



Changes ahead in the roughness standards

Just when you thought it was safe to calculate a tooth flank surface roughness measurement, think again.

I have written numerous articles on tooth flank surface roughness measurement. This is such a page-turner of a subject! Actually, I was thinking I was done with this topic. After all, I occasionally get a comment that “such and such” gear shop now has a profilometer. In addition, several AGMA or ISO gear standards now have sections on tooth flank roughness measurement. Mission accomplished.

What more could I possibly write about on flank roughness and its measurement, right?

Time for a mea culpa. I have sort of misguided you. My quest to get repeatable and reproducible tooth flank roughness measure was based on four key ISO standards:

- ISO 4287: the definitions of the roughness parameters R_a , R_q etc.
- ISO 4288: the process of roughness measurement, the filter, cut-off length, etc.
- ISO 3274: the requirements of a contact stylus profilometer.
- ISO 1302: the roughness diagram, the checkmark.

Unfortunately, I recently found out these and several related ISO Standards are about to be withdrawn and replaced with different standards. So, time for one last article on surface roughness.

THE ISO STANDARDS

The four ISO standards listed above are part of a family of GPS (Geometrical Product Specifications) standards related to two-dimensional (2D) surface texture analysis. There are many more 2D GPS standards, such as ISO 16610-21 (the Gaussian profile filter) or ISO 12179 (calibration of a contact stylus profilometer). Most of these standards were published in the late 1990s and have been regularly reaffirmed but without significant updating.

Between 2012 — 2016, a new GPS family of standards was published — the ISO 25178 family. These establish a new universal basis for surface texture analysis by first defining areal (3D) surface texture. Concurrently, ISO TC213, WG16 (TC = Technical Committee, WG = Working Group) began a project to update the family of 2D GPS profilometry standards.

In the fall of 2012, WG16 started revising the 2D standards to align them with the planned structure of the new ISO 25178, 3D surface texture family. In August 2016, the project was officially registered under the reference code ISO 21920.

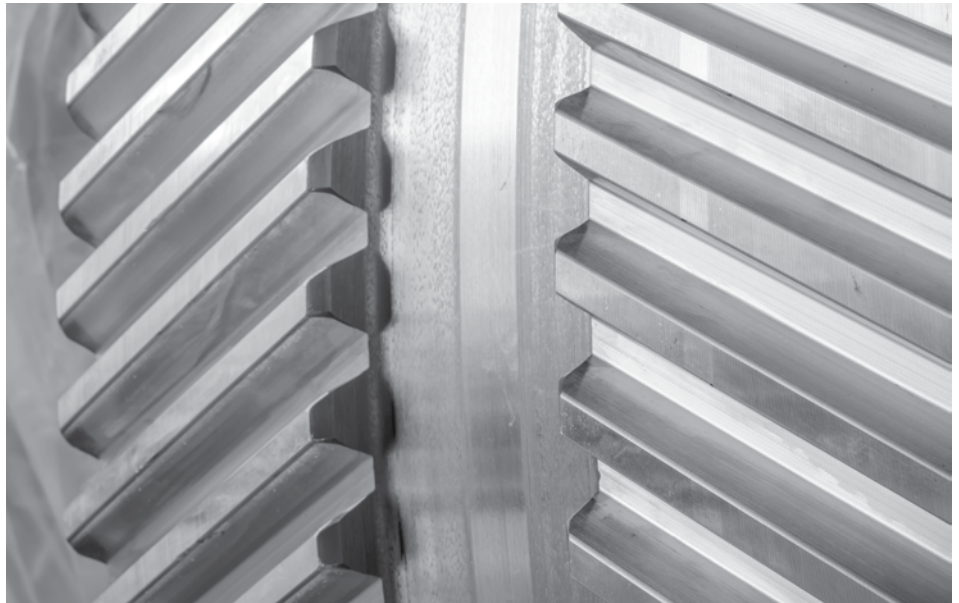
To date, three new ISO 21920 standards have been drafted and

pre-classified as ISO/DIS (Draft Standard). These three new GPS standards will consolidate the majority of the previous 2D surface texture standards. They are currently undergoing the twelve-week balloting process that began on February 19, 2020, and will end on May 13, 2020. Once the balloting process for these three draft standards is complete, and assuming they are accepted, it will take an additional eight weeks to publish the official ISO standards. By my mathematics, the new 2D surface texture standards will become official around July 8, 2020.

THE NEW STANDARDS

The new 2D surface texture standards are:

- ISO/DIS 21920-1: Geometrical product specifications (GPS) – Surface texture: Profile – Part 1: Indication of surface texture.
- ISO/DIS 21920-2: Geometrical product specifications (GPS) – Surface texture: Profile – Part 2: Terms, definitions, and surface texture parameters.



Gear designers and manufacturers will need to review and update their tooth flank roughness specifications based on the new ISO 21920 GPS family of standards. (Shutterstock)

- ISO/DIS 21920-3: Geometrical product specifications (GPS) – Surface texture: Profile – Part 3: Specification operators.

Part 1 will incorporate all of ISO 1302 and some additions from other ISO GPS standards such as ISO 1101.

Part 2 will incorporate all the existing profile parameters (i.e. ISO 4287, 4288, ISO 12085, and ISO 13565). It will also include some new parameters, such as P_{vv} (void volume of the valleys on the primary profile) which is adapted from ISO 25178's S_{vv} parameter. Note: This might become an interesting parameter for tooth flanks since it is a measure of retained lubricant volume on a surface. Finally, Part 3 will specify additional default values and units of the parameters