Note on Engineering Details

No: DWR-MHS-extern-003

Title: Partial Safety Factor for Buckling of Tower Shells according to IEC 61400-1, 3rd Edition

Ref.: International Standard "Wind Turbines – Part 1: Design Requirements", IEC 61400-1, 3rd Edition 2005-08

Contact: Dr. Michael Hauschildt, E-Mail: michael.hauschild@gl-group.com, phone: +49 40 36149 7051

Key Words: Tower, steel, buckling, shell buckling, IEC, partial safety factor for materials

The standard IEC 61400-1, edition 3, demands in chapter 7.6.2.2 that for global buckling a partial safety factor for materials of no less than 1,2 has to be observed for curved, axially loaded shells such as tubular towers.

At a first glance this formally exceeds the relevant rules of the DIN 18800, Part 4 and the EC3 (Eurocode 3). Both standards demand a partial safety factor for materials of $\gamma_M = 1{,}1$ (only in special cases is this increased to 1,45).

Both types of standards, IEC and DIN/EC, have a very different genesis. What is denoted as "partial safety factor for materials" by the IEC is already included in the DIN/EC in the global buckling calculation model, although under a different designation. Thus, for GL both DIN 18800 and EC standards fulfil the demands of the IEC 61400-1, edition 3 for a general safety factor for materials of 1,2 for global buckling of curved shells without any further amendments.

Hamburg, 4th February, 2011

Mike Woebbeking Head of Certification Body	Dr. Michael Hauschildt Head of Department	Marcus Klose Head of Group
Andreas Anders Head of Department	Reinhard Schleesselmann Head of Department	Dr. Michael Hauschildt Author
Peter Bollmann Wind Energy Committee, Chairman	Mike Woebbeking Wind Energy Committee, Secretary	