:20	

11.1.2 Main code

The main codes which are used to describe the observations are listed in 11.2 to 11.5, together with a description of the observation and the use of the code. No observation shall be recorded without using one of these codes.

For clarity these codes have been grouped under 4 headings and the second letter indicates the respective group:

- Codes relating to the fabric of the manhole or inspection chamber (codes DA..);
- Codes relating to the operation of the manhole or inspection chamber (codes DB..);
- Inventory codes (codes DC..);
- Other codes. (codes DD..)

This is entirely for editorial purposes and the headings should not be used to interpret or otherwise restrict the meaning of the codes.

11.1.3 Characterisation

Codes are given to further describe the observation. Up to two types of characterisation are given for each observation type. They shall be recorded in the order in which they are given.

When required by the employing authority, and where an observation cannot be observed (for example if it is not possible to see corrosion in an uncleaned channel) the code YY shall be used as a first characterisation code.

Only characterisation codes listed in this standard may be used.

11.1.4 Quantification

Up to two values shall be recorded as specified in 11.2 to 11.5.

Unless these clauses specify the use of the two quantification values differently, the two values may be used to record a band, by specifying the lower and upper limits (e.g. 10% to 15%).

11.1.5 Circumferential location

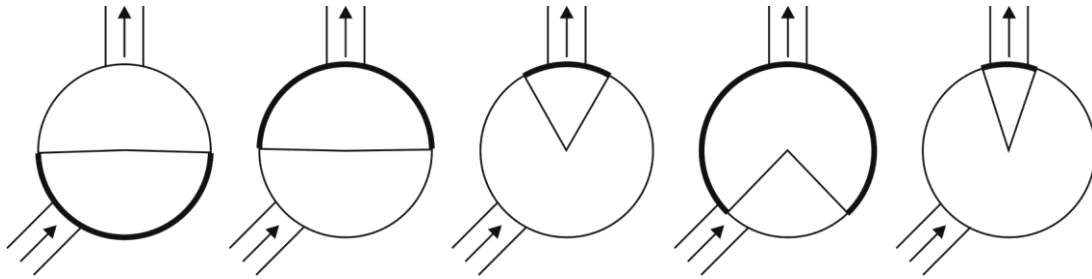
[A₁] Where specified in 11.2 to 11.5, the position of the observation around the circumference or sector of the area of the manhole or inspection chamber shall be recorded using the clockface reference with reference to the lowest outgoing pipeline. **[A₁]** Where more than one outgoing pipeline is at the same level, the reference should be to the largest of the pipes at the lowest level.

The clockface is determined from the angle subtended at the centre of the cross-section (the point defined by half the two horizontal dimensions of the cross section - see Figure 2) between the observation and the circumferential location of the lowest outgoing pipeline from the manhole or inspection chamber.

By defining the circumferential reference point, the employing authority determines whether the lowest outgoing pipeline is described as being at 6 o'clock or 12 o'clock (see 10 (f)). The circumferential reference point used shall be as stated in the header information as described in 10.1. Other details of the clockface reference system are as described in 8.1.5.

Examples of clockface references are given in Figure 4.

A1



Reference point	6 o'clock	09 03	03 09	05 07	02 10	06
	12 o'clock	03 09	09 03	11 01	08 04	12

A1

Figure 4 — Examples of clockface references in manholes and inspection chambers

Where an observation is repeated around the circumference of the manhole or inspection chamber at the same vertical location, each occurrence of the observation shall be coded separately.

11.1.6 Observation at joint

A1 Where an observation occurs at a joint between two adjacent prefabricated chamber units or between a chamber unit and another component (for example a cover slab, landing slab) this shall be recorded as using the code (A) where required. A1

11.1.7 Descriptive location

A1 The location of the observation within the manhole or inspection chamber shall be recorded as follows (see Figure 5): A1

- Cover and frame (A);
- Adjusting construction (B);
- Shaft (C);
- Taper (D);
- Reducing slab (E);
- Chamber (F);
- Landing (G);
- Benching (H);
- Channel (I);
- Invert (J).

A1

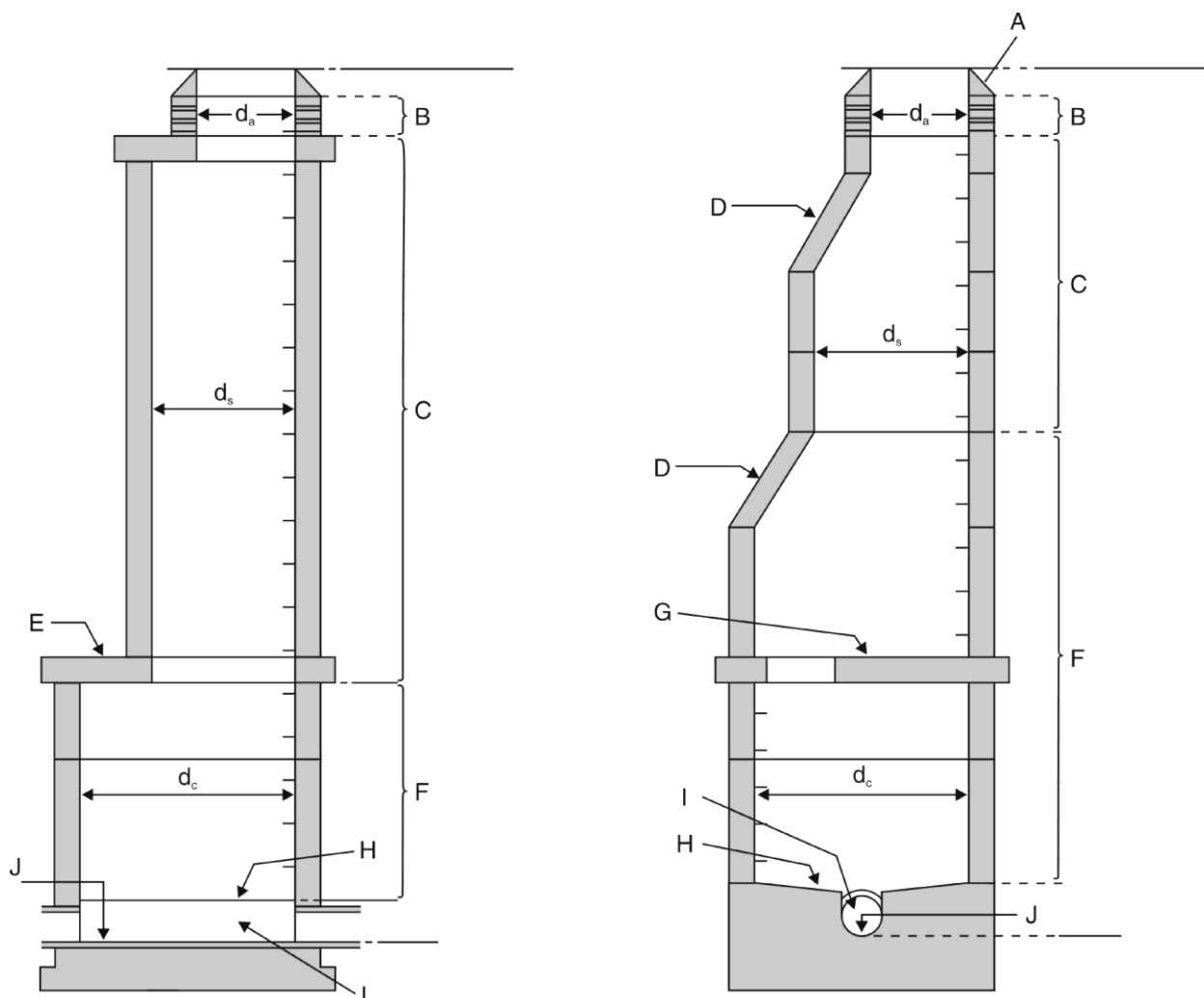


Figure 5 — Descriptive locations within manholes and inspection chambers ^{A1}

11.1.8 Vertical location

The location of each observation shall be specified by stating either:

- the distance from the vertical reference point,
- or the level related to an agreed national or local datum.

The reference point shall be specified in the header information and should be one of the following:

- the invert of the lowest outgoing pipeline in the manhole or inspection chamber;
- the top surface of the cover.

Measurements shall be recorded in metres to two decimal places.

Where observations continue over a distance of more than 1 m, the start and finish of the observation shall be recorded separately, using a continuous observation code containing A (start) or B (finish) and a number which identifies all references to the same observation.