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Highlights

- A clamping force measurement method via ultrasonics.
- A mathematical model for clamping force measurement.
- Larger ultrasonic wafer diameters induce better accuracy.
- Higher ultrasound frequency induce better accuracy.
- Ultrasonic sampling frequency is insensitive to accuracy.
- High accuracy, high stability, non-interfering, on-line, and non-destructive etc.

Abstract: The on-line measurement of clamping force is essential for injection molding equipment and process. A method for on-line measurement of clamping force using ultrasonic technology is proposed in this study. Based on the sono-elasticity theory, a new mathematical model is established to describe the relationship between ultrasonic propagation time and clamping force. A series of experiments are then performed to validate the proposed method. Findings show this method corresponds well with the magnetic enclosed type clamping force tester method, with difference squares less than 0.65 (MPa)^2 , and standard deviations less than 0.11 MPa . Ultrasonic parameters influence measurement results, with larger

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