

# Diametral Pitch Calculation

## THE QUESTION

Circular pitch gives me the size of the teeth in my mind, but diametral pitch does not. What is the purpose of the diametral pitch concept? Does it merely avoid pi in calculation?

### Expert response provided by Dr. Alexander Kapelevich:

Unlike the circular pitch, diametral pitch (DP) is not a dimension. Historically it is defined as the number of teeth given per inch of a gear's pitch diameter, and its unit is 1/in.

However, DP is used for gear dimensions calculation.

For example: the circular pitch is  $\pi/DP$ ; the standard tooth addendum is  $1/DP$ ; the standard tooth whole depth is  $2.2/DP$  (or  $2.25/DP$ ); and the gear pitch diameter is  $n/DP$  (where  $n$  is a number of teeth). An important difference between the circular pitch

and diametral pitch is that whole DP values are standardized (for example,  $DP=4, 6, 8, 10, 12, 16, 20, 24$ , etc.) and used for the standard gear design. Standard cutting and measuring tooling (hobs, shaper cutters, gages, etc.) are off-the-shelf available.

While it is true that the circular pitch could be used for nonstandard gear data definition, it hardly makes sense. Such gear data could be confusing for a gear manufacturer and fabrication of such gears will require nonstandard tooling. As well, this approach does not provide any additional benefits for gear drive performance.

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**Alex Kapelevich** has a Master Degree in Mechanical Engineering at Moscow Aviation Institute and a PhD in Mechanical Engineering at Moscow State Technical University, Moscow. He operates the consulting firm AKGears, LLC, a developer of trademarked Direct Gear Design methodology and software. He has 30 years of experience in custom gear drive development. His areas of expertise are gear transmission architecture, planetary systems, gear tooth profile optimization, gears with asymmetric teeth, and gear drive performance maximization. Alex is author of the book titled Direct Gear Design and many technical articles.

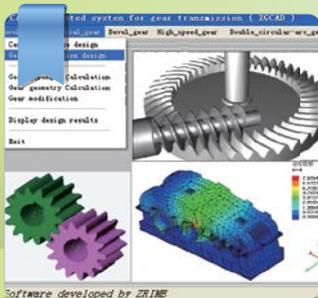


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ZHENGZHOU RESEARCH INSTITUTE OF MECHANICAL ENGINEERING

NO. 81 Songshan South Road, Zhengzhou, Henan 450052, China | Tel: 86 371-67710564 | Fax: 86 371-67710565 | Web: [www.zrime.com.cn](http://www.zrime.com.cn) | Email: [cheny@zrime.com.cn](mailto:cheny@zrime.com.cn)