April 2019

DIN EN 16907-4

ICS 93.020

Earthworks –
Part 4: Soil treatment with lime and/or hydraulic binders;
English version EN 16907-4:2018,
English translation of DIN EN 16907-4:2019-04

Erdarbeiten –
Teil 4: Bodenbehandlung mit Kalk und/oder hydraulischen Bindemitteln;
Englische Fassung EN 16907-4:2018,
Englische Übersetzung von DIN EN 16907-4:2019-04

Terrassements –
Partie 4: Traitement des sols à la chaux et/ou aux liants hydrauliques;
Version anglaise EN 16907-4:2018,
Traduction anglaise de DIN EN 16907-4:2019-04

Document comprises 92 pages

Translation by DIN-Sprachendienst.

In case of doubt, the German-language original shall be considered authoritative.

03.19 3049462

A comma is used as the decimal marker.

National foreword

This document (EN 16907-4:2018) has been prepared by Technical Committee CEN/TC 396 “Earthworks” (Secretariat: AFNOR, France).

The responsible German body involved in its preparation was *DIN-Normenausschuss Bauwesen* (DIN Standards Committee Building and Civil Engineering), Working Committee NA 005-05-22 AA “Earthworks (national mirror committee for CEN/TC 396 and CEN/TC 396/WG 1 to WG 8), Joint working committee with FGSV”.

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 16907-4

December 2018

ICS 93.020

English Version

Earthworks - Part 4: Soil treatment with lime and/or hydraulic binders

Terrassements - Partie 4: Traitement des sols à la chaux et/ou aux liants hydrauliques

Erdarbeiten - Teil 4: Bodenbehandlung mit Kalk und/oder hydraulischen Bindemitteln

This European Standard was approved by CEN on 14 May 2018.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Ref. No. EN 16907-4:2018 E

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European foreword

This document (EN 16907-4:2018) has been prepared by Technical Committee CEN/TC 396 "Earthworks", the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2019, and conflicting national standards shall be withdrawn at the latest by June 2019.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document is one of the European Standards within the framework series of EN 16907 on *Earthworks*, as follows:

— *Part 1: Principles and general rules;*

— *Part 2: Classification of materials;*

— *Part 3: Construction procedures;*

— *Part 4: Soil treatment with lime and/or hydraulic binders* (this document)*;*

— *Part 5: Quality control;*

— *Part 6: Land reclamation earthworks using dredged hydraulic fill;*

— *Part 7: Hydraulic placement of extractive waste.*

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Introduction

In the context of the present standard, the treatment of a material designates the operation which consists of mixing, to an agreed specification, the material with a binder, for example lime, or hydraulic binder, or both of them, and optionally with additional water. The objective is to enhance the properties of materials with poor characteristics for use in earth structures. It can also be to enhance properties of materials to enable their use in specific applications (like capping layers, abutment fills, foundations, etc.).

Although the technique has been used for a long time, its application at a large scale, for the construction of earth structures, started in the 1960s. Since then, the technique has seen a substantial increase thanks to its many benefits, among which are:

— enhancement of the mechanical properties of material;

— elimination of lorry movements for disposal of site material;

— reduced lorry movements for importation of construction material;

— reduced noise and nuisance to local residents;

— less wear and tear on the local road network;

— no tipping charges or landfill tax;

— maintained landfill capacity;

— no waste of valuable non-renewable aggregate resources;

— generally reduced construction time and cost.

Once treated properly, the material can be used in embankment, capping layer or any part of the structure, provided it meets the specification of the project.

The treatment products considered in this standard are limited to the following standardized products: cement, fly ash, granulated blast furnace slag, hydraulic road binder and lime.

For the purpose of this standard, these treatment products will be designated as binders.

For the purpose of this standard, cement, granulated blast furnace slag and hydraulic road binder will be designated as hydraulic binders.

Fly ash includes siliceous fly ash and calcareous fly ash. Siliceous fly ash is a material which requires a source of calcium oxide, e.g. lime or cement, to produce a hydraulic reaction. Calcareous fly ash contains calcium oxide and is comparable to a hydraulic binder. For the purpose of this standard, both types of fly ash will be designated as hydraulic binders.

Lime is air lime and has no hydraulic property. For the purpose of this standard, it will be designated as a binder.

Typical uses of the binders are as follows:

— lime is generally used to dry up wet materials, and/or to enhance the performance of cohesive materials;

— hydraulic binders are mainly used to quickly and significantly increase the mechanical performance of non-cohesive materials;

— in presence of cohesive material and depending on the application, lime and hydraulic binder may be used together, in two steps on site, or through a pre-blended form like a hydraulic road binder.

The materials considered in this standard are: soils, weak rocks, intermediate rocks, chalk, recycled materials, artificial materials. They can also be mixes of these different types.

The success of a treatment operation relies upon the respect of specifications as well as of good practices that closely depend on local geological and climatic conditions. Thus, in addition to the requirements of this standard, reference may be made to the guidelines of good practices valid in the place of use. Some of them are included as notes in the standard or in the annexes at the end of this document.