Internal involute waviness scanning measurement standard (PTB, Germany)

PTB designed and manufactured an internal involute waviness scanning measurement standard (SAFT 2w). For transportation and mounting on different measurement systems a support has been developed. The device embodies an internal and an external involute profile both superposed with a certain waviness which enables to characterize the dynamic behavior of probing systems. The measurement standard is designed as a disc with two high accurate reference surfaces (a circle and a plane) to define the datum axis of the workpiece. A precise bore is used to define the x-axis.

Both the internal and external involute profiles have been calibrated as unmodified gear profiles according to existing standards and guidelines (e.g. ISO 1328-1), i.e. for both profiles the total deviation F_α, the form deviation $f_{f\alpha}$ and the slope deviation $f_{H\alpha}$ have been calibrated. Moreover, a spectral analysis has been performed using FFT method. The three main components of the spectrum have been calibrated in terms of wavelength and amplitude.

Geometry parameters	
Outer diameter	290 mm
Facewidth	20 mm
Involute parameters: • Radius of base circle • Range of involute function inv(α)	 20 mm Int. involute: 0° - 270°; ext. involute: 0° - 200°
Nominal wavelength/amplitude	8 mm/5 µm, 2.5 mm/3 µm, 0.8 mm/1 µm

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