# British Precast Drainage Association

Publications from the British Precast Drainage Association (BPDA):

BPDA was formed in 2017 from the integration of the Concrete Pipeline Systems Association (CPSA) and the Box Culvert Association (BCA).

Information published by both CPSA and BCA will be rebranded and replaced as BPDA in due course.  New material will be branded BPDA.

All CPSA and BCA web traffic will be redirected to the new BPDA web site at www.precastdrainage.co.uk

concrete pipeline systems association

# Technical Bulletin 3

## Routine testing of concrete pipes and the resultant allowable cracks in the tensile zone

The quality and durability of concrete pipes have been secured over the years primarily as a result of the insistence by the industry in establishing a regime of routine testing. The Concrete Pipeline Systems Association has always backed this principal by insisting that Third Party certification is a fundamental requirement of Association membership.

For many years the British Standards for concrete pipes have specified tests to quantify fitness for purpose and a fundamental test has been the line load crushing tests. Both reinforced and unreinforced pipes must withstand a specified minimum crushing load. In addition, reinforced pipes must withstand a lower proof load without developing crack widths in excess of a specified level. The crushing tests are undertaken on finished products sampled from production batches.

For reinforced concrete pipes, cracking of the concrete may occur at proof load, demonstrating that the composite materials of concrete and steel are working together to resist the effects of the load. The extent of the cracking is specifically limited to a level that will not affect the durability of the concrete pipe. After the test is complete and the load is removed cracks will close, but it can be expected that a residual crack may be visible.

On installation, and with the application of top load, the line load tested pipe and an untested pipe will perform in the same manner. Provided the pipe and the bedding have been correctly designed and installed the resulting crack width will not exceed that obtained under proof test and will be below a level that will have an adverse effect on the durability of the pipe.

Permissible cracking of concrete pipes is covered in Section 4.3.2 of EN 1916:2002.

Cracks in the tensile zone of reinforced concrete within the limits specified as a

result of testing in accordance with the appropriate annex are deemed to comply with the Standard (see Section 5.2.3 of EN 1916: 2002) and are therefore equally suitable for use, together with the pipes which have not been selected for testing.

This principle is in line with the limit state of serviceability in BS 8110 parts 1 and 2, which permits a crack width dependent on the exposure conditions.

In order that the sample size can be sufficient to give confidence to the purchaser it follows that the concrete pipes offered for sale by the manufacturer will include a number of pipes exhibiting the fine crack left from the line load proof test. These pipes comply with the standard and are fit for purpose, as are pipes that have not been tested.

The above explanation is intended to satisfy users of concrete pipes that there is no justification in rejecting pipes exhibiting the minor cracking associated with the line load proof test. Not to accept these pipes means that perfectly satisfactory pipes are being rejected and this would ultimately increase unnecessarily the cost of concrete pipes manufactured and tested in accordance with EN 1916: 2002.


For further information please contact your usual supplier

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