MONTANSTAHL
SPECIAL PROFILES IN STEEL

Mech. Engineering & Machinery

Precision Steel Amplificators for Ultrasonic Haptic Feedback

Profile: *T-Booster*
Material grade: *Carbon Steel 34CrMo4*
Execution: *Cold Worked*
Destination: *France*

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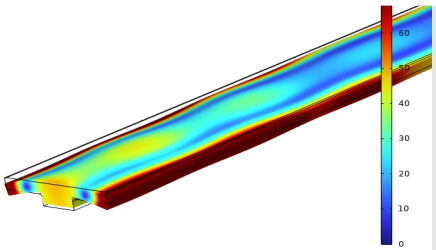
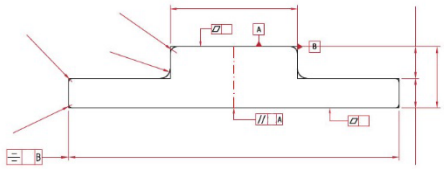
Background



The ultrasonic haptic systems of Vibra Nova rely on specially designed amplificators to boost vibration amplitude and deliver crisp, realistic tactile feedback.
These components work by controlled bending deformation, as illustrated in the accompanying image, to efficiently transfer ultrasonic energy and generate perceivable vibrations on the surface.
Operating at high frequencies (50–120 kHz), the deformation must be precisely controlled to ensure the desired haptic sensation.
The accuracy of each part directly impacts the quality of the tactile response, making dimensional stability and material consistency fundamental for this type of application

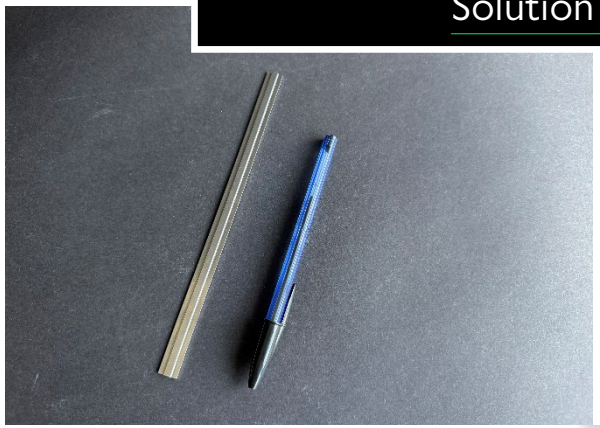
Challenge



The project required meeting extremely tight dimensional tolerances due to the high operating frequencies:

- Even minor dimensional variations could shift the resonance frequency outside the acceptable range.
- The main width of the amplificator had to remain within ±0.2% of its nominal value to ensure consistent performance.
- Small radii, as tight as 0.1 mm with tolerances down to ±0.05 mm, were critical, directly influencing stress distribution and resonance behavior.

Solution



Thanks to Montanstahl's expertise in manufacturing high-precision components, each amplificator was produced in full compliance with the strict dimensional and tolerance specifications.
Using cold working, with parts cut to size with a length tolerance of ±0.2 mm, we achieved flatness deviations under 0.05 mm, ensuring predictable resonance and stable acoustic output.
This precision guarantees repeatable bending performance, enabling Vibra Nova to deliver high-quality and dependable ultrasonic haptic feedback even in the most demanding applications.

Learn more...