



Gear Noise



Website: www.wenlio.com
Email: support@wenlio.com



WENLIO GEAR
Bevel Gear Manufacturing

1. Causes of Gear Noise (Related Factors)

① Geometry / Accuracy

- Poor tooth contact pattern (tooth bearing)
- Large tooth profile error
- Large pitch error
- Center distance becomes smaller

② Surface / Process

- Insufficient tooth flank finishing
- Heat-treatment distortion

③ Operating / System Effects

- Excessive rotational speed
- Gearbox resonance amplifies noise and vibration
- Torque pulsation transmitted through the shaft

④ Bearings / Support

- Impact or vibration from ball or roller bearings
- Shaft deflection / stiffness issues (misalignment risk)

2. How to Manufacture Quiet-Running Gears

- ① Gear geometry & accuracy
 - Produce correct pitch and minimize pitch error.
 - Use proper cutting conditions and rigid fixturing/arbor support to achieve accurate tooth geometry.
 - Apply tooth crowning (barrel-shaped lead modification) to improve contact and reduce noise.
- ② Tooth modification to avoid impact
 - Based on the lead/profile error characteristics, modify the driven gear addendum (tooth crown/tip area) so it does not contact the driving gear root at the initial engagement, preventing impact noise.
 - Increase the number of teeth in mesh (increase contact ratio) to reduce excitation.

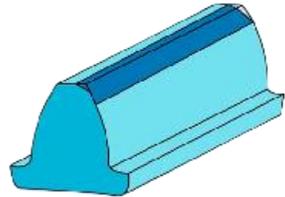
③ Housing / system vibration control

- Machine gearbox bores/features correctly to avoid unnecessary vibration; adopt vibration-damping design where possible.
- Design the gearbox housing with a box-like/rectangular form to improve stiffness.
- Use shock-absorbing bearings to attenuate impact loads.

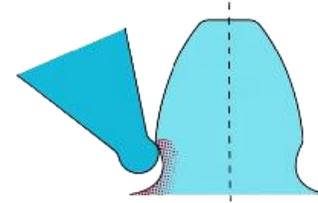
④ Deburring & assembly

- Deburr and chamfer sharp edges and burrs around the part.
- During assembly, confirm there is no one-sided tooth contact pattern (single-flank bearing); correct alignment if needed.

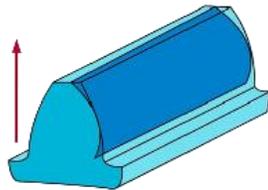
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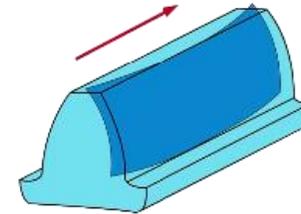
**Tooth tip
trimming**



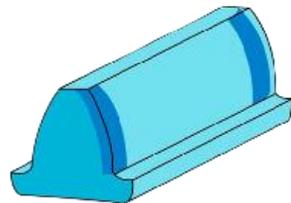
**Tooth root
trimming**



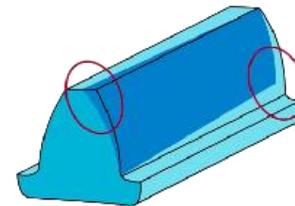
**Toothed
drum**



**Tooth-
shaped**



**Tooth tip
trimming**



**Tooth
twist**

THANK YOU

Wenlio Gear specializes in precision bevel gears manufacturing for high-performance power transmission.

Our gear guides help engineers and sourcing professionals better understand gear design, selection, and applications.

Wenlio Gear – Your Reliable Partner for Precision Bevel Gears

- 👉 Technical Support
- 👉 Custom Manufacturing
- 👉 Fast Quotation

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