Measurement report: g-fit Gear T300 technical inspection

Vibration measurement in a gym environment
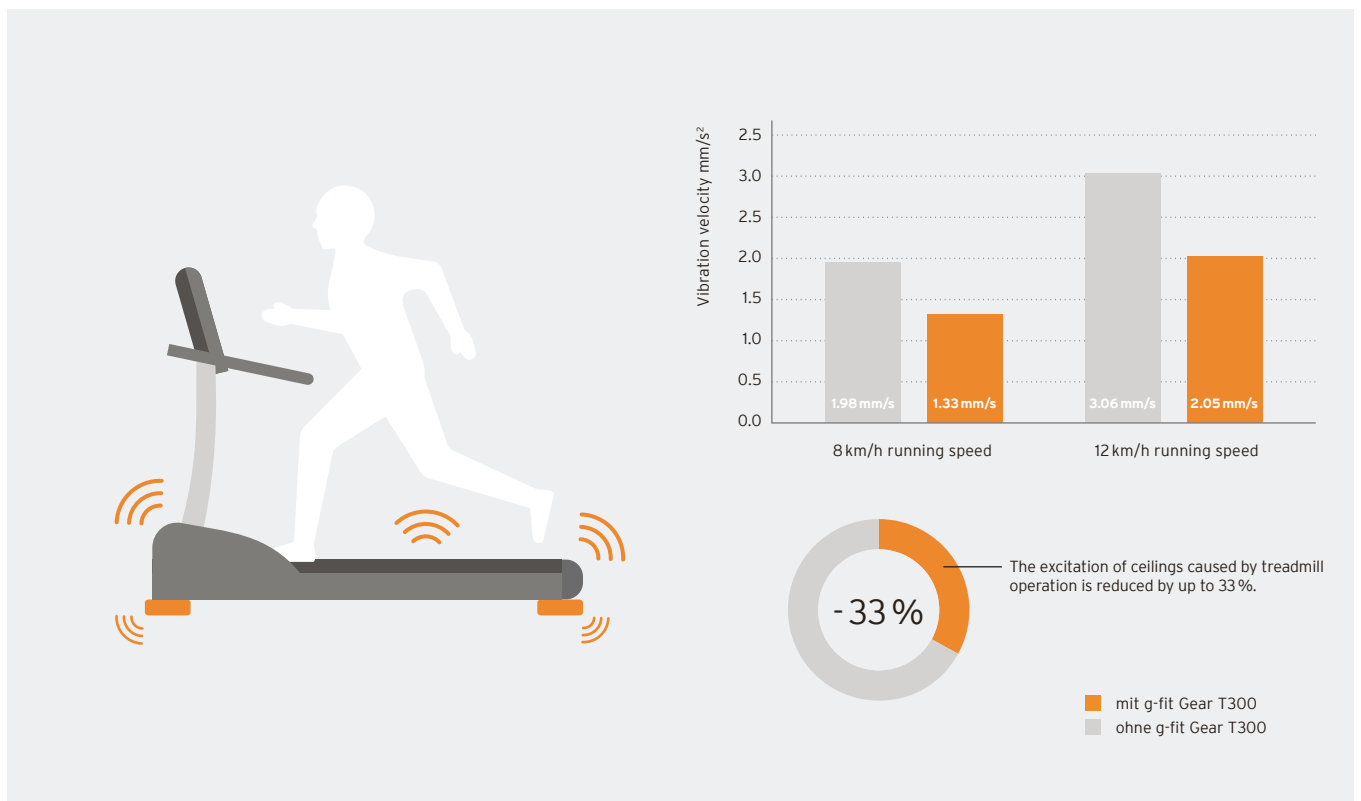
Introduction

We have technically inspected the g-fit Gear T300 elastomer bearings for treadmills, in collaboration with one of our customers, to demonstrate their effectiveness. Treadmills generate vibrations caused by harmonic excitation when running and the rotation of the integrated motor that drives the treadmill belt. Initial research shows that treadmills have a main excitation frequency of 18 Hz. In our case here, the main excitation frequency of the treadmill corresponds to the natural frequency of the ceiling. Thus, the generated vibrations are amplified by the resonance, causing significant noise for gym users as well as neighbours.

The graphics below illustrate measurements taken during normal gym operation and at different running speeds for treadmills with and without the bearings, respectively.
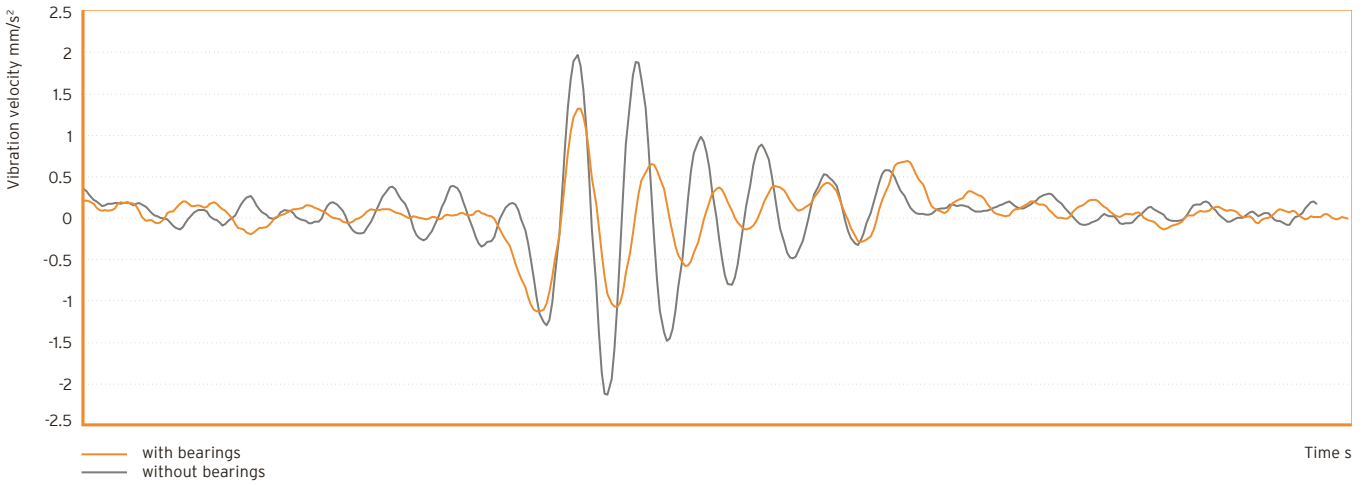
Source: Basler & Hofmann, g-fit Gear T300 technical inspection, 2019

### Fewer vibrations thanks to elastic bearings for treadmills

Vibration velocity mm/s²

	8 km/h running speed	12 km/h running speed
ohne g-fit Gear T300	1.98 mm/s	3.06 mm/s
mit g-fit Gear T300	1.33 mm/s	2.05 mm/s

-33 %

The excitation of ceilings caused by treadmill operation is reduced by up to 33 %.

■ mit g-fit Gear T300
■ ohne g-fit Gear T300

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Time signal

Comparison of amplitudes with and without the bearings

with bearings
without bearings

Acoustic effectiveness based on third octave spectrum

Insertion loss for running speeds of 8 km/h and 12 km/h for MP treadmill

Level difference with/without, v = 8 km/h
Level difference with/without, v = 12 km/h
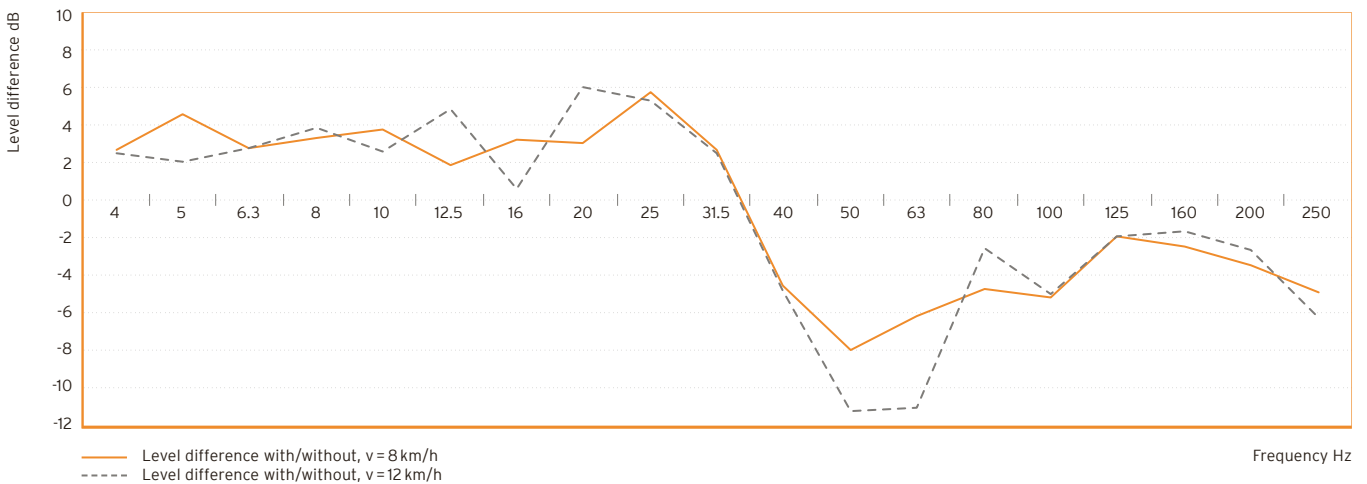
Summary

Through the use of high-damping elastic treadmill bearings, the acting vibrations can be reduced by up to 33 %. The vibration-isolating effect of the elastic PU materials Getzner uses for its g-fit Gear T300 bearing reduces noise levels by up to 8 dB (for running speeds of 8 km/h) and 11 dB (for running speeds of 12 km/h) – effectively reducing them by half.

Further information can be found in VDI Guideline 2062 (Association of German Engineers) as well as in glossary. Further characteristic values on request.

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