Irish Standard
I.S. 398-1:2013

Reactive pyrite in sub-floor hardcore material – Part 1: Testing and categorization protocol

I.S. 398-1:2013

Incorporating amendments/corrigenda/National Annexes issued since publication:

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I.S. xxx: Irish Standard – national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation - recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

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Údarás um Chaighdeáin Náisiúnta na hÉireann

DECLARATION

OF

SPECIFICATION

ENTITLED

REACTIVE PYRITE IN SUB-FLOOR HARDCORE MATERIAL

PART 1: TESTING AND CATEGORISATION PROTOCOL

AS

THE IRISH STANDARD SPECIFICATION FOR

REACTIVE PYRITE IN SUB-FLOOR HARDCORE MATERIAL

PART 1: TESTING AND CATEGORISATION PROTOCOL

NSAI in exercise of the power conferred by section 16 (3) of the National Standards Authority of Ireland Act, 1996 (No. 28 of 1996) and with the consent of the Minister for Jobs, Enterprise and Innovation, hereby declare as follows:

1. This instrument may be cited as the Standard Specification (Reactive pyrite in sub-floor hardcore material – Part 1: Testing and categorisation protocol) Declaration, 2013.

2. (1) The Specification set forth in the Schedule to this declaration is hereby declared to be the standard specification for Reactive pyrite in sub-floor hardcore material – Part 1: Testing and categorisation protocol.

   (2) The said standard specification may be cited as Irish Standard 398-1:2013 or as I.S. 398-1:2013.

Contents

Foreword

This Irish Standard was developed by the NSAI Technical Committee 58, "Reactive Pyrite".

It has been developed for use by those intending to provide testing and categorisation services for buildings suspected of being affected by pyrite.

This Irish Standard is one of two standards published by the NSAI on this subject:

I.S. 398-1 Reactive pyrite in sub-floor hardcore material – Part 1: Testing and categorisation protocol

and

I.S. 398-2 Reactive pyrite in sub-floor hardcore material – Part 2: Methodology for remediation works.

Compliance with an Irish Standard does not of itself confer immunity from legal obligations.

In line with international standards practice the decimal point is shown as a comma (,) throughout this document.

Introduction

Pyrite, (Iron Sulfide FeS_2), is a naturally occurring mineral found commonly in sedimentary or carbonaceous rock types. In Ireland, rocks containing pyrite have been used for sub-floor hardcore material in buildings. When some forms of pyrite are exposed to moisture and oxygen, a series of chemical reactions can occur. In such conditions, pyrite will oxidise to form sulfuric acid (H_2SO_4) and other products. The acid may in turn react with other minerals found in the rock. Calcium sulfate ($CaSO_4.2H_2O$) in the form of gypsum may be produced when calcium carbonate (calcite) is present in the rock, and is available to react with the sulfuric acid. Gypsum has a significantly greater volume than the original pyrite and calcite; thus the growth of its crystals, in particular between laminations of rock, has the effect of causing expansion.

The Report of the Pyrite Panel (June 2012), commissioned by the Minister of the Environment, Community and Local Government, highlights that when expansion occurs in pyritic hardcore, that is well compacted, and confined between the rising walls and a ground floor concrete slab (e.g. in a dwelling), it may result in the cracking of floors, internal partitions and external walls, outward movement of external walls, and/or the heaving of ground floors, bulging of internal partition finishes, and damage to substructure. This is commonly know as pyritic heave.

At the time the Report of the Pyrite Panel was written, pyritic heave was evident in five local authority areas, Fingal, Dublin City, Meath, Kildare and Offaly.

The Report of the Pyrite Panel made a number of recommendations for the development of technical documents. One of which is establishing an Irish testing protocol. The report recognises the need for a standardised, accurate and reliable protocol to establish whether or not a building is or may be affected by reactive pyrite in the sub-floor hardcore material.

SCHEDULE

Reactive pyrite in sub-floor hardcore material – Part 1: Testing and categorisation protocol

1 Scope

This Standard:

a) establishes a comprehensive structured protocol for assessing and determining whether or not a building has been damaged by reactive pyrite or is likely to be in the future, and

b) categorises buildings, in accordance with this standard.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

I.S. EN 1097-6, *Tests for mechanical and physical properties of aggregates - Part 6: Determination of particle density and water absorption*

I.S. EN 13242, *Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction*

I.S. EN ISO 14689-1**,** *Geotechnical investigation and testing - Identification and classification of rock - Part 1: identification and description*

I.S. EN ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*

S.R.21:2004+A1:2007, *Guidance on the use of I.S. EN 13242:2002 - Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction*

TRL 447, *Sulfate specification for structural backfills, Transport Research Laborotary2005*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply

3.1 General

accredited laboratory
laboratory with formal recognition by an accrediting organization that the laboratory is competent to carry out specific activities which lead to the calibration or verification of systems in accordance with documented requirements of the accrediting organization

aggregate(s)
crushed rock or processed sand and gravel materials used for construction purposes

attribute
statistically determined weighting of items of visual damage observed during a non invasive Building Condition Assessment