Bonding a stainless steel sheet to a soundproofing mat

Objective
To rapidly bond a sound proofing mat to a stainless steel sheet for use in dishwashers. The client was unhappy with the quality from oven heating, and was instead looking to implement induction within a production line.

Material
- Stainless steel sheet (4” x 6” x 0.018” / 102 mm x 152 mm x 0.5 mm)
- Sound proofing mat with adhesive (4” x 6” x 0.18” / 102 mm x 152 mm x 4.5 mm)

Temperature 300 ºF (149 ºC)

Frequency 173 kHz

Equipment
- Ambrell EASYHEAT LI 3542, 4.0 kW, 150-400 kHz induction heating system equipped with a remote heat station containing two 0.5 μF capacitors.
- A single position, eight-turn helical induction heating coil designed and developed specifically for this application.

Process
The part was assembled with the mat in contact with the stainless steel sheet. The part was set on non-conductive material, and placed inside the coil. The power supply was turned on, the part was heated, and the power supply was turned off – the process took three seconds. The part was then air cooled and the bonding application was completed.

Results/Benefits
- Precision and efficiency: Induction heating only heats the part, which saves energy, while not melting the sound proofing mat since the mat is not conductive
- Higher production rate: With bonding only taking three seconds and the mat applied during heating, it accelerates the production rate when compared to an oven
The stainless steel plate and sound proofing mat sitting on a non-conductive material inside the coil