NORDIC SEWER SYSTEM
INSPECTION MANUAL
PART 1: PIPELINES
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Title:

Nordic Sewer System Inspection Manual

Abstract:

The present manual includes standard definitions, pictures, and drawings for the purpose of describing observations of sewer systems provided by visual inspection. The overall objective is to describe how these inspections can be performed on an identical level in the Nordic countries.

The manual is a result of Nordic cooperation based on the requirement for a national annex for Sweden, Norway, Finland and Denmark to the European CEN standard: “Conditions of drain and sewer systems outside buildings – Part 2: Visual inspection coding system”, EN:13508-2:2003. A common Nordic annex to the CEN standard is a condition to protect the Nordic method for inspection based on classification of each observation.

It can be concluded to be a fact that the 4 Nordic countries had the same objectives for CCTV inspection reports, as well as nearly the same opinion concerning which observations stated in the CEN standard to be used in the respective countries. This manual causes changes in the existing national manuals, because of adding new types of observations to the manual.

Please notice that this manual only deals with inspection for main sewer pipes as well as renovated pipes. The manual is prepared in English language based on the CEN standard for the purpose of having an equal and common platform for national versions of CCTV – inspection manuals taking national options into account.
Preface

Present manual includes standard definitions, pictures, and drawings etc. for the purpose of describing observations of sewer systems provided by visual inspection (mainly CCTV-inspection). The overall objective is to describe how CCTV-inspections can be performed on an identical level in the Nordic countries.


Acknowledgement of this requirement in the Nordic countries resulted in applications for support for a common Nordic project concerning a common Nordic annex to the CEN standard. The annex is a condition to protect the Nordic method for inspection based on classification of each observation.

At the same point it was a fact that the 4 Nordic countries had the same objectives for CCTV inspection reports, as well as nearly the same opinion concerning which observations stated in the CEN standard to be used in the respective countries.

On this background it became an issue for representatives from the 4 countries to prepare a manual in English langue based on the CEN standard for the purpose of having an equal and common platform for national versions of CCTV – inspection manuals taking national options into account.

This manual causes changes in the existing national manuals, because of adding new types of observations to the manual.

Please notice that this manual only deals with inspection for main sewer pipes as well as renovated pipes. We do hope to be able to obtain financial support to enlarge the manual with inspections for service pipes as well as for manholes.

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The members of the working group would like to thank the Nordic Innovation Centre as well as Nordtest for their financial support to the project, from which two sources we have obtained half of the financing. The 4 national water associations have been responsible for the rest.

Bo Laden
Project manager
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1. General information

This Nordic inspection manual specifies a coding system for visual inspection of sewers in order to establish a uniform description of header information and observations under the inspection. The definitions of the codes are based on EN 13508-2 "Conditions of drains and sewers systems outside buildings, Part 2 Visual Inspection Coding System". This Nordic Sewer System Inspection manual also includes a practical grading system for observations. The purpose of the grading system is to create easy understandable overviews of the inspection results.

Alternatives in the coding system

In this manual alternative solutions are described for some observations. However, there are no differences in the basic definitions of the observations. The choices of alternatives among the Nordic countries are shown in Appendix E.

Header information

Header information are listed in chapter 2 and the definitions are described in Appendix A.

The following information shall be recorded according to the EN 13 508-2:

- The pipeline length identification
- A textual description of the location
- The direction of the inspection
- The coding system
- The longitudinal reference point
- The method of inspection
- The date of the inspection
- Whether the sewer was pre-cleaned
- Any other information required by the employing authority.

Additional Header information shall be specified by the employing authority or in National guidelines.

Changes in header information

There are two alternative ways for dealing with changes in header information for dimension, cross-section and material. (There are no differences in the definitions of the codes, only how to store data in databases and how to present the information on paper). The employing authority or national guidelines shall specify which alternatives are used.

The two alternatives are:

Alternative A1: The dimension, cross-section and material are described in the header information. The changes in dimension, cross-section and material are recorded by using the inventory codes for “Change in dimension”, “Change in shape of cross-section” or “Change in material”.

Alternative A2: The codes for dimension, cross-section and material are recorded in three separate columns parallel to the observation codes at the coding sheet. The original codes are recorded at the first row of the observations. Any changes in dimension, cross-section and material along the inspection are recorded in its respective column.
**Observation codes**

The coding system consists of a description of all observations combined with photos and illustrations. The observations have been grouped under 4 headings:

- Codes related to the fabric of the pipeline
- Codes related to the operation of the pipeline
- Inventory codes
- Other codes

Each observation is described by a **main code** comprising of maximum 3 letters. Most of the observations can be characterised in more details using a characterisation code of 1 or 2 letters. The codes are translated into the national languages.

The observations shall be recorded including longitudinal location and normally also circumferential location. When different observations occur at the same point, then each observation shall be recorded separately.

**Circumferential location**

When specified the position of the observation shall be recorded using the clockface reference. An observation to the right of the cross sectional area of the sewer would therefore be described as being at 3 o’clock. Up to two clockface references can be used in clockwise direction.

Examples of clockface references:

![Examples of clockface references](image)

**Longitudinal location**

The reference point for the longitudinal location of sewers is determined by the employing authority or national guidelines. The reference point can be:

- The centre of the starting manhole
- The midpoint of the incoming and outgoing pipes, measured along the channel in the starting manhole
- The centre of the manhole cover

Measurements shall be recorded in metres to one decimal place.

**Continuous observations**

Where an observation continues over more than 1 m, the start and the finish of the observation shall be recorded separately, using continuous observation code, (A for start and B for finish) and a numeric label which identifies all references to the same observation. For example the start of the first continuous observation can be marked with A1 and the finish of the first continuous observation can be marked with B1.

**Orientation of observations**

The orientation of observations can be given as:

- Longitudinal – an observation which is mainly parallel to the axes of the pipe
- Circumferential – an observation which is mainly around the circumference of the pipe
- Complex – an observation which cannot be described as longitudinal or circumferential
Defect codes

The codes related to the fabric of the pipeline or to the operation of the pipeline can also be described as defect codes. A grading system is used to describe the extent of the defects. The grades vary between 1-4, where grade 1 is a small defect and grade 4 is a severe defect.

For some defects, for instance “Defective reopening of connection”, several alternative observations can result in a specific grade. If more than one observation can be noticed than the highest corresponding grade shall be used.

Grades

The grading system for some of the defect codes are classified by using spans. Where the defects are described in relation to a percentage of the dimension or cross sectional area, than the following spans are used:

- Grade 1: $x \leq 5\%$
- Grade 2: $5\% < x \leq 15\%$
- Grade 3: $15\% < x \leq 30\%$
- Grade 4: $x > 30\%$

Later e.g. $5\% < x \leq 15\%$ has the same meaning as 5-15%

Measured values

If measurements of the observation are carried out then the measured value and the measuring unit shall be recorded. It shall also be stated under remarks whether the measured value is estimated, manually or digitally measured or if other methods have been used.

Remarks

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

Photos

A reference to identify any photographs or digital images shall be recorded against an observation wherever a photograph is taken.

Reports

A separate inspection report shall be produced for each pipeline length and each lateral inspection.

The employing authority shall specify whether the report shall be written on a coding sheet and/or in a digital data file. The data file format shall also be specified in accordance with the database used by the employing authority or in national guidelines.

Dimension

The dimension of any pipeline can be expressed as:

- The internal diameter for circular pipes
- In Danish egg shaped pipes as vertical diameter
- In other shapes as the horizontal measure with the largest vertical measure in remarks
2. Header information

Header information is entered at the start of the inspection. The information that shall be recorded is given under “General Information”. Additional header information’s are listed here and definitions are given in Appendix A.

Location of the inspection
- Employing authority
- Town or village
- Location
- Location type
- Direction of inspection
- Pipeline identification

Additional information of location for lateral inspections
- Longitudinal location of start of lateral
- Circumferential location of start of lateral

Inspection details
- Coding System
- Longitudinal reference point
- Method of inspection
- Date of inspection
- Time of inspection
- Name of inspector and company
- Inspector’s job reference
- Media storage details
- Photograph storage details
- Media volume reference
- Media image location system
- Purpose of inspection

Pipeline details
- Shape
- Height (If circular: dimension)
- Width (Not required if circular)
- Material
- Lining type
- Lining material
- Pipe unit length
- Use of sewer
- Cleaning

Other information
- Precipitation
- Temperature
- Flow control measures
- General remark
3. Observations

*Defect codes relating to the fabric of the pipeline*

**Deflection**

**Definition**

The cross-sectional shape of the pipeline has been deformed from its original shape.

**Grades**

1. Deformation is 5% or less of pipe dimension
2. Deformation is between 5 – 15% of pipe dimension
3. Deformation is between 15 – 30% of pipe dimension
4. Deformation is more than 30% of pipe dimension

**Characterisation**

- Vertical – the height of the pipeline has been reduced
- Horizontal – the width of the pipeline has been reduced
- Point deformation

**Inspection requirements**

For a point deformation the circumferential location shall be recorded.

**Measured value**

If the deformation is measured the reduction value shall be recorded.

**Guidelines**

The deformation is expressed as a percentage change in the dimension which reduces.

The code shall only be used for flexible pipes.

If the cause of the deformation is obvious it shall be recorded under remarks.

**Examples of different types of deformation:**

- Horizontal deformation
- Point deformation
- Vertical deformation
<table>
<thead>
<tr>
<th>Grades</th>
<th>Deformation, example photos</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Deformation is 5% or less of pipe dimension.</td>
</tr>
<tr>
<td>2</td>
<td>Deformation is between 5 – 15% of pipe dimension.</td>
</tr>
<tr>
<td>3</td>
<td>Deformation is between 15 – 30% of pipe dimension.</td>
</tr>
<tr>
<td>4</td>
<td>Deformation is more than 30% of pipe dimension.</td>
</tr>
</tbody>
</table>
Fissure (Alternative B1)

**Definition**
There is a visible fissure on the pipe wall but the shape of pipe has not been changed and all pieces are still in place.

**Grades**
1. A crack only in the surface
2. Crack lines visible on the pipe wall
3. Crack visibly open in a pipe wall
4. Not used

**Characterisation**
- Longitudinal
- Circumferential
- Complex

**Inspection requirements**
The circumferential location shall be recorded.

**Measured value**
If the width of the fissure is measured the value shall be recorded.

**Guidelines**
The width of fissure is expressed in mm.
<table>
<thead>
<tr>
<th>Grades</th>
<th>Fissure, example photos</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><img src="image1.jpg" alt="Image" /></td>
</tr>
<tr>
<td></td>
<td>A crack only in the surface.</td>
</tr>
<tr>
<td>2</td>
<td><img src="image2.jpg" alt="Image" /></td>
</tr>
<tr>
<td></td>
<td>Crack lines visibly on the pipe wall.</td>
</tr>
<tr>
<td>3</td>
<td><img src="image3.jpg" alt="Image" /></td>
</tr>
<tr>
<td></td>
<td>Crack visibly open in a pipe wall.</td>
</tr>
</tbody>
</table>
Break/Collapse (Alternative B1)

**Definition**

Pipeline is broken when pieces are displaced or missing.
The pipeline has collapsed when the shape of a rigid pipe has been changed.

**Grades**

1. Surface break
   - Spalling (breaking away of small fragments from the surfaces of the fabric)
   - All or part of the mortar from brickwork or masonry is missing
2. Break
   - Pieces of pipe visibly displaced but not missing
   - Bricks or masonry units still present but displaced from their original position
3. Missing
   - Missing pieces of wall
   - Bricks or masonry units missing from their original position
4. Collapse
   - Complete loss of structural integrity

**Characterisation**

**Inspection requirements**
The circumferential location shall be recorded.

**Measured value**

For grades 1, 2 and 3:
If measured the length of the break shall be recorded.

For grade 4:
If the collapse is measured the reduction shall be recorded.

**Guidelines**
The collapse is expressed as a percentage in the dimension which reduces.
Grades | Break/Collapse, example photos
---|---
1 | Surface break
2 | Break
3 | Missing
4 | Collapse.
Fissure/Break/Collapse (Alternative B2)

Definition

Fissure: There is a visible fissure on the pipe wall but the shape of pipe has not been changed and all pieces are still in place.

Break: Pieces of pipe visibly displaced but not missing.

Collapse: Complete loss of structural integrity.

Grades

1. • A crack only in the surface
   • Spalling or part of the brickwork is partly loose
2. • Crack visibly open in a pipe wall
   • Brickwork loose
3. • Pieces visibly displaced or missing pieces of wall (less than 4 hours)
   • Brick units missing from their original position
   • Deformation up to 15% in ridged pipes
4. • Collapse
   • Pieces visibly displaced or missing pieces of wall (more than 4 hours)
   • Fissure/break in flexible pipe or hose
   • Hole in flexible pipe or hose
   • More than 15% deformation in ridged pipes

Characterisation

• Longitudinal
• Circumferential
• Complex
• Spalling
• Break

Inspection requirements

The circumferential location shall be recorded.

Measured value

For grades 1, 2:
If the width of the fissure is measured, the value shall be recorded

For grades 3, 4:
If the length of break/collapse is measured value shall be recorded.

Guidelines

The width of fissure is expressed in mm.
<table>
<thead>
<tr>
<th>Grades</th>
<th>Fissure/Break/Collapse, example photos</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A crack only in the surface.</td>
</tr>
<tr>
<td>2</td>
<td>Crack visibly open in a pipe wall.</td>
</tr>
<tr>
<td>3</td>
<td>Pieces visibly displaced or missing pieces of wall.</td>
</tr>
<tr>
<td>4</td>
<td>Collapse.</td>
</tr>
</tbody>
</table>
Surface damage

Definition
The surface of the pipeline has been damaged by chemical action (including corrosion of metal pipes) or mechanical action.

Grades
1. Increased roughness
2. Visible aggregate,
   - missing glaze in clay pipes
   - starting rust in iron pipes
   - surface attack on brickwork
3. Missing aggregate or visible reinforcement, fissures may occur
   - scratches in plastic pipes
   - rust in iron pipes
   - brickwork porous and mortar missing
4. Missing wall

Characterisation

Inspection requirements
The circumferential location shall be recorded.

Measured value

Guidelines
<table>
<thead>
<tr>
<th>Grades</th>
<th>Surface damage, example photos</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Increased roughness.</td>
</tr>
<tr>
<td>2</td>
<td>Visible aggregate.</td>
</tr>
<tr>
<td>3</td>
<td>Missing aggregate or visible reinforcement.</td>
</tr>
<tr>
<td>4</td>
<td>Missing wall.</td>
</tr>
</tbody>
</table>
Manufacturing defect

Definition

A defect in the manufacturing (fabrication or installation) of the pipeline has been observed, e.g. porous pipe, lining defect or weld failure.

Grades

1. • The manufacturing defect causes a reduction in cross sectional area of 5% or less.
   • The extension of the defected section of the pipeline is less than a span of 2 hours above horizontal centreline.

2. • The manufacturing defect causes a reduction in cross sectional area of between 5 – 15%
   • The extension of the defected section of the pipeline is less than a span of 2 hours below horizontal centreline.

3. • The manufacturing defect causes a reduction in cross sectional area of between 15 – 30%
   • The extension of the defected section of the pipeline is in a span of 2-6 hours.

4. • The manufacturing defect causes a reduction in cross sectional area of more than 30%
   • The extension of the defected section of the pipeline is more than a span of 6 hours, e.g. more than half of the circumferential location.

Characterisation

• Longitudinal
• Circumferential
• Complex

Inspection requirements

The circumferential location of the observation shall be recorded.

Measured value

If the defect reduces the cross sectional area of the pipe, then the defect is expressed as the percentage reduction of cross sectional area.

Guidelines

A span of 2 hours is the same as 1/6 (60°) of the circumference of the pipe. A span of 6 hours is then same as half the circumference of the pipe (180°).

If possible the type of the manufacturing defect (e.g. porous pipe, white marks in plastic pipe, weld failure, wrinkles, loose inner foil, discoloured, other) shall be recorded in remarks.

In concrete pipes manufacturing defects are often observed as porous sections together with encrustation or infiltration.

The natures of the defects in lining of the pipeline are often discolouration, wrinkles, blistered lining or loose inner foil.

Wrinkles are measured as reduction of cross section area. Others are measured in hours.
### Grades

<table>
<thead>
<tr>
<th>Grade</th>
<th>Manufacturing defect, example photos</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The manufacturing defect causes a reduction in cross sectional area of 5 % or less. The extension of the defected section is less than a span of 2 hours above horizontal centreline.</td>
</tr>
<tr>
<td>2</td>
<td>The manufacturing defect causes a reduction in cross sectional area of between 5 – 15 %. The extension of the defected section is less than a span of 2 hours below horizontal centreline.</td>
</tr>
<tr>
<td>3</td>
<td>The manufacturing defect causes a reduction in cross sectional area of between 15 – 30 %. The extension of the defected section of the pipeline is in a span of 2-6 hours (example: porous pipe).</td>
</tr>
<tr>
<td>4</td>
<td>The manufacturing defect causes a reduction in cross sectional area of more than 30 %. The extension of the defected section of the pipeline is more than a span of 6 hours.</td>
</tr>
</tbody>
</table>
Intruding connection (Alternative C1)

**Definition**
A connecting pipe projecting into the pipeline, obstructing the cross-sectional area.

**Grades**
1. Connecting pipe is projecting 5 % or less of pipe dimension
2. Connecting pipe is projecting between 5 – 15 % of pipe dimension
3. Connecting pipe is projecting between 15–30 % of pipe dimension
4. Connecting pipe is projecting more than 30 % of pipe dimension

**Characterisation**

**Inspection requirements**
The circumferential location shall be recorded.

**Measured value**
If measured the length of the intrusion shall be recorded.

**Guidelines**
Where this code is used, the connection code is also required.
<table>
<thead>
<tr>
<th>Grades</th>
<th>Intruding connection, example photos</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Connecting pipe is projecting 5% or less of pipe dimension.</td>
</tr>
<tr>
<td>2</td>
<td>Connecting pipe is projecting between 5-15% of pipe dimension.</td>
</tr>
<tr>
<td>3</td>
<td>Connecting pipe is projecting between 15-30% of pipe dimension.</td>
</tr>
<tr>
<td>4</td>
<td>Connecting pipe is projecting more than 30% of pipe dimension.</td>
</tr>
</tbody>
</table>
Defective connection (Alternative C1)

**Definition**
A connection is defective.

**Grades**
1. Incorrect position (i.e. the position of the centre of the connecting pipe is below centre of main pipe, the slope of the connecting pipe is negative)
2. The direction of flow from the connecting pipe is against the flow direction in the main pipe
3. There is a partial gap between the end of connecting pipe and the main pipe (circumferential between the end of connecting pipe and the main pipe)
4. There is a gap between the end of connecting pipe and the main pipe (circumferential between the end of connecting pipe and the main pipe)

**Characterisation**

**Inspection requirements**
The circumferential location shall be recorded.

**Measured value**

**Guidelines**
Where this code is used, the connection code is also required.

Observations within the connecting pipe (damaged or blocked) shall be recorded under remarks or in a separate report.
Grades | Defective connection, example photos
---|---
1 | Incorrect position (i.e. the position of the centre of the connecting pipe is below centre of main pipe, the slope of the connecting pipe is negative).
2 | The direction of flow from the connecting pipe is against the flow direction in the main pipe.
3 | There is a partial gap between the end of connecting pipe and the main pipe (circumferential between the end of connecting pipe and the main pipe).
4 | There is a gap between the end of connecting pipe and the main pipe (circumferential between the end of connecting pipe and the main pipe).
Defective reopening of connection
(Alternative C1)

Definition
A connection in a lined pipeline is defectively reopened using a cutter from the inside of the pipe.

Grades
1. • Cut deviates 5 mm or less (other than junction)
   • Cut deviates 10 mm or less (junction)
   • Brush stripes in the surface of the glazing, but no cuts in host pipe material.
   • Small threads or shreds of lining material, inner foil etc.
2. • Irregular cut with notches
   • Visible cuts in original pipe material in rigid host pipe
   • Large threads or shreds of pipe lining material, inner foil etc.
3. • Cut deviates more than 5 mm (other than junction)
   • Cut deviates more than 10 mm (connection (junction)
   • Distinct cuts in host pipe material
   • Any cuts in original pipe material in flexible host pipe
   • Missing host pipe material behind the lining.
4. • No connection behind the opening
   • The connection is connected with the centreline below the horizontal centreline of the main pipe

Characterisation

Inspection requirements
The circumferential location of the centre of the connection shall be recorded.

Measured value
If the defect is measured the value shall be recorded.

Guidelines
Where this code is used, the connection code is also required.
This defect relates only to the main pipeline.
If the cut deviates then the deviation from the pipe wall of the connecting pipe to the cut shall be expressed in mm.
<table>
<thead>
<tr>
<th>Grades</th>
<th>Defective reopening of connection, example photos</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cut deviates less than 5-10 mm, no cut in host pipe, small threads</td>
</tr>
<tr>
<td>2</td>
<td>Irregular cut with notches, visible cuts in original pipe material in rigid host pipe or large threads or shreds of pipe lining material, inner foil etc.</td>
</tr>
<tr>
<td>3</td>
<td>Cut deviates more than 5-10 mm, distinct cuts in host pipe material, any cuts in original pipe material in flexible host pipe or missing host pipe material behind the lining</td>
</tr>
<tr>
<td>4</td>
<td>No connection behind the reopening</td>
</tr>
</tbody>
</table>
Defective transitional profile in connection (Alternative C1)

**Definition**
A relined connection, sealed by using a prefabricated transitional profile, is defective.

**Grades**
1. • Wrinkles or resin reduce the cross-sectional area of the main pipe or the connected pipe with 5 % or less
2. • Wrinkles or resin reduce the cross-sectional area of the main pipe or the connected pipe with 5 – 15%
3. • Wrinkles or resin reduce the cross-sectional area of the main pipe or the connected pipe with –15-30%
4. • Wrinkles or resin reduce the cross-sectional area of the main pipe or the connected pipe with more than 30%  
   • The transitional profile is not properly attached to or covering the cutting in the lining 
   • A gap is observed between the transitional profile and the lining 
   • Centreline of the connection is below the horizontal centreline of the main pipe

**Characterisation**
• Closed 
• Wrinkles 
• Resin 
• The transitional profile is not covering the cutting in the lining

**Inspection requirements**
The circumferential location of the centre of the connection shall be recorded.

**Measured value**
If the defect is measured the value shall be recorded.

**Guidelines**
This defect relates to the main pipeline and to the connecting pipeline until the first joint.

It shall be specified under remarks whether the observation applies to OPH or OPS.

Where this code is used, the connection code is also required.

If the defect reduces the cross-sectional area of the connecting pipe the defect is expressed as the reduction in cross-sectional area, expressed as a percentage.
<table>
<thead>
<tr>
<th>Grades</th>
<th>Defective transitional profile in connection, example photos</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Wrinkles or resin reduce the cross-sectional area of the main pipe or the connected pipe with 5 % or less.</td>
</tr>
<tr>
<td>2</td>
<td>Wrinkles or resin reduce the cross-sectional area of the main pipe or the connected pipe with 5 -15 %.</td>
</tr>
<tr>
<td>3</td>
<td>Wrinkles or resin reduce the cross-sectional area of the main pipe or the connecting pipe with 15 - 30%.</td>
</tr>
<tr>
<td>4</td>
<td>Wrinkles or resin reduce the cross-sectional area with more than 30 %, the transitional profile is not properly attached to the lining or a gap is observed between the transitional profile and the lining.</td>
</tr>
</tbody>
</table>
Intruding sealing material

Definition
All or part of the material used to seal a joint between two adjacent pipes is intruding into the pipeline.

Grades
1. • Sealing ring visibly displaced but not intruding into the pipe
   • Other sealing material is reducing the cross sectional area with 5 % or less
2. • Sealing ring broken
   • Other sealing material is reducing the cross sectional area with between 5 – 15 %
3. • Sealing ring hanging but not broken – lowest point above the horizontal centreline
   • Other sealing material is reducing the cross sectional area with between 15 – 30 %
4. • Sealing ring hanging but not broken – lowest point below the horizontal centreline
   • Other sealing material is reducing the cross sectional area with more than 30 %

Characterisation
• Sealing ring
• Other sealant

Inspection requirements
The circumferential location shall be recorded.

Measured value
If the intrusion of the sealant material other than ring is measured the reduction value shall be recorded.

Guidelines
Where the seal is not a ring, the intrusion, i.e. the reduction in cross sectional area, is expressed as a percentage.
<table>
<thead>
<tr>
<th>Grades</th>
<th>Intruding sealing material, example photos</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><img src="image1.png" alt="Image" /></td>
</tr>
<tr>
<td></td>
<td>Sealing ring visibly displaced but not intruding into the pipe. Other sealing material is reducing the cross sectional area with 5 % or less.</td>
</tr>
<tr>
<td>2</td>
<td><img src="image2.png" alt="Image" /></td>
</tr>
<tr>
<td></td>
<td>Sealing ring broken. Other sealing material is reducing the cross sectional area with between 5-15 %.</td>
</tr>
<tr>
<td>3</td>
<td><img src="image3.png" alt="Image" /></td>
</tr>
<tr>
<td></td>
<td>Sealing ring hanging but not broken – lowest point above the horizontal centreline. Other sealing material is reducing the cross sectional area with between 15-30 %.</td>
</tr>
<tr>
<td>4</td>
<td><img src="image4.png" alt="Image" /></td>
</tr>
<tr>
<td></td>
<td>Sealing ring hanging but not broken – lowest point below the horizontal centreline. Other sealing material is reducing the cross sectional area with more than 30 %.</td>
</tr>
</tbody>
</table>
Displaced joint (Alternative D1)

Definition
Adjacent pipes are displaced from their intended position in relation to each other.

Grades
1. • Longitudinal displacement is between 10-20 mm.
   • Radial displacement is 10 mm or less.
   • Angular displacement is 2 degrees or less.
2. • Longitudinal displacement is between 20-40 mm.
   • Radial displacement is between 10-20 mm.
   • Angular displacement is between 2-4 degrees.
3. • Longitudinal displacement is between 40-60 mm or sealing material is visible.
   • Radial displacement is between 20-30 mm.
   • Angular displacement is between 4-6 degrees or sealing material visible.
4. • Longitudinal displacement is more than 60 mm or soil visible through defect.
   • Radial displacement is more than 30 mm or soil visible through defect.
   • Angular displacement is more than 6 degrees or soil visible through defect.

Characterisation
• Longitudinal (i.e. pipes are displaced parallel to the line of the sewer)
• Radial (i.e. pipes are displaced in a direction at right angles to the line of the sewer)
• Angular (i.e. axes of the pipes are not parallel)

Inspection requirements
The circumferential location of visible sealing material or visible soil shall be recorded. The circumferential location of radial or angular displacement shall be recorded showing the direction of the radial displacement around the wall of the sewer.

Measured value
If the displacement is measured the value shall be recorded.

Guidelines
The longitudinal and radial displacement is expressed in mm. The angular displacement is expressed in degrees.

The longitudinal displacement is expressed as the distance between the end of the spigot and the inside of the socket of the adjacent pipe in mm. Longitudinal displacements of less than 10 mm shall not be recorded.

For example a radial or angular displacement which appears upward should be 12 o’clock and downward should be 6 o’clock.
<table>
<thead>
<tr>
<th>Grades</th>
<th>Displaced joint (Alternative D1), example photos</th>
</tr>
</thead>
</table>
| 1      | ![Example Photo 1](image1.png)  
Longitudinal displacement is between 10-20 mm, radial displacement is 10 mm or less or angular displacement is 2 degrees or less |
| 2      | ![Example Photo 2](image2.png)  
Longitudinal displacement is between 20-40 mm, radial displacement is between 10-20 mm or angular displacement is between 2-4 degrees. |
| 3      | ![Example Photo 3](image3.png)  
Longitudinal displacement is between 40-60 mm or sealing material is visible, radial displacement is between 20-30 mm or angular displacement is between 4-6 degrees or sealing material visible. |
| 4      | ![Example Photo 4](image4.png)  
Longitudinal displacement is more than 60 mm, radial displacement is more than 30 mm or angular displacement is more than 6 degrees or soil visible through defect. |
Displaced joint (Alternative D2)

Definition
Adjacent pipes are displaced from their intended position in relation to each other.

Grades

1. • The displacement is less than
   - ½ the thickness of the pipe wall in rigid pipes
   - 1/10 of the dimension in flexible pipes

2. • The displacement is between
   - ½ and 1/1 of the thickness of the pipe wall in rigid pipes
   - 1/10 and 1/6 of the dimension in flexible pipes

3. • The displacement is between
   - 1/1 and 2/1 of the thickness of the pipe wall in rigid pipes
   - more than 1/6 of the dimension in flexible pipes

4. • The displacement is more than 2/1 of the thickness of the pipe wall in rigid pipes or soil visible through defect.
   • A gap is observed in flexible pipes.
   • Revolving camera shows visible soil.

Characterisation
• Longitudinal
• Radial
• Angular

Inspection requirements
The circumferential location of angular displacement shall be recorded showing the direction of the angular displacement around the wall of the sewer.

Measured value
If the displacement is measured the value shall be recorded.

Guidelines
For example a radial or angular displacement which appears upward should be 12 o'clock and downward should be 6 o'clock.

With flexible pipe means: Steel pipes, singel wall plastic pipes, dubbel wall plastic pipes, profil plastic pipes.
Grades

**1**

The displacement is less than ⅛ the thickness of the pipe wall in rigid pipes or 1/10 of the dimension in flexible pipes.

**2**

The displacement is between ⅛ and ⅓ of the thickness of the pipe wall in rigid pipes or between 1/10 and 1/6 of the dimension in flexible pipes.

**3**

The displacement is between ⅓ and ⅔ of the thickness of the pipe wall in rigid pipes or more than 1/6 of the dimension in flexible pipes.

**4**

The displacement is more than ⅔ of the thickness of the pipe wall or soil visible through defect in rigid pipes or a gap is observed in flexible pipes.
Defective transitional or point repair component (Alternative E1)

**Definition**

A change in material, dimension, shape or point repair curvature of the pipeline is defective.

**Grades**

1. • Change in cross sectional area is 5 % or less.
   • The transition is smooth without leaks, (but) and without small partial gaps or (to a liner with) small notches, treads or shreds.

2. • Change in cross sectional area is **above** horizontal centreline and between 5 – 15 %
   • The transition is smooth without leaks, but with visibly partial gaps or (to a liner with) or small wrinkles, notches, treads or shreds.

3. • Change in cross sectional area is **below** horizontal centreline and between 5 – 15 %.
   • The transition is smooth without leaks, but with visibly partial gaps or (to a liner with) or small wrinkles, notches, treads or shreds.

4. • Change in cross sectional area is more than 15 %.
   • The transition is leaking
   • The liner is not properly attaches to the pipe wall.
   • Other transitions is leaking or with gap between the components.
   • No prefabricated transitional component is used in change of dimension, shape or curvature of the pipeline.

**Characterisation**

**Inspection requirements**

The circumferential location of the reduction in cross sectional area shall be recorded.

**Measured value**

If measured the reduction in cross-sectional area shall be recorded.

**Guidelines**

The type of change in construction (material, dimension, shape or curvature) shall be recorded under remarks.
<table>
<thead>
<tr>
<th>Grades</th>
<th>Defective transitional component, example photos</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><img src="image1.jpg" alt="Image 1" /> <img src="image2.jpg" alt="Image 2" /></td>
</tr>
<tr>
<td></td>
<td>The transition is smooth without leaks, but with small partial gaps, the transition to a liner is smooth without leaks, but with small notches, treads or shreds or change in cross sectional area is 5 % or less.</td>
</tr>
<tr>
<td>2</td>
<td><img src="image3.jpg" alt="Image 3" /> <img src="image4.jpg" alt="Image 4" /></td>
</tr>
<tr>
<td></td>
<td>The transition is smooth without leaks, but with visibly partial gaps, the transition to a liner is smooth without leaks, but with wrinkles, notches, treads or shreds or change in cross sectional area are above horizontal centreline and between 5 – 15 %.</td>
</tr>
<tr>
<td>3</td>
<td><img src="image5.jpg" alt="Image 5" /> <img src="image6.jpg" alt="Image 6" /></td>
</tr>
<tr>
<td></td>
<td>The transition is smooth without leaks, but with visibly partial gaps, the transition to a liner is smooth without leaks, but with wrinkles, notches, treads or shreds or change in cross sectional area is below horizontal centreline and between 5 – 15 %.</td>
</tr>
<tr>
<td>4</td>
<td><img src="image7.jpg" alt="Image 7" /> <img src="image8.jpg" alt="Image 8" /></td>
</tr>
<tr>
<td></td>
<td>The transition is leaking or with gap between the components, the liner is not properly attaches to the pipe wall, no prefabricated transitional component is used in change of dimension, shape or curvature of the pipeline or change in cross sectional area are more than 15 %.</td>
</tr>
</tbody>
</table>
Defect codes relating to the operation of the pipelines

Roots

Definition
Roots of trees or other plants growing into the pipeline through joints, defects or connections.

Grades
1. The reduction in cross-sectional area is 5 % or less
2. The reduction in cross-sectional area is between 5 – 15 %
3. The reduction in cross-sectional area is between 15 – 30 %
4. The reduction in cross-sectional area is more than 30 %

Characterisation
• Tap root
• Independent fine roots
• Complex mass of roots

Inspection requirements
The circumferential location shall be recorded.

Measured value
If measured the value shall be recorded.

Guidelines
The amount of roots is expressed as percentage reduction in cross-sectional area.

Roots can hide other observations.
The reduction in cross-sectional area is 5% or less

The reduction in cross-sectional area is between 5 – 15%

The reduction in cross-sectional area is between 15 – 30%

The reduction in cross-sectional area is more than 30%
Attached deposits

**Definition**
Material is attached to the wall of the pipeline.

**Grades**
1. The reduction in cross-sectional area is 5% or less
2. The reduction in cross-sectional area is between 5 – 15%
3. The reduction in cross-sectional area is between 15 – 30%
4. The reduction in cross-sectional area is more than 30%

**Characterisation**
- Encrustation
- Grease
- Fouling (e.g. organisms attached to the wall)
- Other, further details shall be recorded under remarks.

**Inspection requirements**
The circumferential location shall be recorded.

**Measured value**
If measured, the value shall be recorded.

**Guidelines**
The amount of attached deposits is expressed as percentage reduction in cross-sectional area.

Deposits can hide other observations.
Grades

1

The reduction in cross-sectional area is 5 % or less.

2

The reduction in cross-sectional area is between 5 – 15 %.

3

The reduction in cross-sectional area is between 15 – 30 %.

4

The reduction in cross-sectional area is more than 30 %.
Settled deposits

Definition
Deposited material in the invert of the pipeline.

Grades
1. The depth of the deposit is 5 % or less
2. The depth of the deposit is between 5 – 15 %
3. The depth of the deposit is between 15 – 30 %
4. The depth of the deposit is more than 30 %

Characterisation
- Fine (e.g. sand, silt)
- Coarse (e.g. rubble, gravel)
- Hard or compacted material (e.g. concrete)
- Sanitary waste
- Other, further details shall be recorded under remarks.

Inspection requirements
The circumferential location shall be recorded.

Measured value
If measured, the value shall be recorded.

Guidelines
The amount of settled deposits is expressed as the depth of the deposit, as a percentage of the vertical dimension.

Deposits can hide other observations.
<table>
<thead>
<tr>
<th>Grades</th>
<th>Settled deposits, example photos</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><img src="image1" alt="Image" /> The depth of the deposit is 5 % or less.</td>
</tr>
<tr>
<td>2</td>
<td><img src="image2" alt="Image" /> The depth of the deposit is between 5 – 15 %.</td>
</tr>
<tr>
<td>3</td>
<td><img src="image3" alt="Image" /> The depth of the deposit is between 15 – 30 %.</td>
</tr>
<tr>
<td>4</td>
<td><img src="image4" alt="Image" /> The depth of the deposit is more than 30 %.</td>
</tr>
</tbody>
</table>
Other obstacles

Definition
Objects in the pipeline, obstructing the cross-sectional area.

Grades
1. The reduction in cross-sectional area is 5 % or less
2. The reduction in cross-sectional area is between 5 – 15 %
3. The reduction in cross-sectional area is between 15 – 30 %
4. The reduction in cross-sectional area is more than 30 %

Characterisation
• Protruding though the wall
• Built into the structure
• Entering through a connection
• External pipes or cables built through pipeline
• Wedget in joint
• Other object lying in the invert, further details shall be recorded under remarks.

Inspection requirements
The circumferential location shall be recorded.

Measured value
If measured, the value shall be recorded.

Guidelines
The size of other obstacles is expressed as the percentage reduction in cross-sectional area.

This code shall only be used where none of the other codes are applicable.

If the obstacle is identified it shall be recorded under remarks.
<table>
<thead>
<tr>
<th>Grades</th>
<th>Other obstacles, example photos</th>
</tr>
</thead>
</table>
| 1      | ![Image](image1)  
**The reduction in cross-sectional area is 5 % or less.** |
| 2      | ![Image](image2)  
**The reduction in cross-sectional area is between 5 – 15 %.** |
| 3      | ![Image](image3)  
**The reduction in cross-sectional area is between 15 – 30 %.** |
| 4      | ![Image](image4)  
**The reduction in cross-sectional area is more than 30 %.** |
Infiltration

**Definition**
Ingress of water through the wall of a pipe or through joints or defects.

**Grades**
1. Sweating
2. Dripping
3. Flowing
4. Gushing

**Characterisation**

**Inspection requirements**
The circumferential location of the point / area of entry shall be recorded.

**Measured value**

**Guidelines**
If the reason for the infiltration is identified it shall be recorded under remarks.

If soil from the surrounding ground is intruding with the infiltrating water it shall be recorded under remarks.
Grades

1. Sweating.

2. Dripping.

3. Flowing.


Infiltration, example photos
Inventory codes

Connection (Alternative C1)

Definition
Another pipeline is connected to the pipeline.

Characterisation
- Junction – a pipe unit with a prefabricated connection
- Saddle connection – drilled – a connection made using a saddle fitting – hole made with a drill
- Saddle connection – chiselled – a connection made using a saddle fitting – hole made with a chisel
- Plain connection – drilled – a connection made without using any special fitting – hole made with a drill
- Plain connection – chiselled – a connection made without using any special fitting – hole made with a hammer and chisel
- Connection in relined pipeline – drilled – a connection reopened by using a cutter from the inside of the main pipe
- Rehabilitated connection – sealed – a connection is sealed by using a sealing material or a transitional profile e.g. a hatshaped saddle piece
- Other type of connection, further details shall be recorded under remarks.

Inspection requirements
The circumferential location of the centre of the connection shall be recorded.

Measured value
If measured the dimension of the connected pipe shall be recorded.

Guidelines
The diameter of the connected pipeline is expressed in mm.
Connection, example photos

Junction

Plain connection – drilled

Plain connection – chiselled

Saddle connection – drilled

Saddle connection – chiselled

Connection in relined pipeline – drilled

Rehabilitated connection – sealed

Other type of connection
## Connection closed (Alternative C1)

### Definition
A connection is closed.

### Characterisation

### Inspection requirements
The circumferential location shall be recorded.

### Measured value

### Guidelines
This may indicate a junction provided during construction for future use, or it may indicate that the connection has been cut off.

Where this code is used, the connection code is also required.
Connection closed, example photos
Junction (Alternative C2)

**Definition**
A pipeline is connected to the main pipe with a prefabricated junction pipe unit.

**Grades**
0. • Junction is connected with its centreline above the horizontal centreline of the main pipe.
1. • Junction is connected with its centreline below the horizontal centreline of the main pipe.
• Intruding lining or other things from junction
• Junction is connected in opposite direction of the flow.

**Characterisation**
• Closed
• Intruding

**Inspection requirements**
The circumferential location of the centre of the connection shall be recorded.

**Measured value**
If measured the dimension of the connected pipe shall be recorded.

**Guidelines**
<table>
<thead>
<tr>
<th>Grades</th>
<th>Junction, example photos</th>
</tr>
</thead>
</table>
| 0      | ![Image](image1.png)  
  Junction is connected with its centreline above the horizontal centreline of the main pipe |
| 1      | ![Image](image2.png)  
  Junction is connected with its centreline below the horizontal centreline of the main pipe or intruding lining or other things from junction |
Saddle connection (Alternative C2)

Definition

A pipeline is connected to the main pipe using a saddle fitting.

Grades

1. • Saddle fitting is placed in centre of the drilled hole.
   • Saddle fitting is connected with centreline above the horizontal centreline of the main pipe.

2. • Saddle fitting is displaced in relation to the centre of the drilled hole.
   • Irregular cut/drilled hole.
   • The cut/drilled hole is bigger than the dimension of the connection.

3. • Connection made with a chisel, not drilled.
   • A gap between the end of the saddle fitting and the main pipe is observed. Soil visible.
   • The connection is not tight.
   • Saddle fitting is connected with centreline below then horizontal centreline of the main pipe.
   • The connecting pipe and the main pipe does not reach each other.
   • Saddle fitting is connected with back slope.

Characterisation

• Closed
• Intruding
• The connecting pipe and the main pipe do not reach each other

Inspection requirements

The circumferential location of the centre of the connection shall be recorded.

Measured value

If measured the dimension of the connected pipe shall be recorded.

Guidelines
<table>
<thead>
<tr>
<th>Grades</th>
<th>Saddle connection, example photos</th>
</tr>
</thead>
</table>
| 1      | ![Image](image1.png)  
Saddle fitting is placed in centre of the drilled hole or saddle fitting is connected with centreline above the horizontal centreline of the main pipe. |
| 2      | ![Image](image2.png)  
Saddle fitting is displaced in relation to the centre of the drilled hole or saddle fitting is connected with centreline below then horizontal centreline of the main pipe. |
| 3      | ![Image](image3.png)  
Saddle fitting is displaced in relation to the centre of the drilled hole and untight or connection is made with a chisel, not drilled or saddle fitting is connected with back slope or a gap between the end of the saddle fitting and the main pipe is observed. |
Plain connection – chiselled (Alternative C2)

Definition
A pipeline is connected to the main pipe by hole made with a chisel.

Grades
1. • Connection pipe is intruding 5% or less of the dimension of the main pipe.
   • Centreline of the chiselled connection is above the horizontal centreline of the main pipe.

2. • Connection pipe is intruding 5-15 % of the dimension of the main pipe.
   • Centreline of the chiselled connection is below the horizontal centreline of the main pipe.

3. • Connection pipe is intruding 15-30 % of the dimension of the main pipe.

4. • Connection pipe is intruding more than 30 % of the dimension of the main pipe.
   • Partial gap around part of the circumference of the connecting pipe with soil or void visible.
   • Centreline of the chiselled connection is below the horizontal centreline of the main pipe.
   • The connecting pipe and the main pipe does not reach each other.

Characterisation
• Closed
• Intruding
• The connecting pipe and the main pipe does not reach each other.

Inspection requirements
The circumferential location of the centre of the connection shall be recorded.

Measured value
If measured the dimension of the connected pipe shall be recorded.

Guidelines
**Grades**

<table>
<thead>
<tr>
<th>Grades</th>
<th>Plain connection - chiselled, example photos</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><img src="image1" alt="Image" /> Connection pipe is intruding 5 % or less of the dimension of the main pipe or centreline of the chiselled connection is above the horizontal centreline of the main pipe.</td>
</tr>
<tr>
<td>2</td>
<td><img src="image2" alt="Image" /> Connection pipe is intruding 5-15 % of the dimension of the main pipe or centreline of the chiselled connection is below the horizontal centreline of the main pipe.</td>
</tr>
<tr>
<td>3</td>
<td><img src="image3" alt="Image" /> Connection pipe is intruding 15-30 % of the dimension of the main pipe.</td>
</tr>
<tr>
<td>4</td>
<td><img src="image4" alt="Image" /> Connection pipe is intruding more than 30 % of the dimension of the main pipe or partial gap around part of the circumference of the connecting pipe is not tighten and closed with concrete, the chiselled connection is connected with back slope or a gap between the end of connecting pipe and the main pipe is observed.</td>
</tr>
</tbody>
</table>
Plain connection – drilled (Alternative C2)

Definition
A pipeline is connected to the main pipe by hole made with a drill, and a rubber sealing.

Grades
1. • Centreline of the drilled connection is above the horizontal centreline of the main pipe.
   • Connection pipe is intruding 5 % or less of the dimension of the main pipe.
2. • Connection pipe is intruding 5-15 % of the dimension of the main pipe.
   • The rubber sealing is not attached smooth to the mainpipe.
   • A piece of rubberlip is visible on the surrounding of the connection pipe.
3. • Connection pipe is intruding 15-30 % of the dimension of the main pipe.
4. • Connection pipe is intruding more than 30 % of the dimension of the main pipe.
   • The socket piece is a shortcut pipe of concrete.
   • A gap between the connecting pipe and the main pipe is observed, soil visible.
   • Centreline of the drilled connection is below the horizontal centreline of the main pipe.
   • The connecting pipe and the main pipe do not reach each other.

Characterisation
• Closed
• Intruding
• The connecting pipe and the main pipe do not reach each other

Inspection requirements
The circumferential location of the centre of the connection shall be recorded.

Measured value
If measured the dimension of the connected pipe shall be recorded.

Guidelines
For some kind of connections it is the sealing, which is intruding.
Centrelines of the drilled connection is below the horizontal centreline of the main pipe or connection pipe is intruding 5 % or less of the dimension of the main pipe.

Connection pipe is intruding 5-15 % of the dimension of the main pipe.

Connection pipe is intruding 15-30 % of the dimension of the main pipe.

The socket piece is a shortcut pipe of concrete, connection pipe is intruding more than 30 % of the dimension of the main pipe or a gap between the end of connecting pipe and the main pipe is observed.
Reopening of connection (Alternative C2)

**Definition**
A connection in a lined pipeline is reopened from the main pipe.

**Grades**
1. • Regular cut without notches
   • Cut deviates 5 mm or less from the original dimension of the connection (not junction)
   • Cut deviates 10 mm or less from the original dimension of the connection (junction)
   • Brush stripes in the surface of the glazing, but no cuts in host pipe material.
   • Small threads or shreds of lining material, inner foil etc.
   • Centreline of the connection is above the horizontal centreline of the main pipe.
2. • Irregular cut with notches
   • Visible cuts in original pipe material in rigid host pipe
   • Large threads or shreds of pipe lining material, inner foil etc.
3. • Cut deviates more than 5 mm from the original dimension of the connection (not junction)
   • Cut deviates more than 10 mm from the original dimension of the connection (junction)
   • Distinct cuts in host pipe material
   • Any cuts in original pipe material in flexible host pipe
   • Missing host pipe material behind the lining.
4. • No connection behind the reopening
   • Centreline of the connection is below the horizontal centreline of the main pipe.

**Characterisation**
• Closed
• Intruding
• The connecting pipe and the main pipe do not reach each other
• Junction
• Saddle connection
• Plain connection – chiselled
• Plain connection - drilled

**Inspection requirements**
The circumferential location of the centre of the connection shall be recorded.

**Measured value**
If measured the dimension of the connected pipe shall be recorded.

**Guidelines**
If the old connection is intruding, it shall be recorded under remarks.
<table>
<thead>
<tr>
<th>Grades</th>
<th>Reopening of connection, example photos</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Regular cut without notches, small cuts deviates 5-10 mm or less, brush stripes in the surface of the glazing, but no cuts in host pipe material or small threads or shreds of lining material, inner foil etc.</td>
</tr>
<tr>
<td>2</td>
<td>Irregular cut with notches, visible cuts in original pipe material in rigid host pipe or large threads or shreds of pipe lining material, inner foil etc.</td>
</tr>
<tr>
<td>3</td>
<td>Cut deviates more then 5-10 mm, distinct cuts in host pipe material, any cuts in original pipe material in flexible host pipe or missing host pipe material behind the lining.</td>
</tr>
<tr>
<td>4</td>
<td>No connection behind the reopening</td>
</tr>
</tbody>
</table>
Transitional profile in connection (Alternative C2)

Definition
A relined connection is sealed by using a prefabricated transitional profile.

Grades
1. • Transitional profile is smooth and tight attached to the main pipe. Wrinkles or resin reduce the cross-sectional area of the main pipe or the connected pipe 5 % or less.
   • Centreline of the connection is above the horizontal centreline of the main pipe.
2. • Wrinkles or resin reduce the cross-sectional area of the main pipe or the connected pipe 5-15%.
3. • Wrinkles or resin reduce the cross-sectional area of the main pipe or the connected pipe with 15-30%.
4. • Wrinkles or resin reduce the cross-sectional area of the main pipe or the connected pipe with more than 30%.
   • The transitional profile is not properly attached to or covering the cutting in the lining.
   • A gap is observed between the transitional profile and the lining.
   • Centreline of the connection is below the horizontal centreline of the main pipe.

Characterisation
• Closed
• Wrinkles
• Resin
• The transitional profile is not properly attached or covering the cutting in the lining.

Inspection requirements
The circumferential location of the centre of the connection shall be recorded.

Measured value
If measured the dimension of the connected pipe shall be recorded.

Guidelines
It shall be specified under remarks whether the observation applies to OPH or OPS.

Where this code is used, the connection code is also required.
Grades | Transitional profile in connection, example photos
--- | ---
1 | ![Image](image1.png)
Wrinkles or resin reduce the cross-sectional area of the main pipe or the connected pipe with 5 % or less.
2 | ![Image](image2.png)
Wrinkles or resin reduce the cross-sectional area of the main pipe or the connected pipe with 5 - 15 %.
3 | ![Image](image3.png)
Wrinkles or resin reduce the cross-sectional area of the main pipe or the connected pipe with 15 - 30 %.
4 | ![Image](image4.png)
Wrinkles or resin reduce the cross-sectional area with more than 30 %, the transitional profile is not properly attached to the lining or a gap is observed between the transitional profile and the lining.
Point repair (Alternative E1)

Definition
A short section of sewer has been repaired.

Characterisation
- Pipe replaced
- Localised lining
- Injected mortar
- Other injected sealing material
- Hole repaired
- Other, further details shall be recorded under remarks.

Inspection requirements
The circumferential location shall be recorded.

Guidelines
If the end of the point repair is not visible use the observation change in material.

Start and stop of point repair is shown by contiuous observation.
Point repair, example photos

- Pipe replaced.
- Localised lining.
- Injected mortar.
- Other injected sealing material.
- Hole repaired.
**Curvature of sewer (Alternative E1)**

<table>
<thead>
<tr>
<th>Definition</th>
<th>The route of the sewer deviates by means of prefabricated bend or deviation that is not caused by angular displacements of joints. The total angle of the curvature is expressed in degrees.</th>
</tr>
</thead>
</table>
| Characterisation | • Prefabricated bend  
• Deviation caused by e.g. directional drilling |
| Inspection requirements | The circumferential location of the deviation shall be recorded showing the direction of the curvature around the wall of the sewer |
| Measured value | If measured then the total angle of deviation shall be recorded. |
| Guidelines | Circumferential location shows the direction of the curvature. (A curvature to the right shall then be 3 o’clock). |
Curvature of sewer, example photos
Change in shape of cross-section (E1)

**Definition**
There is a change of cross-section of sewer.
The new dimension is expressed in mm.

**Characterisation**
The shape of the new cross-section of the pipeline:
- Circular
- Rectangular
- Egg shaped
- Danish egg shape
- Eye shape
- Other

**Inspection requirements**

**Measured value**
If measured the new dimension shall be recorded.

**Guidelines**
Change in shape of cross-section, example photos

Circular

Rectangular

Egg shaped

Danish egg shape

Eye shaped
Change in material (E1)

Definition
There is a change in material of the sewer.

Characterisation
• Asbestos cement
• Brickwork
• Cast iron
• Clay
• Concrete
• Lining materials
• Plastics
• Others

Inspection requirements

Measured value

Guidelines
### Change in material, example photos

<table>
<thead>
<tr>
<th>Asbestos cement</th>
<th>Brickwork</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cast iron</td>
<td>Clay</td>
</tr>
<tr>
<td>Plastics</td>
<td>Lining materials</td>
</tr>
</tbody>
</table>

- Asbestos cement
- Brickwork
- Cast iron
- Clay
- Plastics
- Lining materials
Change in dimension (E1)

Definition
There is a change in dimension of the sewer.

Characterisation

Inspection requirements

Measured value
If measured the new dimension shall be recorded.

Guidelines
The new dimension is expressed in mm.
Change in dimension, example photos
Transitional component (Alternative E2)

**Definition**
A change in material, dimension, shape or curvature of the pipeline is observed.

**Grades**

0. • Prefabricated transitional component without notches and leaks.

1. • Change in cross sectional area is 5 % or less.  
   • The transition is smooth without leaks, and without small partial gaps or small notches, treads or shreds.

2. • Change in cross sectional area is **above** horizontal centreline and between 5 – 15 %.  
   • The transition is smooth without leaks, but with visibly partial gaps or small wrinkles, notches, treads or shreds.

3. • Change in cross sectional area is **below** horizontal centreline and between 5 – 15 %.  
   • The transition is smooth without leaks, but with visibly partial gaps or small wrinkles, notches, treads or shreds.

4. • Change in cross sectional area is more than 15 %.  
   • The transition is leaking.  
   • The liner is not properly attaches to the pipe wall.  
   • Other transitions is leaking or with gap between the components.  
   • No prefabricated transitional component is used in change of dimension, shape or curvature of the pipeline.

**Characterisation**
• Change in material  
• Change in dimension  
• Change in direction (curvature)  
• Change in shape

**Inspection requirements**
The circumferential location of the centre of the connection shall be recorded.

**Measured value**
If measured the dimension of the connected pipe shall be recorded.

**Guidelines**
<table>
<thead>
<tr>
<th>Grades</th>
<th>Transitional component, example photos</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Prefabricated transitional component without notches and leaks.</td>
</tr>
<tr>
<td>1</td>
<td>Change in cross sectional area is 5 % or less. Transition is smooth without leaks, but with small notches, treads or shreds or small partial gaps.</td>
</tr>
<tr>
<td>2</td>
<td>Change in cross sectional area is above horizontal centreline and between 5 – 15 %. Transition is smooth without leaks, but with wrinkles, notches, treads or shreds or with visibly partial gaps.</td>
</tr>
<tr>
<td>3</td>
<td>Change in cross sectional area is below horizontal centreline and between 5 – 15 %. Transition is smooth without leaks, but with wrinkles, notches, treads or shreds or with visibly partial gaps.</td>
</tr>
<tr>
<td>4</td>
<td>Change in cross sectional area is more than 15 % or the liner is not properly attaches to the pipe wall. Other transitions are leaking or with gap between the components or no prefabricated transitional component is used in change of dimension, shape or curvature of the pipeline.</td>
</tr>
</tbody>
</table>
Drop

Definition
Pipe entering a manhole at a higher level above the invert or the pipe is connected using a ramp

Characterisation
- Free drop into a channel
- Backdrop
- Internal drop pipe
- Ramp connection
- Other

Inspection requirements

Measured value

Guidelines

Free drop

Backdrop

Internal drop pipe

Ramp
Drop, example photos

Free drop into a channel

Backdrop

Internal drop pipe

Ramp connection
Other Codes

Inspection abandoned

Definition
The inspection has been terminated before the intended finish node was reached.

Characterisation
• Obstruction
• High water level
• Equipment failure
• Other, further details shall be recorded under remarks.

Guidelines
Where the reason is due to an obstruction this obstruction shall be coded separately using the appropriate main code.
**Water level**

**Definition**
The level of sewage above the invert of the sewer.

**Characterisation**

**Inspection requirements**

**Measured value**
If measured the value of the water level shall be recorded in a separate field.

**Guidelines**
The level expressed as a percentage of the vertical dimension.

Levels under 10 % shall also be recorded.
Flow in incoming pipe

Definition

A flow is observed in an incoming pipe.

Characterisation

Inspection requirements

Measured value

If measured the level shall be recorded.

Guidelines

The water level in the connecting is expressed as a percentage of the vertical dimension of the connecting pipe.

If the reason for the flow is identified it shall be recorded under remarks.

Where this code is used the code for connection is also required.
Loss of vision

Definition
The view of the pipeline is obstructed.

Characterisation
- Camera is under water
- Steam
- Dirt on the lens
- Other, further details shall be recorded under remarks.

Inspection requirements

Measured value

Guidelines
4. References

International Standards


Denmark


Regler og tekniske bestemmelser for Danske TV-inspektionsfirmaers Kontrollordning.


Finland


Norway


Sweden

TV-inspektion av avloppedsledningar i mark – Handbok med anvisningar och fotoexempel, Svenskt Vatten 1994, ISSN 0347 1799,
APPENDIX A: Description of header information

Pipeline identification

The employing authority specifies alternative F1, F2 or F3.

**Alternative F1:**

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipeline length</td>
<td>The pipeline length reference as specified by the employing authority.</td>
</tr>
<tr>
<td>reference</td>
<td></td>
</tr>
<tr>
<td>Start node reference</td>
<td>The node reference of the start node as specified by the employing authority.</td>
</tr>
</tbody>
</table>

**Alternative F2:**

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Node 1 reference</td>
<td>The node reference of the first node as specified by the employing authority.</td>
</tr>
<tr>
<td>Node 2 reference</td>
<td>The node reference of the second node as specified by the employing authority.</td>
</tr>
</tbody>
</table>

**Alternative F3:**

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Node 1 reference</td>
<td>The node reference of the first node as specified by the employing authority.</td>
</tr>
<tr>
<td>Node 2 reference</td>
<td>The node reference of the second node as specified by the employing authority.</td>
</tr>
<tr>
<td>Start node reference</td>
<td>The node reference of the start node as specified by the employing authority.</td>
</tr>
</tbody>
</table>

Description of the client and the location of the site

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employing authority</td>
<td>The name of the employing authority.</td>
</tr>
<tr>
<td>Town or village</td>
<td>The name of the town, village as specified by the employing authority.</td>
</tr>
<tr>
<td>Location</td>
<td>A description of the location of the sewer (e.g. street name)</td>
</tr>
<tr>
<td>Location type</td>
<td>The type of location of the drain or sewer (e.g. In a road, pedestrian area, field)</td>
</tr>
<tr>
<td>Longitudinal location</td>
<td>The longitudinal location, along the main pipeline, of the connection between the start of the lateral and the main pipeline in metres.</td>
</tr>
<tr>
<td>of start of lateral</td>
<td></td>
</tr>
<tr>
<td>Circumferential location</td>
<td>The circumferential location, around the main pipeline, of the connection between the start of the lateral pipeline and the main pipeline.</td>
</tr>
<tr>
<td>of start of lateral</td>
<td></td>
</tr>
<tr>
<td>Direction of inspection</td>
<td>The direction of inspection as follows:</td>
</tr>
<tr>
<td></td>
<td>• downstream</td>
</tr>
<tr>
<td></td>
<td>• upstream</td>
</tr>
<tr>
<td></td>
<td>• not known</td>
</tr>
</tbody>
</table>
## Inspection details

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standard</strong></td>
<td>The version of the standard used to record data.</td>
</tr>
</tbody>
</table>
| **Longitudinal reference point** | The point of reference for the longitudinal location as follows:  
• the inside face of the starting manhole  
• the end of the incoming pipe  
• the centre of the manhole  
• the midpoint of the incoming and outgoing pipes, measured along the channel  
• the centre of the cover  
• other – further details should be recorded using a general remark code immediately following |
| **Method of inspection**      | The method of access as follows:  
• direct inspection by an inspector walking through the pipeline  
• CCTV-camera  
• inspection from manhole only  
• other – Further details shall be recorded in the remarks section. |
| **Date of inspection**        | CCYY-MM-DD                                                                                                                                                                                                  |
| **Time of inspection**        | hh:mm                                                                                                                                                                                                       |
| **Name of inspector**         | Name of inspector and company                                                                                                                                                                               |
| **Inspectors job reference**  | The inspector’s job reference code.                                                                                                                                                                           |
| **Media image storage**       | The type of media used for storing images as follows:  
• VHS video cassette tape  
• CD, DVD  
• Other, further details should be recorded using a general remark code immediately following |
| **Photograph image storage**  | The type of media used for storing images as photographs and computer images.                                                                                                                                  |
| **Media volume reference**    | The reference number of the volume, film, tape, CD or DVD.                                                                                                                                                   |
| **Media image location system** | For moving images, the method of recording the position on the tape, CD or DVD shall be recorded as follows:  
• recording time in hours and minutes since the start of the tape  
• a machine dependant numeric counter  
• other - further details should be recorded using a general remark code immediately following |
| **Purpose of inspection**     | The purpose of the inspection:  
• final control of new construction  
• end of warranty period  
• routine inspection of condition  
• suspected structural problem  
• suspected operational problem  
• suspected infiltration problem  
• final control of renovation or repair  
• transfer of ownership  
• investment planning  
• sample survey  
• other - further details should be recorded using a general remark code immediately following |
## Pipeline details

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shape</td>
<td>The shape of the cross-section of the pipeline as follows:</td>
</tr>
<tr>
<td></td>
<td>• circular</td>
</tr>
<tr>
<td></td>
<td>• rectangular</td>
</tr>
<tr>
<td></td>
<td>• egg shaped</td>
</tr>
<tr>
<td></td>
<td>• danish egg shaped</td>
</tr>
<tr>
<td></td>
<td>• eye shaped</td>
</tr>
<tr>
<td></td>
<td>• other – further details should be recorded using a general remark code immediately following</td>
</tr>
<tr>
<td>Height</td>
<td>The height of the section in millimetres</td>
</tr>
<tr>
<td>Width</td>
<td>The width of the section in millimetres (not required if circular)</td>
</tr>
<tr>
<td>Material</td>
<td>The material of the pipeline:</td>
</tr>
<tr>
<td></td>
<td>• Asbestos cement</td>
</tr>
<tr>
<td></td>
<td>• Brickwork</td>
</tr>
<tr>
<td></td>
<td>• Cast iron</td>
</tr>
<tr>
<td></td>
<td>• Clay</td>
</tr>
<tr>
<td></td>
<td>• Concrete</td>
</tr>
<tr>
<td></td>
<td>• Plastics</td>
</tr>
<tr>
<td></td>
<td>• Others</td>
</tr>
<tr>
<td></td>
<td>Where the pipeline has been lined the material recorded is the material of the original pipeline.</td>
</tr>
<tr>
<td>Lining type</td>
<td>The method of lining:</td>
</tr>
<tr>
<td></td>
<td>• lining inserted during manufacture</td>
</tr>
<tr>
<td></td>
<td>• sprayed lining</td>
</tr>
<tr>
<td></td>
<td>• cured in place lining</td>
</tr>
<tr>
<td></td>
<td>• segmental lining</td>
</tr>
<tr>
<td></td>
<td>• lining with discrete pipes</td>
</tr>
<tr>
<td></td>
<td>• lining with continuous pipes</td>
</tr>
<tr>
<td></td>
<td>• close fit lining</td>
</tr>
<tr>
<td></td>
<td>• spirally wound lining</td>
</tr>
<tr>
<td></td>
<td>• other – further details should be recorded using a general remark code immediately following</td>
</tr>
<tr>
<td>Lining material</td>
<td>The lining material if possible to describe.</td>
</tr>
<tr>
<td>Pipe unit length</td>
<td>The length in millimetres of individual pipe units which comprise the pipeline.</td>
</tr>
<tr>
<td>Use of sewer</td>
<td>The use of the drain or sewer system as follows:</td>
</tr>
<tr>
<td></td>
<td>• only wastewater</td>
</tr>
<tr>
<td></td>
<td>• only surface water</td>
</tr>
<tr>
<td></td>
<td>• combined drain or sewer</td>
</tr>
<tr>
<td></td>
<td>• trade effluent sewer</td>
</tr>
<tr>
<td></td>
<td>• culverted watercourse</td>
</tr>
<tr>
<td></td>
<td>• other – further details should be recorded using a general remark code immediately following</td>
</tr>
<tr>
<td>Cleaning</td>
<td>Whether the drain or sewer was cleaned prior to the inspection:</td>
</tr>
<tr>
<td></td>
<td>• cleaned</td>
</tr>
<tr>
<td></td>
<td>• not cleaned</td>
</tr>
</tbody>
</table>
Other information

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precipitation</td>
<td>The precipitation as follows:</td>
</tr>
<tr>
<td></td>
<td>• no precipitation</td>
</tr>
<tr>
<td></td>
<td>• rain</td>
</tr>
<tr>
<td></td>
<td>• melting snow</td>
</tr>
<tr>
<td>Temperature</td>
<td>The temperature in Celsius.</td>
</tr>
<tr>
<td>Flow control measures</td>
<td>The measures taken to deal with the flow at the time of the inspection:</td>
</tr>
<tr>
<td></td>
<td>• no measure taken</td>
</tr>
<tr>
<td></td>
<td>• flows have been blocked upstream</td>
</tr>
<tr>
<td></td>
<td>• flows partially blocked upstream</td>
</tr>
<tr>
<td></td>
<td>• other - further details should be recorded using a general remark code immediately following</td>
</tr>
<tr>
<td>General remark</td>
<td>A remark which cannot be included in any other way.</td>
</tr>
</tbody>
</table>
# APPENDIX B: Glossary: Terms in English, Danish, Finnish, Norwegian and Swedish

<table>
<thead>
<tr>
<th>English</th>
<th>Danish</th>
<th>Finnish</th>
<th>Norwegian</th>
<th>Swedish</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attached deposits</td>
<td>Udfældning</td>
<td>Saostuma</td>
<td>Utfelling / belegg</td>
<td>Utfällning</td>
</tr>
<tr>
<td>Break/Collapse</td>
<td>Brud/sammanstyrting</td>
<td>Putkirikko/sortuma</td>
<td>Sprukket rør</td>
<td>Rörbrott/kollaps</td>
</tr>
<tr>
<td>Brickwork</td>
<td>Murværk af tegl</td>
<td>Tiilistä muurattu</td>
<td>Teglstein</td>
<td>Murverk av tegel</td>
</tr>
<tr>
<td>Change in dimension</td>
<td>Dimensionsændring</td>
<td>Koko muuttuu</td>
<td>Dimensjonsendring</td>
<td>Dimensionsändring</td>
</tr>
<tr>
<td>Change in material</td>
<td>Materialeændring</td>
<td>Materiaali muuttuu</td>
<td>Materialendring</td>
<td>Materialändring</td>
</tr>
<tr>
<td>Change in shape of cross-section</td>
<td>Tværsnitsændring</td>
<td>Muoto muuttuu</td>
<td>Tverrsnittsendring</td>
<td>Tvärsnittsändring</td>
</tr>
<tr>
<td>Circumferential location</td>
<td>Urreferance</td>
<td>Sijainti putken kehällä</td>
<td>Urviser-referanse</td>
<td>Klockreferens</td>
</tr>
<tr>
<td>Complex</td>
<td>Sammensat</td>
<td>Vaihteleva</td>
<td>Kompleks</td>
<td>Utbredd</td>
</tr>
<tr>
<td>Connection</td>
<td>Tilslutning</td>
<td>Liittymä</td>
<td>Tilkopling</td>
<td>Anslutning</td>
</tr>
<tr>
<td>Connection closed</td>
<td>Afproppet tilslutning</td>
<td>Suljettu liittymä</td>
<td>Plugget tilkoping</td>
<td>Proppad anslutning</td>
</tr>
<tr>
<td>Continuous observations</td>
<td>Kontinuert observation</td>
<td>Jatkuva havainto</td>
<td>Strekningsobservasjon</td>
<td>Utbredd observation</td>
</tr>
<tr>
<td>Curvature of sewer</td>
<td>Kurvet ledningsføring</td>
<td>Viemäri kaartaa</td>
<td>Retningsendring</td>
<td>Böjd rördragning</td>
</tr>
<tr>
<td>Defect codes</td>
<td>Fejkode/observationskode</td>
<td>Vikahavainnot (koodit)</td>
<td>Feilkoder</td>
<td>Feilkoder</td>
</tr>
<tr>
<td>Defective change in construction</td>
<td>Defekt overgang</td>
<td>Viallinen muutoskohta</td>
<td>Feil ved konstruksjons-endring i røret</td>
<td>Defekt rörövergång</td>
</tr>
<tr>
<td>Defective connection</td>
<td>Defekt tilslutning</td>
<td>Viallinen liittymä</td>
<td>Tilkoplingsfeil</td>
<td>Defekt anslutning</td>
</tr>
<tr>
<td>Defective transitional component</td>
<td>Defekt overgangsprofil</td>
<td>Viallinen muutososa</td>
<td>Defekt overgangsdel</td>
<td>Felaktig övergång</td>
</tr>
<tr>
<td>Defective reopening of connection</td>
<td>Defekt stikåbning</td>
<td>Virheellinen liittymän avaus (saneeratussa viemärissä)</td>
<td>Defekt gjenåpning av tilkoping</td>
<td>Defekt uppskärning av anslutning</td>
</tr>
<tr>
<td>Defective transitional profile in connection</td>
<td>Defekt overgangsprofil (hattprofil)</td>
<td>Viallinen hattprofilli liittymässä (saneeratussa viemärissä)</td>
<td>Defekt hattprofil</td>
<td>Defekt övergångsprofil i anslutning (hattprofil)</td>
</tr>
<tr>
<td>Deformation</td>
<td>Deformation</td>
<td>Muodonmuutos</td>
<td>Deformasjon</td>
<td>Deformation</td>
</tr>
<tr>
<td><strong>English</strong></td>
<td><strong>Danish</strong></td>
<td><strong>Finnish</strong></td>
<td><strong>Norwegian</strong></td>
<td><strong>Swedish</strong></td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>-----------------------------------</td>
<td>------------------------------------</td>
<td>--------------------------------------</td>
<td>-------------------------------------</td>
</tr>
<tr>
<td>Displaced joint, angular</td>
<td>Vinkeldrejning i samling</td>
<td>Kulmapoikkeama</td>
<td>Vinkelendring</td>
<td>Vinkeländring</td>
</tr>
<tr>
<td>Displaced joint, longitudinal</td>
<td>Åben samling</td>
<td>Avoin liitos</td>
<td>Lengdeforskjøvet skjøtt</td>
<td>Långsforskjutning</td>
</tr>
<tr>
<td>Displaced joint, radial</td>
<td>Forskudt samling</td>
<td>Poikkisirtymä</td>
<td>Tverrforskjøvet skjøtt</td>
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<td>Vann fra stikkledning</td>
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<td>Kasvusto</td>
<td>Biofilm</td>
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<td>Administrative detaljer</td>
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<td>Vesijuoksu</td>
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<td>Foring</td>
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<td>Mitattu arvo</td>
<td>Målte verdier</td>
<td>Mått värde</td>
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<td>Vieras esine/este</td>
<td>Hindring</td>
<td>Annat hinder</td>
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<td>Punktreparation</td>
<td>Paikallinen korjaus</td>
<td>Punktreparasjon</td>
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<td>Sade</td>
<td>Avrenning</td>
<td>Nederbörd</td>
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<td>Sedimenter</td>
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<td>Korrosion/overfladeskade</td>
<td>Pintavaurio</td>
<td>Korrosjon / Slitasje</td>
<td>Ytukada</td>
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<td>Muutososa</td>
<td>Overgangsdel</td>
<td>Övergängskomponent</td>
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<td>Vand(niveau)</td>
<td>Putken täyttöaste</td>
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<td>Avskalling</td>
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### OBSERVATION CODES

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<th>LOCATION (m)</th>
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<th>OPERATIONAL RELATED</th>
<th>INVENTORY CODES</th>
<th>OTHER CODES</th>
<th>CIRCUMFERENTIAL LOCATION</th>
<th>MEASURED VALUE</th>
<th>REMARKS</th>
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</table>

**OBSERVATION CODES**

- **FABRIC RELATED**
- **OPERATIONAL RELATED**
- **INVENTORY CODES**
- **OTHER CODES**
- **CIRCUMFERENTIAL LOCATION**
- **MEASURED VALUE**

**REMARKS**

**Documentation:** 4 EN-13508-2:2003

**Location of laterals:**

- Start node: __________  __________
- End node: __________  __________

- Longitudinal: __________
- Circumferential: __________

**Location:** __________
### APPENDIX C: Example of a paper report
(Based on changes in header information, alternative A1, and alternative C2/E2 in coding)

<table>
<thead>
<tr>
<th>Employing authority:</th>
<th>Method of inspection:</th>
<th>Use of sewer:</th>
<th>Date:</th>
<th>Inspectors job reference:</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
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<table>
<thead>
<tr>
<th>Employers job reference:</th>
<th>Media image:</th>
<th>Direction of flow:</th>
<th>Time:</th>
<th>Company:</th>
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<tbody>
<tr>
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<table>
<thead>
<tr>
<th>Purpose of inspection:</th>
<th>Media volume reference:</th>
<th>Cleaning:</th>
<th>Inspector:</th>
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</thead>
<tbody>
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<table>
<thead>
<tr>
<th>Locations System:</th>
<th>Precipitation:</th>
<th>Vehicle-ID:</th>
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<th>Dimension:</th>
<th>Material:</th>
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### OBSERVATION CODES

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<th>WATER LEVEL</th>
<th>FABRIC RELATED</th>
<th>OPERATIONAL RELATED</th>
<th>INVENTORY CODES</th>
<th>CIRCUMFERENTIAL LOCATION</th>
<th>MEASURED VALUE</th>
<th>REMARKS</th>
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</table>

Location of laterals: Start node: ___________ ___________ End node: ___________ ___________

ο Longitudinal: ___________
ο Circumferential: ___________

Location: __________________________________________________________________________

Page ___ of ___
APPENDIX C: Example of a paper report
(Based on changes in header information, alternative A2, and alternative C1/E1 in coding)

<table>
<thead>
<tr>
<th>Employing authority:</th>
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<th>Inspectors job reference:</th>
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</thead>
<tbody>
<tr>
<td>Employers job reference:</td>
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<td>Direction of flow:</td>
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<td>Purpose of inspection:</td>
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**O B S E R V A T I O N C O D E S**

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<th>CIRCUMFERENTIAL LOCATION</th>
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</table>

Location of laterals:
- Start node: ______________
- End node: ______________
- Longitudinal: ______________
- Circumferential: ______________
- Location: ________________________

Page _ of _
APPENDIX C: Example of a paper report
(Based on changes in header information, alternative A2, and alternative C2/E2 in coding)

Employing authority: | Method of inspection: | Use of sewer: | Date: | Inspectors job reference:
---|---|---|---|---
Employers job reference: | Media image: | Direction of flow: | Time: | Company:
Purpose of inspection: | Media volume reference: | Cleaning: | Inspector:
Locations System: | Precipitation: | Vehicle-ID:

### OBSERVATION CODES

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<th>POSITION NO.</th>
<th>PHOTO NO.</th>
<th>LOCATIN (m)</th>
<th>SHAPE DIMENSIN (mm)</th>
<th>MATERIAL</th>
<th>WATER LEVEL</th>
<th>FABRIC RELATED</th>
<th>OPERATIONAL RELATED</th>
<th>INVENTORY CODES</th>
<th>CIRCUMFERENTIAL LOCATION</th>
<th>MEASURED VALUE</th>
<th>REMARKS</th>
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Documentation: 4 EN-13508-2:2003 Location of laterals: Start node: End node:  
○ Longitudinal:  
○ Circumferential: Location:  

Page 1 of 1
# APPENDIX C: Example of a paper report
(Version Finland)

## SEWER INSPECTION REPORT

<table>
<thead>
<tr>
<th>Pipe code</th>
<th>Start node</th>
<th>End node</th>
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### FABRIC RELATED

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### OPERATION RELATED

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<th>Use of sewer</th>
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<td>WW</td>
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<td>No</td>
<td>Upstream</td>
<td>SW</td>
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<tr>
<td>Other</td>
<td>Other</td>
<td>CS</td>
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### INVENTORY

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<th>Remarks</th>
<th>Characterisation</th>
<th>Measured value</th>
<th>Photo No.</th>
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</table>

### Overall scoring (1-4):

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### Verbal description:

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<th>Operation related</th>
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</thead>
</table>

<table>
<thead>
<tr>
<th>Infiltration</th>
</tr>
</thead>
</table>

Each observation shall be classified by using grades 1-4.


Longitudinal reference point: centre of the starting manhole.
**APPENDIX D: Informative guidelines**

**Inspection abandoned**

If the employing authority specifies that he only wants one report from an inspection that has been abandoned 2 times on the same pipeline length, one from both directions, the following guidelines can be used.

1. inspection  
   Stop  
2. inspection  
   Stop

**Combined report**

*Stop ___ , ___ m from Start node  Stop ___ , ___ m from End node*

- gives the distance from the manhole to the stop of the inspection from each side.

*Measured on surface*

*Measured on surface: ___ , ___ m*

- If the inspection has been abandoned on the same pipeline length from both directions the distance between the two manhole starting point **shall** be measured on the surface.

*Difference*

*Difference: ___ , ___ m*

- If the difference between the measured length on the surface and the longitudinal measurements on the two inspections are:
  
  0 = the whole pipeline length has been inspected  
  + = part of the pipeline has not been inspected  
  - = part of the pipeline has been inspected 2 times.

**Longitudinal location**

- The longitudinal location in the combined report shall use the same reference note. Recalculation of the longitudinal location must therefore be done of one of the inspections.

*Other methods can be described and required by the employing authority.*
### APPENDIX E: National choice of alternatives

<table>
<thead>
<tr>
<th>Alternatives</th>
<th>Denmark</th>
<th>Finland</th>
<th>Norway</th>
<th>Sweden</th>
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<tbody>
<tr>
<td>A: Changes in header information</td>
<td>A2</td>
<td>A1</td>
<td>A2</td>
<td>A1</td>
</tr>
<tr>
<td>C: Connections</td>
<td>C2</td>
<td>C1</td>
<td>C1</td>
<td>C1</td>
</tr>
<tr>
<td>D: Displaced joint</td>
<td>D2</td>
<td>D1</td>
<td>D2</td>
<td>D2</td>
</tr>
<tr>
<td>E: Transitional Component</td>
<td>E2</td>
<td>E1</td>
<td>E1</td>
<td>E1</td>
</tr>
<tr>
<td>F: Pipeline identification</td>
<td>F2</td>
<td>F1/F2/F3</td>
<td>F3</td>
<td>F1/F3</td>
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</table>
The Nordic Innovation Centre initiates and finances activities that enhance innovation collaboration and develop and maintain a smoothly functioning market in the Nordic region.

The Centre works primarily with small and medium-sized companies (SMEs) in the Nordic countries. Other important partners are those most closely involved with innovation and market surveillance, such as industrial organisations and interest groups, research institutions and public authorities.

The Nordic Innovation Centre is an institution under the Nordic Council of Ministers. Its secretariat is in Oslo.

For more information: www.nordicinnovation.net