DIN 4030-1:2024-07 (E)

Assessment of water, soils and gases for their aggressiveness to concrete - Part 1: Principles and limiting values

Contents

Page

Foreword ... 4

Introduction ... 5

1 Scope ... 6

2 Normative references ... 6

3 Terms and definitions ... 6

4 Substances aggressive to concrete and their effect ... 7
4.1 General ... 7
4.2 Acidic water ... 7
4.2.1 General ... 7
4.2.2 Mineral acids ... 7
4.2.3 Dihydrogen sulfide (hydrogen sulfide) ... 7
4.2.4 Sulfur dioxide ... 7
4.2.5 Hydrogen chloride ... 8
4.2.6 Lime-dissolving capacity (lime-dissolving carbonic acid) ... 8
4.2.7 Organic acids ... 8
4.2.8 Humic acids ... 8
4.3 Sulfates ... 8
4.4 Sulfides ... 8
4.5 Magnesium salts ... 8
4.6 Ammonium salts ... 8
4.7 Soft water ... 8
4.8 Fats and oils ... 9
4.8.1 General ... 9
4.8.2 Vegetable and animal fats and oils ... 9
4.8.3 Mineral oils and fats ... 9
4.8.4 Coal tar oils ... 9

5 Aggressive media ... 9
5.1 Water ... 9
5.1.1 Sea water ... 9
5.1.2 Sea water in estuaries and brackish water ... 10
5.1.3 Mountain and spring water ... 10
5.1.4 Peat water ... 10
5.1.5 Groundwater and other forms of soil water ... 10
5.1.6 River water ... 10
5.1.7 Wastewater ... 10
5.2 Soil ... 11
5.2.1 General ... 11
5.2.2 Soil containing sulfides ... 11
5.2.3 Peat soils ... 11
5.2.4 Landfill ... 11
5.3 Gases ... 11
5.3.1 Exhaust gases from combustion processors ... 11
5.3.2 Digester gases ... 12

6 Assessment of waters, soils and gases aggressive to concrete 12
6.1 General 12
6.2 Water 12
6.2.1 General characteristics 12
6.2.2 Chemical analysis 12
6.2.3 Degree of aggressiveness of water of mainly natural origin 14
6.3 Soil 14
6.3.1 General characteristics 14
6.3.2 Chemical analysis 16
6.3.3 Aggressiveness of soil 16
6.4 Gases 16
Annex A (informative) **Distribution of pyrite-containing rock on the earth's surface in Germany 17**
Bibliography 19

Figures

Figure A.1 — Distribution of pyrite-containing rock of the pre-Quaternary period at the earth's surface (down to about 10 m depth without Quaternary cover) in Germany, which can lead to water that is very aggressive to concrete due to pyrite oxidation 17

Figure A.2 — Distribution of pyrite-containing carbonate rock of the pre-Quaternary period at the earth's surface (down to about 10 m depth without Quaternary cover) in Germany, which can lead to water that is chemically very aggressive to concrete due to pyrite oxdation 18

Tables

Table 1 — Composition of sea water (guideline values) 9

Table 2 — Scope of analysis according to DIN 4030-2 12

Table 3 — Potassium permanganate consumption 13

Table 4 — Limit values for exposure classes for chemical attack from natural soil and groundwater 15