ISO/AGMA Standards — Specific Sliding Defined

THE QUESTION

Does the definition of specific sliding mean the same between ISO 21771:2007 and AGMA 917-B97? In ISO, specific sliding is the ratio of the sliding speed to the speed of a transverse profile in the direction of the tangent to the profile. In AGMA, specific sliding is ratio of gear tooth sliding velocity to its rolling velocity.

Expert response provided by Bob Errichello: AGMA 917-B97 Ref. 1) defines specific sliding as the ratio of gear tooth sliding velocity to rolling velocity, but it does not offer equations for calculating specific sliding. It recommends using profile shift to balance the specific sliding at each end of the path of contact to minimize wear of gear teeth, and cites Khiralla (Ref. 2) for calculation methods.

ISO 21771:2007 (Ref. 3) Eq. (114) and Eq. (115) define specific sliding, which agrees with the AGMA 917-B97 definition (note that in the ISO definition "speed of a transverse profile" is equivalent to "rolling velocity" in AGMA 917-B97). Furthermore, the ISO Eq (114) and Eq (115) are equivalent to Khiralla's Eq (2-76) and Eq (2-77).

For more information on profile shift and specific sliding, see AGMA 901-A92 (Ref. 4), Annex A. It explains typical reasons for profile shift including:

- Avoiding undercut
- Balancing specific sliding
- Balancing flash temperature
- Balancing bending fatigue life
- Avoiding narrow top lands

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References

1. AGMA 917-B97. *Design Manual for Parallel Shaft Fine-Pitch Gearing*, AGMA 1997.
2. Khiralla, T.W. *On the Geometry of External Involute Spur Gears*, Copyright 1976 by Tofa William Khiralla, printed by C/I Leaming, North Hollywood, California.
3. ISO 21771:2007(E). "Gears — Cylindrical Involute Gears and Gear Pairs — Concepts and Geometry," ISO 2007.
4. AGMA 901-A92. "A Rational Procedure for the Preliminary Design of Minimum-Volume Gears," AGMA 1992.

In a career spanning more than 40 years, **Robert Errichello** has earned a reputation for being the go-to person for instruction on gear failure analysis. Bob heads his own gear consulting firm, GEARTECH, and is founder of GEARTECH Software, Inc. He is a registered Professional Engineer who holds BS and MS degrees in Mechanical Engineering and a Master of Engineering degree in structural dynamics from the University of California at Berkeley. He is author of more than 60 articles on design, analysis, and application of gears, and has written three widely-used computer programs for the design and analysis of gears. He is a recipient of AGMA's Lifetime Achievement Award in addition to other awards from AGMA, AWEA, and STLE. Students come from all over the world to attend his course, and AGMA is proud to be able to extend this learning experience to you. Last, but certainly not least, Bob is also a longtime Gear Technology magazine Technical Editor.