

Assessment of the Saint Gobain's cement mortar lining for ductile iron pipes - schedule



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1. Scope

To assess the performance and effectiveness of the cement mortar lining (CML) applied to ductile iron (DI) pipes supplied by Saint Gobain Pipelines.

The cement mortar lined pipes are used in potable water applications as components of (normally) pressurised mains. The cement mortar comprises a slurry (wet mix) of blast furnace cement, graded sand and water. The slurry is applied to the pipe from a central fixed supply lance whilst the pipe is centrifugally spun, thus forcing the applied CML to the pipe wall. The method of application results in some segregation of the mortar constituents such that a thin laitance layer may be formed on the inside surfaces.

The lining may be finished as follows according to the diameter of the pipe:

- Type A: 900 mm to 1000 mm diameter: CML only;
- Type B: 900 mm diameter upwards: CML with mechanical grinding of the surface to remove the laitance layer and deposit;

2. Assessment schedule

2.1 Technical audit of mechanical properties of the applied CML.

2.2 Technical audit of impact of CML on water quality.

2.3 Audit of quality control procedures used for the application of CML.

2.4 Audit of quality control procedures relating to the supply, handling and storage of materials for CML.



3. Review of properties

BS EN 545⁽¹⁾ is the leading standard for ductile iron pipes for water pipelines. This assessment schedule has been drafted taking into account the requirement of this standard and the performance claims of the product.

For use in the UK, internal linings need to comply with the Regulation 31.4.a of the relevant Water Supply Regulations for England and Wales^(1,2) and Regulation 27.4a of those for Scotland⁽⁴⁾.

3.1 Materials properties

3.1.1 Components and composition of cement mortar mix to clause 4.4.3.1 and 4.4.3.2 of BS EN 545: 2006.

3.1.2 Lining thickness and surface condition of cement mortar lining to clause 4.4.3.3 of BS EN 545: 2006.

3.2 Mechanical properties

3.2.1 Compressive strength of cement mortar lining to clause 7.1 of BS EN 545: 2006.

3.3 Effect of materials on water quality

3.3.1 For ground and unground (Type A and B) CML pipes,

- demonstrate long term durability of the CML by reviewing historical data of CML exposed to soft water, and/or by alternate test procedure agreed by WRc;
- demonstrate for Type A pipes that the laitance from the CML (whether

remaining fixed in place, or loose, or collecting within the joints) will not, **when used in accordance with the Instructions for Use**, change the quality of the water to such an extent that it fails to comply with the requirements of relevant Water Supply Regulations^(2,3,4,5), specifically for turbidity.

- demonstrate for Type B pipes that the CML will not, **when used in accordance with the Instructions for Use**, change the quality of the water to such an extent that it fails to comply with the requirements of Water Supply Regulations^(2,3,4,5), specifically for pH.

4. Review of procedures

In addition to the performance of the lining, the following items will be checked.

(a) Quality control procedures as they apply to:

- supply, handling and storage of materials;
- application of CML .

The application of these procedures will be witnessed on-site by WRc.

(b) Procedures for testing and commissioning of pipes for their impact on water quality after completion of standard commissioning procedures.

5. Reference documents

1. BS EN 545: 2006 Ductile iron pipes, fittings, accessories and

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their joints for water pipelines –
Requirements and test methods.

2. England: The Water Supply (Water Quality) Regulations 2000, S.I. No. 3184.
3. Wales: The Water Supply (Water Quality) Regulations 2001, S.I. No. 3911.
4. Scotland: The Water Supply (Water Quality) (Scotland) Regulations 2001, S.I. No. 207.
5. Northern Ireland: The Water Supply (Water Quality) Regulations (Northern Ireland) 2002, S.R. No.331.