



BSI Standards Publication

Design and use of inserts for lifting and handling of precast concrete elements

National foreword

This Published Document is the UK implementation of CEN/TR 15728:2016. It supersedes PD CEN/TR 15728:2008 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee B/524, Precast concrete products.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2016. Published by BSI Standards Limited 2016

ISBN 978 0 580 89849 5

ICS 91.100.30

Compliance with a British Standard cannot confer immunity from legal obligations.

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 31 March 2016.

Amendments issued since publication

Date	Text affected
------	---------------

TECHNICAL REPORT

CEN/TR 15728

RAPPORT TECHNIQUE

TECHNISCHER BERICHT

February 2016

ICS 91.100.30

Supersedes CEN/TR 15728:2008

English Version

Design and use of inserts for lifting and handling of precast concrete elements

Conception et utilisation d'inserts pour le levage et la
manutention du béton préfabriqué - Éléments

Bemessung und Anwendung von Transportankern für
Betonfertigteile - Elemente

This Technical Report was approved by CEN on 27 July 2015. It has been drawn up by the Technical Committee CEN/TC 229.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents	Page
European foreword.....	4
1 Scope	5
1.1 General.....	5
1.2 Types of inserts for lifting and handling.....	5
1.3 Minimum dimensions.....	5
2 Normative references.....	5
3 Terms and definitions and symbols	6
3.1 Definitions	6
3.2 Symbols.....	8
3.2.1 Action and resistance	8
3.2.2 Concrete and steel.....	8
3.2.3 Inserts.....	9
4 Basis of design	9
4.1 General.....	9
4.2 Required verifications.....	9
4.3 Design Principles.....	9
4.3.1 Limit state design	9
4.3.2 Ultimate limit state.....	9
4.3.3 Admissible load design	10
4.4 Verification.....	11
4.4.1 General.....	11
4.4.2 Partial factor method (Ultimate limit state)	11
5 Actions on inserts.....	12
5.1 General.....	12
5.2 Effect of lifting procedures on load directions	13
5.3 Actions from adhesion and form friction	14
5.4 Dynamic actions.....	15
5.5 Combined actions.....	16
6 Design of lifting inserts and anchorage in concrete by calculation	16
6.1 General conditions.....	16
6.2 Types of inserts covered.....	17
6.2.1 Inserts independently placed on the market.....	17
6.2.2 Inserts made by the precaster.....	19
6.3 General design.....	19
6.3.1 Failure modes.....	19
6.3.2 Design procedures	20
6.3.3 Unreinforced concrete	20
6.3.4 Reinforced concrete	22
6.4 Lifting inserts.....	24
6.4.1 General design.....	24
6.4.2 Lifting loops of smooth bars.....	24
6.4.3 Lifting loops of strands.....	26
6.4.4 Lifting loops of steel wire ropes.....	26
6.5 Lifting of walls and linear elements	27

6.5.1	General	27
6.5.2	Minimum thickness of wall or element	28
6.5.3	Anchorage reinforcement.....	28
6.6	Lifting of slabs and pipes.....	30
6.6.1	Minimum edge distances	30
6.6.2	Anchorage reinforcement.....	30
7	Design of lifting inserts and anchorage in concrete by testing	31
7.1	General conditions	31
7.2	Specification of specimens	32
7.2.1	Areas of application	32
7.2.2	Design of test specimen	32
7.2.3	Age of concrete specimen at testing.....	34
7.2.4	Specification of inserts.....	34
7.3	Loading conditions	34
7.3.1	Load and support conditions.....	34
7.3.2	Loading history	35
7.3.3	Measurements	35
7.4	Test programs.....	35
7.4.1	General	35
7.4.2	Tests to verify prior knowledge	36
7.4.3	Tests utilizing no prior knowledge — Determination of properties for one insert used for specific applications.....	36
7.5	Assessment of the test results.....	36
7.6	Test report	36
7.6.1	General information	36
7.6.2	Test members	37
7.6.3	Installation of the insert.....	37
7.6.4	Measured values	37
7.6.5	Evaluation report.....	38
8	Lifting and handling instructions	38
Annex A (informative)	Information to be given by the insert supplier	39
A.1	Information on the content of an operational manual.....	39
Annex B (informative)	Use of Supplier's recommendations.....	42
Bibliography		43