

Draft for Public Comment



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Interested committees: CB/1;B/2;B/11;B/517/1;B/517/3;B/517/8;B/524

Title: Water quality – Determination of aggressive carbon dioxide content

(prEN 13577)

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The guidance given below is intended to ensure that all comments receive efficient and appropriate attention by the responsible BSI committee. Annotated text is not acceptable and will be rejected.

Each comment shall make one point only, be clearly separated from the others and be structured as follows in clause order:

- clause/sub-clause;
- paragraph/table/figure number;
- type of comment (general, technical or editorial);
- comment (with rationale);
- proposed change.

Submission

Insert here name, address and contact details of delegated secretariat: preferably electronically via e-mail or on diskette (MS-DOS compatible, 1.44 megabytes). Comments should be compatible with Version 6.0 of Microsoft® Word for Windows™, if possible; otherwise comments in ASCII text format are acceptable. Any comments not submitted electronically should still adhere to the format requirements given above. No acknowledgement will normally be sent.

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Please indicate whether you consider the UK should submit a negative (with reasons) or positive vote on this draft.

Table for submission of comments

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Project no.: 91 7814	DPC number 99/102235DC
Commentator:	Date:

Clause/ subclause	Paragraph/ Figure/ Table	Type of comment (General/ technical/editorial)	Comment (with rationale)	Proposed change
Examples: 3.1	1st definition	Editorial	Definition is ambiguous and needs clarifying.	Amend to read '... so that the mains connector to which no connection ...'
	2nd paragraph	Technical	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK, giving rise to misleadingly high results.	Delete reference to UV photometer.

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 13577

April 1999

ICS

English version

Water quality - Determination of aggressive carbon dioxide content

Qualité de l'eau - Détermination de la teneur en dioxyde de carbone agressif

Wassergüte - Bestimmung des angreifenden Kohlendioxidgehalts

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 104.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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0 Foreword

This Draft European Standard has been prepared by Technical Committee CEN/TC104 "Concrete".

This Draft Standard is concerned with testing water which may be aggressive to hardened concrete.

It is based on DIN 4030 "Evaluation of liquids, soils and gases aggressive to concrete – Sampling and analysis of water and soil samples".

No existing European Standard is superseded.

1 Scope

1.1 This Draft European Standard describes a reference method for the determination of carbon dioxide present in water and having a lime dissolving capacity.

It is not applicable to the measurement of total carbon dioxide present in water.

1.2 If other methods are used, it shall be shown that they give results equivalent to those obtained by this reference method.

In case of dispute, only the reference method shall be used.

2 Normative references

prEN 206

Concrete – Performance, production and conformity

ISO 5725

Precision of test methods – Determination of repeatability and reproducibility

3 Definitions

For the purpose of this standard, the following definitions apply:

3.1 Those set out in prEN 206.

3.2 Aggressive CO₂: Carbon dioxide present in water and having a lime dissolving capacity.

4 Test method

Calcium carbonate powder is added to water.

After complete reaction of aggressive CO₂ with calcium carbonate the water is titrated with acid.

Difference in titration with same water which has not been subjected to the reaction with calcium carbonate will give the aggressive CO₂ content of the water.

5 Apparatus

5.1 Laboratory equipment

5.1.1 A balance reading up to 100 g accurate to 0,1 mg.

5.1.2 A pH meter (in calibration). An alternative to the pH meter can be a pH indicator.

5.1.3 A magnetic stirrer thermostated device.

5.1.4 A thermometer with a measuring range from 0 to 30 °C and scale divisions of 0,2 K.

5.1.5 A 25 ml burette accurate to 0,03 ml.

5.1.6 A 100 ml pipette accurate to 0,1 ml.

5.1.7 A sample bottle of at least 0,5 litre capacity but usually 1 litre.

5.1.8 A bottle of 0,5 litre capacity with screw closure.

5.1.9 A 250 ml beaker.

5.1.10 Thermally insulated transport boxes (when required). An alternative to manual chemical titration can be the use of an automatic titrator.

5.2 Reagents

5.2.1 Precipitated calcium carbonate powder: 20 g per test (2 measurements).

5.2.2 Hydrochloric acid (0,100 M).

5.2.3 Caution. Hydrochloric acid is corrosive. Take precautions to avoid projections in the eyes or breathing vapors. Prevent skin contact by wearing gloves and suitable protective clothing. If acid enters the eye or touch the skin, wash it out thoroughly with clean water and seek medical treatment without delay.

6 Procedure

6.1 Prior to sampling water 10 g of calcium carbonate powder shall be weighted and pour into the 0,5 l bottle.

6.2 Sampling

6.2.1 Caution. Carbon dioxide is easily lost from water during sampling, transit and storage of samples; as a consequence the water sample shall be taken with care not to remove the dissolved gas and shall be tested as soon as possible after collection.

6.2.2 During sampling, the 1 l sample bottle shall first be filled. Then, the 0,5 l bottle containing the 10 g of calcium carbonate powder shall be filled slowly, care being taken not to flush out the powder while filling. The bottle shall be completely filled, hermetically sealed after collecting the sample and distinctively and permanently marked by the sampler with the sample number, point of collection, sampling date and sampling time.

6.2.3 The composition of water sample shall not alter while it is being transported as a consequence of a rise in temperature. The rise in temperature during transportation from the point of collection to the laboratory shall not exceed 5 K. The time between collection and determination of the aggressive CO₂ content, shall not exceed 48 hours.

When necessary, thermally insulated transport boxes shall be used.

6.3 After sampling, the temperature of the water shall be measured to the nearest 0,2 K and reported in the sampling record.

6.4 100 ml of the sample water shall be titrated electrometrically with hydrochloric acid to a pH value of 4,3.

H_1 is the volume of acid necessary for this titration.

6.5 The 0,5 l bottle (containing the 10 g of CaCO₃ powder) shall be vigorously shaken for not less than 2 hours.

Care must be taken to ensure that the temperature of water does not vary by more than 2 K from the temperature measured during collection. If necessary the magnetic thermostated device shall be used.

After the excess calcium carbonate has settled, 100 ml of the clear supernatant solution shall be titrated electrometrically with the hydrochloric acid to a pH value of 4,3.

H_2 is the volume of acid necessary for this titration.

7 Expression of results

7.1 Calculation

7.1.1 The lime dissolving capacity of the sample is calculated from the formula:

$$LDC = 28 (H_2 - H_1) \text{ expressed in mg of CaO/l}$$

7.1.2 The aggressive CO₂ content of the sample is given by multiplying *LDC* by the ratio 44/56:

$$\text{aggressive CO}_2 = 22 (H_2 - H_1) \text{ expressed in mg of CO}_2\text{/l, to one decimal place.}$$

7.2 Result

The mean value of 2 determination shall be taken as the aggressive CO₂ content of the water.

It shall be expressed in mg/l rounded to the nearest whole number.

8 Test report

8.1 The report shall include

8.1.1 Unambiguous identification of the test sample

8.1.2 Location of performance of test

8.1.3 Date and time of collection

8.1.4 Time of performance of test

8.1.5 Temperature of sample

8.1.6 Calculated aggressive CO₂ contents and mean value

8.1.7 Identification of person carrying out the test

8.1.8 Any deviation from standard test method (where appropriate)

8.2 The report shall include a declaration by the person carrying out the test that it was carried out in accordance with this standard except as noted in 8.1.8.

8.3 An example of test report is given in annex A.

9 Precision

The standard deviation for repeatability is 0,3 mg/l.

The standard deviation for reproducibility is 0,5 mg/l.

Informative Annex

Example of a test report
Determination of aggressive CO₂ content

Client

Test organisation

Accreditation certificate ref

Test location

Test item

Sample identification:

Date and time of collection:

Type of water:
(ground water, surface water, ...)

Temperature of water when collected:

Point of collection:
(borehole, pit, ...)

Depth of collection:

Test and test results

Time of performance of test:

pH meter reference number:

Any deviation from standard test method:

Aggressive CO₂ content:

Test 1: mg/l

Test 2: mg/l

Result: mg/l

Except as detailed above this test was carried out in accordance with EN - : 1997

Technical responsibility

Responsible person: Name:

Position:

Signature:

Certificate identification

Certificate No:

Date issued: