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European Provisions for the Testing, Assessment and Design of Anchors in Concrete and Masonry

Abstract

1 Introduction

Not surprisingly, provisions for the regulation of construction products in Europe differ from those in the United States. This article explains the European requirements as they pertain to the assessment and design of anchors for use in concrete and masonry. This discussion is substantially derived from an article that first appeared in the *Beton Kalender*¹ 2007 [1].

The introduction of a construction product into the European market requires either compliance with a harmonized European code or a European Technical Approval (ETA).

The development of criteria for the qualification of construction products under the newly formed European Union's Construction Products Directive 89/106/EC (CPD) [2] began in the late 1980s. The CPD provides the legal basis for the development of criteria to assess construction products for use in all EU member states. It defines so-called Essential Requirements that construction products must fulfill, depending on their use and importance in the built environment, and specifies the terms for development of assessment criteria.

Due to strong industry support, rapid progress was made in the development of assessment and design provisions for concrete and masonry anchors. National provisions for concrete anchors were already in existence by the early 1970s. Recognizing the need for criteria to direct the issuance of transnational approvals, the European Organization for Technical Approvals (EOTA) [3] established working groups to address the types of anchors then in existence. The members of the working groups were drawn from members of approval bodies, representatives of Associations of the European Anchor Manufacturers and national experts. The first working group, for mechanical anchors, was formed in the early 1990s.

The first European Technical Approval Guideline (ETAG 001), "Guideline for European Technical Approval of Metal Anchors for Use in Concrete," was adopted and sent to the European member states for ratification by the European Commission in 1997. Two ETAs for torque-controlled expansion anchors (ETA-98/0001 and ETA-98/0002), based on ETAG 001, were issued by the German national approval body DIBt (German Institute for Building Technology) [4] in 1998. These were also the first products in the European construction markets to carry a CE-marking [5].



2 ETAGs, CUAPs and ETAs

2.1 Background

The basis for the European harmonization of construction products is the Construction Products Directive (CPD). Harmonization of the products is assured by technical specifications. Products are fit for their intended use if they comply with either:

- a.) hEN: Harmonized Standard (by the CEN/CENELEC)
- b.) An ETA: European Technical Approval (by the EOTA)
- c.) A non-harmonized technical specification recognized by the European Commission.

The preferred path for establishing the fitness for use of construction fasteners (e.g., anchors, power-actuated fasteners and cast-in anchors) is the European Technical Approval.

2.2 EOTA

EOTA The European Organization for Technical Approvals (EOTA) [3] is comprised of Approval Bodies (also referred to as EOTA Bodies) nominated to issue European Technical Approvals (ETAs) by EU Member States and EFTA States who have contracted to the European Economic Area Agreement. The role of EOTA is primarily to monitor the drafting of new guidelines and coordinate all activities related to the issuing of ETAs. The guidelines are developed based on a mandate of the European Commission and an approved work program formulated by EOTA working groups.

¹ The *Beton Kalender* (Concrete Compendium) is an annual publication summarizing design and construction information relevant to concrete construction in Europe.

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2.3 European Technical Approval Guidelines (ETAGs) for Anchors

Following the formation of the working group for mechanical anchors, additional groups were established in the ensuing decade to address other anchor types. Working groups for other construction products have been formed in the interim period as well. The working groups continue to issue new guidelines and revise existing ones as required. Guidelines pertaining to anchorage are currently as follows:

- ETAG 001, Guideline for European Technical Approval of Metal Anchors for Use in Concrete
- ETAG 014, Guideline for European Technical Approval of Plastic Anchors for Fixing of External Thermal Insulation Composite Systems with Rendering
- ETAG 020, Guideline for European Technical Approval of Plastic Anchors for Multiple Use in Concrete and Masonry for non-structural Applications
- ETAG 029, Guideline for European Technical Approval of Metal Injection Anchors for Use in Masonry (not yet endorsed by the EC)

2.4 CUAPs for cast-in anchors, power actuated fasteners and special fasteners

Given the logistical hurdles involved in developing ETAGs for all possible construction products, EOTA has developed an alternate path, the Common Understanding of Assessment Procedure (CUAP), for securing approvals for construction products not covered by an existing ETAG. The CUAP describes the assessment criteria for the product and its intended use. While there is no mandate issued by the European Commission for CUAPs, the approval body applying for the CUAP must receive consent from the European Commission. Similar to a Guideline, a CUAP describes the required tests and the means of evaluating the test results. Since the existence of a CUAP can lead to more requests for approvals for a specific product type, CUAPs can serve as an alternative or a precursor to the development of a guideline. The CUAP draft is sent to all European Approval Bodies for comments and can only be used for issuing an ETA after all the approval bodies have given their consent.

2.5 European Technical Approvals – ETAs

European Technical Approvals (ETAs) may be granted for any construction product that:

- Deviates significantly from harmonized standards
- Has not received a mandate for inclusion in a harmonized standard
- Is not covered by harmonized standards
- Lack as an available harmonized standard

European Technical Approvals are always issued for a particular construction product and the associated manufacturer or, where applicable, all manufacturing plants associated with the product. A list of ETAs is published by the EOTA office in Brussels [3], and in Germany by the German Institute for Building Technology [4]. ETAs are uniformly organized in accordance with a European template with the following components:

- Cover page
- Specific conditions of the European technical approval
- Legal bases and general conditions
- Annexes

Proponents wishing to obtain an ETA for a specific construction product apply to one of the EOTA approval bodies. This involves completion of the requisite form and submission of test results as well as detailed information about the product. The test reports include all information described in the relevant ETAG or CUAP under which the application is made. Based on the information submitted, the approval body then develops an Evaluation Report as well as an ETA draft. These two documents are then distributed to the relevant EOTA approval bodies for review. The review period after receipt of the draft ETA and Evaluation Report is two months. If no comments are received, the ETA is issued as drafted. If comments are received, these must be resolved prior to issuance of the ETA. ETAs are issued in the official language(s) of the Approval Body as well as in English.

2.6 Comprehension Documents and Progress Files

EOTA Comprehension Documents are EOTA internal working documents used to update reference documents and to provide clarification regarding the application or interpretation of particular elements in an issued ETAG. Comprehension Documents are discussed within the Working Group. Once they are endorsed by EOTA, Comprehension Documents are effectively part of the ETAG to which they refer.

In contrast to Comprehension Documents, Progress Files contain actual changes or amendments to an ETAG. The Progress File procedure is similar to that used for Comprehension Documents.

To read the complete, full-length article [click here](#).

Literature

- [1] Latenser, K., „Europäische Regelungen für Befestigungssysteme (European Provisions for Anchorages), Beton-Kalender 2007, Verlag Ernst & Sohn, Berlin 2007 (in German)
- [2] CPD: The Construction Products Directive (Council Directive 89/106/EEC) of December 21, 1988 on the approximation of laws, regulations and administrative provisions of the Member States relating to construction products
- [3] <http://www.eota.eu>
- [4] <http://www.dibt.de>
- [5] “First ETAG, first ETA, First CE Marking,” EOTA News, Issue No. June 12, 1998, Brussels

This article is intended to provide information about the European Provisions for the Testing Assessment and Design of Anchors in Concrete and Masonry. It should not be construed as an endorsement or procedural recommendation by ICC-ES®.

