



European Harmonized Design for Membrane Structures

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Abstract

Numerous activities of the last years to harmonize and standardize design procedures for membrane structures made from structural textiles or foils lead to a new European standard expected to be published in 2022: CEN/TS 19102 “Design of tensioned membrane structures”. This document is a milestone on the path to a Eurocode for membrane structures. First time it provides unified design rules harmonized among many experts in the field across Europe. It covers coated and uncoated fabrics as well as foils, mechanically as well as pneumatically prestressed structures. Ultimate and serviceability limit state approaches are based on the concepts of EN 1990. The new standard gives the frame for materials and their requirements, static verification of materials and connections, and it defines required experimental tests. It is also planned to provide execution rules together with the design rules in order to ensure reliable and safe membrane structures. This contribution gives an overview of the new standard and shows the approaches by means of examples.

Keywords: Tension membrane structures, fabrics, foils, standards.

1 Introduction

Parallel to the currently ongoing amendment of the existing structural Eurocodes, a novel design standard is under development which aims to cover the design of membrane structures. It will be published as a CEN “Technical Specification” (TS), with the final goal in near future to be advanced to another standard in the row of the structural Eurocodes. The CEN/TS is under development in CEN/TC 250 Working Group 5 (WG5) and the Project Team WG5.T2, in close cooperation between many actors in the market like engineering offices, research institutes, laboratories, material producers, manufacturers, and building authorities. It is expected to be published in 2022 as draft version prCEN/TS 19102 “Design of tensioned membrane structures” [1]. With the release of the final CEN/TS 19102 after a commentary and consultation phase, the European

Committee for Standardization (CEN) will provide the first harmonized European standard covering the structural design of tensioned membranes structures, including technical textiles and foils. The standard aims to give guidelines for all technical textiles and foils, but focusing on PTFE-coated glass fibre fabrics, PVC-coated PET fabrics as well as ETFE-foils. prCEN/TS 19102 provides rules for the basis of design, materials, durability, connections, and execution of membrane structures. In the frame of this paper, an overview of the current final draft of prCEN/TS 19102 is given, presenting selected key aspects like basis of design and the design of structural textile membranes in the Ultimate and Serviceability Limit States (ULS and SLS).