



From aspheres to non-circular cylindrical optical surfaces – manufacturing and testing

**Berliner Glas KGaA
 Herbert Kubatz GmbH & Co.**

Rainer Schuhmann Email:rainer.schuhmann@berlinerglas.de

Non-spherical surfaces became more and more important in optical systems since manufacturing processes and metrology are available for generating highly sophisticated surface qualities. Years ago different descriptions of aspherical surfaces have been proposed and became part of the optical design process. The main forms of describing aspherical surfaces have been standardized as part of the ISO 10110 series as well as the analysis of measured form deviations within the ISO 14999 series. The application of these basics have been expanded to other forms of surfaces as cylindrical or toric surfaces. Especially non-circular cylindrical surfaces can play an important role in laser line systems or anamorphic systems as aspheres do in rotationally invariant systems. Surfaces with very low or no symmetry can then be described and designed as general surfaces, so-called free form surfaces, as considered by an additional part of the 10110 series. In the talk an overview about actual enhancements of the corresponding ISO standards will be discussed. Furthermore selected process items, technicalities and results of manufacturing and testing of aspherical and non-circular cylindrical surfaces will be presented.

SHORT BIO:

Dr. Rainer Schuhmann is currently Manager of Metrology and Software Department at Berliner Glas in Berlin. After receipt of Diploma and PhD (Dr.-Ing.) in Physics at the Technical University Berlin in the field of Technical Optics and Optical Design here worked with Schneider Kreuznach as Head of Optical Design Department, with LINOS, former Spindler & Hoyer, in Göttingen as Director R&D and Head of Quality Management and finally as Vice President and Head of Business Division Industrial Manufacturing, with Acritec in Hennigsdorf near Berlin as Managing Director in the sector of Ophthalmic Implants (intra-ocular lenses), and he joined Berliner Glas in 2006. Since 1985 he is member of the German Society of Applied Optics (Deutsche Gesellschaft für angewandte Optik (DGaO)), the German Branch of the European Optical Society, from 1998 – 2012 board member of DGaO, first as representative to the EOS Advisory Board, from 2004 – 2008 as President of DGaO, in 2001 he directed the 102nd Annual Meeting of the DGaO in Göttingen. Furthermore he is a longtime member of the European Optical Society (EOS) and of the Optical Society of America (OSA), here today as Senior member. Besides activities in various working groups for standardization at DIN (German Institute for Standardization) he was chairman of Subcommittee SC1 "Fundamental Standards" within Technical Committee TC 172 "Optics and Photonics" of the International Organization for Standardization (ISO) from 2009 – 2017.