Schlicker, Uwe:

Ultraschall-Rollnahtschweißen von
Glas/Metall-Verbunden unter besonderer
Berücksichtigung thermischer Eigenspannungen

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Abstract

Up to now, by ultrasonic bonding only spot welding of glass to metal could be realized. In this work the realization of seam weldings by ultrasonic roll seam welding is investigated. Starting point is the development of an appropriate apparatus. By optimizing the joining parameters amplitude, feed and welding force as well as further factors influencing the quality reproduction is ensured. The investigation focuses on the combination borosilicate glass to the iron based alloy NiCo2917. Bonding is achieved via an aluminium interlayer as for all other material combinations. The strength of the weld is determined by tensile shear tests and tightness is proved by a helium leakage test. During the welding process an infrared pyrometer enables the measurement of the temperature distribution which is used as a basis for the calculation of thermal residual stresses by finite elements method. Thus, treatments to reduce the residual stresses are simulated and the received results are confirmed experimentally. The present work represents an extensive knowledge base for potential users and thus enables the industrial application of this new joining technique.

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